Applying Human Dimensions Theory Into Practice: A Story of The 556th National Wildlife Refuge

5399

Paper

The recent establishment of the Everglades Headwaters National Wildlife Refuge and Conservation Area demonstrates how human dimensions, climate change, and ecological resilience strongly influenced the biological planning process. The U.S. Fish & Wildlife Service engaged a disparate group of stakeholders, partners, and technical experts to inform the refuge's conservation design. Human dimensions tools were used to understand the cultural ecosystem services that informed the outdoor recreational compatibility determinations. Partnership engagement was integral in developing the resource management plan. Stakeholder engagement was critical because two-thirds of the refuge will be conservation easements, providing wildlife benefits on lands that will continue to be owned and managed by willing landowners for agricultural production. The final planning document was informed by the biological and social drivers of Central Florida. In the end, the Everglades Headwaters will serve as a wildlife and ecological greenway between existing conservation lands from central Florida to Everglades National Park.

Value proposition: **The Everglades Headwaters NWR is a fusion of theoretical and applied human dimensions in the context of establishing a federal protected place.**

Keywords: **Human Dimensions, NWR**

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Predicting effects of climate change: Ecosystem drivers in the tropical subalpine shrubland

5435

Paper

Changes in Hawaiian high elevation plant communities are expected as climate change shifts the trade wind inversion belt downslope resulting in drier conditions. Simultaneously, non-native plant invasions are predicted to increase upslope with rising temperatures. To manage for native plant assemblages within these novel communities, we need to understand how current plant communities respond to environmental (precipitation, elevation, substrate age, type) and anthropogenic (disturbance) gradients. In 2011/2012 the NPS Inventory & Monitoring Program established 60 vegetation plots (1000m2) in the subalpine shrublands of Hawai‘i Volcanoes (HAVO) and Haleakalā (HALE) National Parks. Preliminary results indicate high variance in species richness, abundance, and shrub density. Elevation and anthropogenic influences (e.g., presence of feral ungulates) were important in explaining species composition. Non-native species were more abundant at lower elevations, whereas rare plants were correlated to ungulate exclusion. Quantifying patterns in these unique tropical communities is critical for predicting future effects of climate change.

Value proposition: How to use baseline Inventory & Monitoring vegetation data to help inform resource management.

Keywords: subalpine, shrublands, Hawaii

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Monitoring Ecological Changes Following Historic Waterfront Rehabilitation and Wetland Restoration at Saugus Iron Works NHS

5079

Paper

In 2008, Saugus Iron Works NHS (MA) completed a combined historic and ecological restoration. The project rehabilitated the culturally significant waterfront, recreated open-water in the historic turning basin, and restored tidal mudflat and brackish wetlands along the Saugus River. The design included a comprehensive planning and environmental compliance strategy, and intensive pre- and post-restoration monitoring. Wetland vegetation, fish community, water quality, tidal regime, benthic invertebrates, and wildlife use will be monitored until 2018. The restored wetland is a low marsh-mud flat dominated by dwarf spikerush and frequented by foraging shorebirds. Fish transitioned from a freshwater to estuarine/brackish community dominated by killifish. Inundation by tidal estuarine water increased and water and sediment quality of the river improved. The restoration successfully removed invasive vegetation from the wetland and provided habitat for native wetland plants and shorebirds. The restoration and monitoring serve as a model for integrated historic and natural resource preservation.

Value proposition: **Project serves as a model for integrated historic and natural resource preservation. Outlines comprehensive planning and environmental compliance strategy involving multiple stakeholders.**

Keywords: **Restoration, historical, wetland**

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The Roles of Tourism in the Degradation of Ashgaygah Sand Dunes Area in Alqassim, Kingdom of Saudi Arabia

6669

Poster

Protecting the natural environment from degradation especially in areas with sensitive ecological systems characterized by rare and low rain falls has been the focus of many countries around the world. Such areas in Saudi Arabia cannot tolerate negative human activities for a long. Growing tourism activities and urbanization are noticeable in Ashgaygah which, effects on the natural environment in different ways such as decreasing the vegetation cover and degrading the soil. Ashgaygah sand dunes area has seasonal tourism festivals twice a year and associated activities with these festivals were usually uncontrolled as observed during several seasons. The aim of this study is to provide a clear picture of the current condition of natural environment at Ashgayagh and develop a model to conserve and rehabilitate the area taking into account the continuation of sustainable tourism. Also, producing high accuracy digital maps and digital database in GIS software to solve environmental problems.

Value proposition: **The multi methodology applied to identify the size of degradation in dray areas, and the reasons of this degradation especially human activities employing GIS technique.**

Keywords: **environmental management, degradation**

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Launch of the National Park Service Healthy Parks Healthy People Science Agenda Panel Discussion

5092

Panel Discussion

The "Launch of the Healthy Parks Healthy People Science Agenda" panel discussion will provide an overview of the National Park Service's Healthy Parks Healthy People Science Plan and engage an interdisciplinary panel of experts and audience members to explore the current and potential role of parks in promoting public health. Participants will discuss the Healthy Parks Healthy People Science Plan, emerging topics for research, new and tested methods for data collection and monitoring and citizen science. Questions to be explored will include: What key issues or trends that should be addressed as part of the Healthy Parks Healthy People research agenda? Should the National Park Service target certain population groups in order to diversify park visitation and encourage utilization of park resources for associated health benefits? What are the best available tools and technologies assessing and monitoring park use for health benefits? In implementing the Science plan?

Value proposition: **Learn about the new Healthy Parks Healthy People research agenda to inform park policies, programs, and management of natural and built environments to promote health.**

Keywords: **Health, Science, Research**

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Hoihi and Respect: Honoring the Spirit of Kaloko-Honokohau

5532

Paper

Archaeology is entwined in a complex web of relationships influenced by historical, political, social, and economic factors. Archaeologists must also account for cultural diversity, which presents its own set of challenges. This is the case for cultural heritage managers at Kaloko-Honokōhau National Historical Park in Hawai‘i. While the National Park works with many cultural groups, its primary responsibility is to native Hawaiian descendants. To address these challenges, Kaloko-Honokōhau National Historical Park is working to integrate National Park Service institutional policies with native Hawaiian models of management. To facilitate current efforts, I work with Kaloko-Honokōhau National Historical Park, to create an avenue towards alternative management strategies for cultural resources. The first step of this collaborative project, involves an analysis of government documents and policies, to understand what was envisioned in the park's founding document, The Spirit of Kaloko-Honokōhau, and steps that can bring the Spirit of Kaloko-Honokōhau to life.

Value proposition: **Understand the importance of culture and history in Hawai'i to engage and promote sustainable partnerships with communities in Hawai'i.**

Keywords: **Indigenous, Oceania, Archaeology**

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Park Partnerships for Sustainable Transportation: Assessing the Full Circle Trolley Pilot Program

5262

Paper

With the clang of a bell and wave of the driver, an innovative alternative transportation service began in Woodstock, Vermont in summer 2010. Funded through the Department of Transportation – and implemented through a partnership between Marsh Billings Rockefeller National Historical Park and local agencies and organizations – the Full Circle Trolley Pilot Program set forth several goals for the free electric shuttle: reduce congestion and parking problems; educate riders about renewable/sustainable energy; protect natural and cultural resources; contribute to economic vitality; and serve as an exemplar of partners working together. In 2012, partner interviews and rider surveys were conducted to assess the program's success in meeting its goals and to consider opportunities and barriers to a permanent shuttle service in the region. Findings from the study help to inform planning, service, and management of the Full Circle Trolley and have implications for related alternative transportation partnerships.

Value proposition: **Audience members will learn about an innovative alternative transportation partnership that may have applicability in a variety of parks and protected areas and neighboring communities.**

Keywords: **alternative/sustainable transportation, partnerships**

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Prevention of Aquatic Invasive Species at Glen Canyon National Recreation Area

5361

Paper

Predicted to be the first body of water in the west infested with invasive zebra and quagga mussels, Lake Powell, in Glen Canyon National Recreation Area, remains mussel free through extensive and ever evolving park efforts. With the infestation of Lake Mead and other western waters, the number of threatening vessels and equipment seeking to launch on the lake each year has increased from less than 50 to over 15,000 in five years. All elements of park operation play important roles in the coordinated and successful defense system. Glen Canyon's program is a model for the West and the world and has made a difference that can be demonstrated with over 30 mussel infested vessels stopped from launching during the summer of 2012. Glen Canyon's Wahweap Laboratory extensively monitors Lake Powell for mussels with an effort that is not matched in any body of water world-wide.

Value proposition: **Will learn about aquatic invasive species prevention and innovative approaches to enforcement, monitoring, and interdiction and the NPS Quagga/Zebra Mussel Prevention and Response Guide (2007).**

Keywords: **zebra, quagga, AIS**

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NPS Academy for Cultural Resources: Charting a New Course for Training within the NPS

5325

Panel Discussion

The NPS Career Academy for Cultural Resources (the Academy) is a burgeoning professional development website that has the opportunity to be an incredibly powerful tool for cultural resource professionals. In a time when tightening budgets make on-site training difficult, the Academy will offer access to myriad training resources and opportunities while also connecting a geographically and disciplinarily isolated workforce. To achieve a robust learning environment, three pillars of the Academy are under development: Training, the Clearinghouse, and the Cultural Resource Commons. These three aspects are heavily intertwined, allowing users to: engage in new, both classroom and online learning opportunities; find a growing library of learning resources to support their learning experience; and openly engage with the larger cultural resource community through a social networking site. Please join us to more deeply explore the Academy's three elements, offer your comments on the website, and your suggestions for improvement.

Value proposition: **Learn about new training website available to those caring for cultural resources; Offer suggestions to improve website**

Keywords: **Training, Cultural Resources**

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Brown Bear-Human Conflict Management At Brooks River, Katmai National Park

5407

Poster

Bear management report forms collected at Brooks Camp, Katmai National Park (KNP), were placed in 9 event categories. Using non-parametrical statistics identified dominance interactions, fish-related dominance interactions, food obtained, food-related incidents, fish stolen, property damage, and use of deterrents either decreasing or exhibiting no significant trends over time. Aggressive behavior by bears towards park staff in bear management situations increased. An elevated walkway and platform at Brooks Falls and an electric fence at the campground marked significant decrease in bear-human interactions. Changes in fishing regulations in 1998 marked significant decreases in fish stolen. Changes in minimum distance regulations in 2003 marked no change. Efforts to facilitate visitor traffic in areas around the floating bridge have marked significant increases in number of bear-human interactions. Management efforts have been successful in minimizing bear-human interactions at Brooks Camp. Habituation of bears to human activity has likely contributed to both minimizing general interactions.

Value proposition: **This poster represents successful bear/human management techniques that could be used in other locations.**

Keywords: **bear-human interaction**

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Brown Bear–Human Conflict Management at Brooks River, Katmai National Park and Preserve

5414

Paper

Bear management report forms collected at Brooks Camp, Katmai National Park (KNP), were placed in 9 event categories. Using non-parametrical statistics identified dominance interactions, fish-related dominance interactions, food obtained, food-related incidents, fish stolen, property damage, and use of deterrents either decreasing or exhibiting no significant trends over time. Aggressive behavior by bears towards park staff in bear management situations increased. An elevated walkway and platform at Brooks Falls and an electric fence at the campground marked significant decrease in bear-human interactions. Changes in fishing regulations in 1998 marked significant decreases in fish stolen. Changes in minimum distance regulations in 2003 marked no change. Efforts to facilitate visitor traffic in areas around the floating bridge have marked significant increases in number of bear-human interactions. Management efforts have been successful in minimizing bear-human interactions at Brooks Camp. Habituation of bears to human activity has likely contributed to both minimizing general interactions.

Value proposition: **This paper describes bear management practices that reduce bear/human interactions that can be incorporated at other parks.**

Keywords: **bear/human interaction**

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An Adaptation Portfolio Approach to Managing Climate Risk

5640

Paper

Climate change promises to erode ecosystems and undermine more than a century of conservation gains. To "buy time" for diverse, future ecosystems to develop, our priority should be to maintain those elements that take a long time to develop, including soils and the genetic diversity in populations. Unfortunately, uncertainty about the future of ecosystems under climate change dictates that it is unknowable which strategy will work "best," and a "portfolio" of approaches must be tried to spread the risk of loss. We argue that protected area adaptation is best served by allocating wildlands to three zones: 1) a Restoration Zone where whole ecosystems are actively maintained and change is resisted, 2) an Observation Zone where change is accepted, and 3) an Innovation Zone where change is guided into conditions unlike the past but with a better chance of sustaining highly valued ecosystem elements and processes in the long term.

Value proposition: **Attendees will hear about an approach to land allocation that spreads the risk of climate change and establishes wilderness as part of the solution.**

Keywords: **climate change adaptation**

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Creating a New Global Relationship/Partnership between Iconic National Parks in Chile and California

5556

Paper

Redwood National and State Parks (RNSP) are working with the Corporacion Nacional Forestal de Chile (CONAF) to develop a Sister Park relationship between RNSP and Parque Nacional Alerce Costero (PNAC). This relationship evolved from the realization that the parks conserve iconic forest resources in temperate rainforests at similar latitudes north and south of the equator, and has high species biodiversity of global importance for conservation. Some of the mutual interests and similarities that make for a compelling partnership are the preservation and protection of iconic tree resources, the coast redwood and alerce forests, temperate rainforest ecosystems, similar histories of resource exploitation and the need for restoration, planning for sustainable community development, science and research partnerships with area universities and NGOs, and coordinated research in temperate rain forest environments. Through these cooperative relationships, our shared desire to protect and restore areas of global significance can be highlighted to our park visitors.

Value proposition: **The audience will hear about RNSPs effort to create a sisterpark relationship with Alerce Costero NP in Chile and the mutual benefit this relationship creates.**

Keywords: **Sisterpark Relationship**

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Stalking and managing a killer plant pathogen in Redwood National and State Parks

5558

Paper

Sudden Oak Death (SOD) is a non-native plant disease striking forests of many coastal California counties. The disease is caused by the microscopic pathogen Phytophthora ramorum, which causes lethal cankers on native trees species in California, particularly in tanoak (Notholithocarpus densiflorus). First noticed in 1995 in Marin County, SOD disease has now spread to fourteen coastal California counties, and Curry County in Oregon. While California has not been able to control the spread of this disease, Oregon has had more success using a strategy that removes all diseased and healthy tanoak trees within 300 feet of an infection zone. The disease is currently found within 3 miles of the southern mixed evergreen forests of Redwood National Park, heavily populated with tanoak. A brief history of the disease, efforts to contain disease in California and Oregon, and possible management strategies for the control of this disease in RNP will be presented.

Value proposition: **The audience will hear the history of failed forest disease management in California, and current strategies to address this tree killer in RNSP.**

Keywords: **Sudden Oak Death**

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Does nature subsidize costs for ecotourism providers? Externality cost analysis for best business practices.

5301

Paper

Santa Rosa a municipality in Bolivia that has received ecotourists since the late 1990s. With no ecotourism training most operations developed in a haphazard manner. In 2007 Santa Rosa passed a bill to create a 600,000 hectares Municipal Protected Area called the Yacuma River Protected Area (PRY). Progress in the protected area management has been slow; one of the main problems is a price reduction business competition strategy to attract tourists, which creates a cost externality. Based on the business plans of eight ecotourism operators in the PRY, this research created a generalized business plan for ecotourism operators to foster best practices in sustainable ecotourism operations. The generalized business plan includes actual costs, internalizing costs of operations, needed inversions to improve practices, estimated new costs of operations and a determination of externalized costs. The plan encourages ecotourism operators to upscale costs in order to increase revenue and become more sustainable.

Value proposition: **Audience will learn best practices for ecotourism business planning and cost analysis, a key to sustainable ecotourism operations**

Keywords: **Ecotourism, cost analysis**

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Wild and Scenic River Frontcountry Planning and Management Challenges

5113

Panel Discussion

We are directed to address user capacity under the Wild and Scenic Rivers Act. Presentations would:
• Highlight recent policy recommendations on addressing user capacity on wild and scenic rivers developed through coordination with Interagency Visitor Use Management Council (IVUMC) and IWSRCC. Discuss related tools under development by the IVUMC (e.g., numerical capacity and indicators and standards guidebooks) that would complement guidance developed by IWSRCC.
• Provide a summary of Interagency Wild and Scenic Rivers Coordinating Council (IWSRCC) guidance paper, "Addressing User Capacity on Wild and Scenic Rivers" highlighting statutory and legal basis to address capacity in Comprehensive River Management Plans (CRMP) and the protection and decision framework for the National Wild and Scenic Rivers System.
• Address implications of Merced Court Case and visitor capacity, by describing how YOSE addressed the Court concerns in its latest CRMPs.
• Describe the approach used for Virgin CRMP at Zion National Park

Value proposition: **Attendees will gain a basic understanding of current guidance regarding Visitor Use Management for Wild and Scenic River planning in frontcountry areas.**

Keywords: **WSR, user capacity**

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Ericka Pilcher, Project Specialist, NPS, Denver, CO

Wild and Scenic River Planning 101

5152

Panel Discussion

Rivers are protected under the Wild and Scenic Rivers Act to conserve certain values: the river's outstanding resources, water quality, and free-flowing character. To enhance consistency across agencies in WSR studies and planning, the Interagency Wild and Scenic Rivers Coordinating Council has developed guidelines for identifying a river's Outstandingly Remarkable Values (ORVs). Protection of ORVs, water quality, and free flow provides the basis for Comprehensive River Management Plans (CRMP) which are required by WSR legislation. The NPS has developed a standardized workshop format to evaluate and identify ORVs. The workshop format includes defining overall ORVs, evaluation of ORVs by river segment, developing ORV statements, and defining existing water quality and free flow condition. New guidance in being developed for cultural resources and scenic assessments as well as integrating visitor use management in CRMPs. Come learn about this process and how it can be applied to your wild and scenic river.

Value proposition: **Attendees will gain a basic understanding of Wild and Scenic River planning in the NPS as well as updates on new directions for these efforts.**

Keywords: **WSR, planning**

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Panelist #1: Bill Hansen, PhD, NPS Wild and Scenic River Program, Co-leader, NPS, Fort Collins, CO

Panelist #2: Chris Church, Project Manager, NPS, Denver, CO

Panelist #3: Sean McGuinness, NPS, Superintendent Upper Delaware Scenic & Recreational River, PA

Panelist #4: Cassie Thomas, Program Analyst, NPS, Anchorage, AK

Wild and Scenic Rivers - Open Discussion

5394

Day Capper

NPS experts invite questions and discussion about Wild and Scenic Rivers issues. Attendees will have an opportunity to propose topics for either group or individual discussion. Potential topic areas include: upcoming guidance documents on cultural resources and integrating visitor use management; scenic assessments; avoiding or eliminating impacts of water resources projects; and clarifying river values. Participants will be encouraged to share their experiences.

Value proposition: **Attendees will discuss Wild and Scenic issues of concern with NPS experts**

Keywords: **WSR**

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Completing the Reporting Loop without Killing Your Staff

5604

Paper

The National Park Service South Florida / Caribbean Network (SFCN) is working on ways to simplify and streamline reporting both internally and among agencies in south Florida. Internally SFCN is automating database reports for data summary reports and automating exports to MS Excel graphing templates, ArcGIS map templates, and for posting to the internet. The graphing templates provide rapid display of data in a form staff find easy to manipulate for presentations and papers as well as reports. These tools and templates have enabled rapid reporting of results for coral, water temperature, and invasive species corridors monitoring with other vital signs in development. Summaries are being designed to go with little editing into SFCN's annual report, web page, and fact sheets. SFCN is also working with Everglades National Park and the RECOVER System Status Report so staff/PI's write one summary that can be used with minimal editing for multiple venues.

Value proposition: **We provide practical examples and recent learning to stimulate thinking and discussion. Ideas could be easily implemented by other programs. Willing to share templates.**

Keywords: **Report, Reporting, Monitoring**

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Valuing Ecosystem Services in Support of Protected Areas Management: A Cross-agency Case Study

5180

Paper

As the science of ecosystem services matures, agencies are increasingly asked to account for ecosystem services in decision making. To best support inclusion in the planning process, ecosystem service assessments should be quantifiable, replicable, scenario-based, and not unreasonably resource-intensive. Through a series of pilot studies, USGS has partnered with the Bureau of Land Management, USDA Forest Service, and National Park Service to explore the use of a variety of tools that integrate biophysical modeling, social values surveys, and economic valuation of ecosystem services. We will discuss the findings for these pilot studies, the strengths and weaknesses of existing tools for systematically valuing ecosystem services from a protected areas management perspective, and the complementarity between agency planning processes and ecosystem services tools. This can inform both the developers of existing and future tools to better meet agency needs, and managers to better account for ecosystem services in agency planning processes.

Value proposition: **We provide framework information to systematize ecosystem services analysis in protected areas management, which has been lacking despite growing interest in their practical application.**

Keywords: **Ecosystem services, economics**

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Results of Pilot Taxonomist-in-Park Project

5107

Poster

In summer of 2012, Great Basin National Park hosted entomologist Dr. Ken Kingsley, as a volunteer. Dr. Kingsley worked on site at least one week per month, May through September. He organized the Park's collections and collecting equipment; collected, curated, and identified arthropods to order and family; cataloged specimens in the NPS cataloging system; helped organize and manage the Park's annual BioBlitz; and assisted with public outreach. Previously, the Park's limited entomological knowledge was largely based on aquatic invertebrate sampling, cave bioinventories, and three BioBlitzes, each limited to a single insect order. Dr. Kingsley helped the Park expand its collection and furthered appreciation of insect diversity. His example helps inform development of the NPS Taxonomist in Parks program, currently under development. Dr. Kingsley's contributions make it clear that such a program would benefit other parks and provide much needed taxonomic expertise from the ranks of retirees, students, and academia.

Value proposition: **Learn a new approach to discover biodiversity in parks at a low cost and high expertise.**

Keywords: **biodiversity, entomology, volunteer**

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Tod B. Williams, Great Basin National Park

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Developing a Nationwide Inventory and Monitoring Cave Ecology Framework

5109

Paper

In 2008 a meeting was held in Lakewood, Colorado to discuss how national protocols could be written to address a variety of National Park Service (NPS) units containing caves. A number of focus groups were created, and our group concentrated on cave ecology. With NPS caves varying from the longest in the world to only a few belly lengths, from significant nutrient inputs to virtually none, it was decided that one set of protocols would not be practical or desirable. Instead, we developed a Cave Ecology Framework that contains a decision-making tool NPS units can use to determine local cave biology and ecology inventory and monitoring priorities and needs. In addition, the Framework contains information from experts in the field and references protocols currently being implemented in the NPS. This Framework is near completion and additional reviewers, particularly those that might use it, are being sought.

Value proposition: **Learn about a framework to inventory and monitor caves throughout the National Park System in a variety of cave types.**

Keywords: **caves, ecology, monitoring**

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Rocky Mountain National Park Internships: Engaging Youth in NPS Careers

5338

Poster

Rocky Mountain National Park has been making focused efforts to engage youth through internship programs. Internships provide the bridge between the critical years of high school and college when students are making decisions that will influence their career choices. Students receive hands-on experience, create personal connections to the existing workforce, and participate in active mentoring as explore career opportunities. These programs begin with developing partnerships with local schools and youth organizations. Youth work in the park as paid interns and as part of work crews to address various management issues. The internships develop opportunities for students to connect with national parks, foster student interest in science and public lands, and ultimately provide a path for students to pursue careers in the National Park Service.

Value proposition: **Using internships to engage youth in the National Park Service and establish a pathway for the next generation of NPS employees.**

Keywords: **youth engagement, internships**

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Mechanisms for Connecting Park Professionals across Multiple Scales, Nationally and Globally

5471

Panel Discussion

Sharing knowledge can lead us to a more resilient stewardship of our parks and protected areas and the wildlife and cultural assets therein, both locally and globally. Yet this sharing offers many challenges in the form of organization restrictions on sharing, connecting disparate academic silos, different forms of data, connecting managers with academics to inform research needs as well as barriers resulting from cross boarder issues involving many countries. This session offers a change for park professionals to hear about programs working internationally as well as tools using cyberinfrasrtucture to bridge these gaps in the form of very different delivery systems; from universities, NGO's, federal initiatives and the World Bank. It will also be a chance for participants to ask questions and provide feedback related to perceived gaps in the programs in an effort to increase their effectiveness.

Value proposition: **Participants will learn about programs to share information, identify how their own needs may be enhanced through use, as well as shape their future deployment.**

Keywords: **cyberinfrastructure, sharing knowledge**

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Marijuana and Missing Persons: The Use of GIS in Law Enforcement and Search and Rescue

5508

Paper

Over the last several years, the use of geographic information systems (GIS) has changed significantly and become integral to law enforcement operations, such as search and rescue and marijuana interdiction activities. Marijuana cultivation on public lands has increasingly caused significant resource damage and safety concerns. Through the use of commonly available software and data, GIS technology allows public land management agencies to detect and identify cultivation sites and areas with greater probabilities of cultivation, thus allowing for targeted law enforcement operations and resource allocation. GIS also has become increasingly utilized in search and rescue operations, as integration of GIS technology can assist search managers with operational planning and data management, provide better map and data products for field teams, and provide greater situational awareness. Land management agencies across the nation face similar and growing problems, and can benefit from the integration of GIS technology in the operations environment.

Value proposition: **Attendees will learn about new ways to use GIS technology to assist missing persons, and to protect public lands from resource damages.**

Keywords: **marijuana, SAR, GIS**

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All-Hazards Resource Advisors: Advocates for Trust Resources on Federal Incident Responses

5439

Poster

The All-Hazard Resource Advisor (READ), plays a vital role in advocating for the protection of natural and cultural resources during incident response efforts on Federal Lands. These individuals work within the Incident Command System and bring a diverse range of skills to the Incident Management Team assigned to the response. A three-course online training curriculum has recently been developed through a multi-bureau collaboration within the U.S. Department of the Interior (DOI) and lead by the DOI Office of the Secretary. This poster will present the roles and responsibilities of a READ, skills needed to be effective as a READ, and the process by which Federal employees can become trained to serve as READs.

Value proposition: **Gain an understanding of the role or All-Hazard Resource Advisors (READs) during Federal incident responses, skills needed and specific training steps to become a READ.**

Keywords: **Resources, Incident Response**

Lead author • session organizer • poster / demo / exhibit presenter:

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The All-Hazards Resource Advisor (READ): Generalist, Specialist and All-around Advocate for Resources

5490

Café Conversation

During Federal incident responses, All-Hazard Resource Advisors (READs) communicate the protection needs of local natural and cultural resources within the Incident Command System. READs are advocates for resources and provide assessments and proactive recommendations to the response team. READs need to be flexible, able to take on complex tasks, work both in and outside of their expertise area, and able to communicate the needs of resources quickly and effectively. This cafe conversation will help you learn about training to become a volunteer READ and then test your critical thinking skills in a series of scenario exercises. These will place you and your tablemates into the role of READs responding to an incident. Already a READ? Come share your experiences. Interested in serving as a READ? Come test your abilities in what will be a dynamic exchange of ideas - all dedicated to the protection of natural and cultural resources.

Value proposition: **Learn of the skills needed to become an All-Hazards Resource Advisor (READ), then practice those skills in a series of group interactive tabletop scenario exercises.**

Keywords: **Resources, Incidents, Response**

Lead author • session organizer • poster / demo / exhibit presenter:

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Dave Anderson, NPS Spill Response

Using Smartphones for Data Collection by Professionals and Volunteers

5342

Panel Discussion

Now with over 46% of Americans having a smartphone, we have a unique opportunity to harness the power of millions of individuals to help protect our natural and cultural resources. These devices are equipped with digital cameras, GPS and internet connectivity, making data collection easier than ever before. This session will demonstrate and discuss smartphone use by both volunteers and professionals for data collection. How effective they can be and how this could change how we inventory, monitor and view our natural resources in the future.

Value proposition: Can smartphones and tablets be effective data collection tools? How can they be used by volunteers? How can they be used by professionals?

Keywords: Inventory, Monitoring, Smartphones

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others to be determined

Indigenous Cultural Landscapes: Developing a More Inclusive Approach to Large Landscape Conservation

5129

Panel Discussion

This interactive panel will report on the latest research on the concept of Indigenous Cultural Landscapes and launch a discussion on its application beyond current work in the Chesapeake Watershed. While in the early stages of implementation, the concept shows potential to interpret the place of American Indians on the land and to strengthen conservation by adding a cultural perspective to areas already recognized or in protected area status as important for ecological resources. The session will explore how the idea emerged from work in the Eastern Woodlands as a method of defining larger lived-in landscapes from the perspectives and lifestyles of pre-colonial native peoples who established settlements, hunted and fished, practiced agriculture and traveled throughout the region. This holistic perspective could provide visibility to descendant communities and engage them in the conservation economy and heritage tourism efforts that are directed toward regional assets.

Value proposition: **Join the discussion on Indigenous Cultural Landscapes; hear the latest research and its application to landscape conservation, protected areas management and engaging descendant communities.**

Keywords: **Indigenous, Cultural Landscape**

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Erve Chambers, Professor of Anthroology, University of Maryland
Stephanie Toothman, Associate Deputy for Cultural Resources, National Park Service

Protected Area Manager

Gateway Nature: Technology's Role in Encouraging Outdoor Experiences

4998

Poster

This study uses survey and focus group methods to explore attitudes toward nature and technology among millennial-aged students at two western universities. Results show that respondents view technology as neither universal villain nor insurmountable obstacle in their individual interactions with the outdoor world. Millennials may supplement their nature experiences with videos such as Planet Earth, but youth also recognize that these trends are not proxies for physical nature. While participants often preferred hyper-reality over concrete nature, they were also troubled by this trend. They acknowledged the critical importance of diverse sensory experiences to be found in camping, hiking or outdoor play. Participants also recognized that Planet Earth programs provide a kind of gateway to nature, motivating youth to migrate outdoors and reconnect with the physical environment. This project contributes to the growing field of youth geographies by exploring the ways in which millennial aged students perceive and experience outdoor spaces.

Value proposition: **Audience members will gain a better understanding of perceptions that millennial age students in Colorado have toward nature, technology, and national parks.**

Keywords: **Colorado, technology, nature**

Lead author • session organizer • poster / demo / exhibit presenter:

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Acclimation of Reef-building Corals in Ofu, American Samoa

5329

Paper

Reef-building corals are the foundation of coral reef ecosystems and are especially sensitive to increasing temperatures attributed to climate change. However, some corals are much more temperature resilient than others. In the backreef lagoons on Ofu Island in the National Park of American Samoa, colonies of the same species in adjacent pools experience different temperatures and exhibit different thermal tolerances. Whether all corals can acquire this heat tolerance, and how quickly this occurs is not known. We measured the rate of acclimation of the coral Acropora nana using temperature-controlled seawater tanks at the National Park research lab on Ofu. Corals acquired heat tolerance within two weeks of exposure to the temperature variation seen in natural back reef environments. Understanding the ability of corals to alter their thermal tolerance as temperatures increase, along with the mechanisms behind such processes would help inform decisions regarding how best to conserve this valuable resource.

Value proposition: **Audience members will gain an increased understanding of how organisms, specifically corals, respond to temperature, with particular relevance to climate change.**

Keywords: **Corals, Climate Change**

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Managing Invasive Plants in National Parks

5267

Exhibit

This exhibit shows invasive plant management program and projects across the country. Shows collaboration between parks, Exotic Plant Management Teams, other agencies and tribal lands.

Value proposition: **Demonstrates what parks around the service are engaging in managing invasive plants, tools they are using, inventorying and monitoring techniques and restoring native landscapes.**

Keywords: **Invasive Plants,**

Lead author • session organizer • poster / demo / exhibit presenter:

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Ecological Restoration Techniques on Three Wilderness Peaks: a team approach

5589

Poster

Yosemite National Park has developed an interdisciplinary approach to resolve erosion and trampling on off-trail routes in designated wilderness. Climbing use on Mt. Hoffman, Mt. Dana and Cathedral Peak has increased dramatically in the last decade. The resolution of these resource impacts required a team effort including Wilderness Managers, Trails Manager, Restoration Ecologist, Hydrologist, and Social Scientist. This team identified the resources at risk, possible mitigations, wilderness minimum tools, and implemented a plan to restore the eroded areas. One route was defined as the best for sustainability and protecting resources. After this route was defined, multiple social trails to the peaks were removed and restored to natural conditions. This successful approach will be continued on other wilderness social trails in the future and may be applied to other parks with similar problems.

Value proposition: **Working with an interdisciplinary team can help resolve resource impacts and develop techniques to restore high elevation sites within designated wilderness.**

Keywords: **Ecological restoration**

Lead author • session organizer • poster / demo / exhibit presenter:

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Facilities & Resource Management in the Coastal Zone: Blazing the Trail for Climate Adaptation

5451

Panel Discussion

Storms and sea level rise will affect visitor use, available habitat, facilities, and a variety of natural and cultural resources in more than 105 parks in the coastal zone. This panel is an opportunity to share lessons learned and discuss what decision making frameworks, data, and guidance are helpful and needed. To adapt to climate change, NPS must devise new facilities, retreat, relocate, fortify, and even "let go" of some resources and assets. This panel assembles senior leadership who are "blazing the trail" for NPS climate change topics and addressing climate change in innovative ways. The audience will have an opportunity to ask questions of panelists after initial presentations of not more than 8 minutes each. All panelists are confirmed.

Value proposition: **NPS climate change leaders will communicate with the field that we must devise new methods, be prepared for mistakes, and think out of the "box".**

Keywords: **coastal, adaptation, vulnerability**

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Trish Kicklighter, Superintendent, Assateague Island National Seashore
Dan Kimball, Superintendent, Everglades & Dry Tortugas National Parks
Shawn Norton, Chief, Sustainable Operations and Climate Change, National Park Service
Mike Eissenberg, Engineer, Denver Service Center, National Park Service
Linda Canzanelli, Superintendent, Gateway National Recreation Area

Integrating Cultural Resources into Landscape Conservation Cooperatives Conservation and Science Planning

5094

Panel Discussion

Landscape Conservation Cooperatives (LCCs) were established through Secretarial Order 3289 to address the impacts of climate change and other landscape-scale stressors on America's water, land, and other natural and cultural resources. Conservation and science priorities for natural resources are well underway across the 22 LCC network; however, the integration of cultural resources into these efforts has been inconsistent. Issues are twofold: (1) lack of cultural resource technical expertise on LCC science and other key working groups, and (2) the nature of cultural resources such that they include a wide-spectrum of tangible and intangible elements. This panel session will bring together LCC leads and NPS experts to discuss specific landscape-scale cultural resources questions, information opportunities, and management issues through an interactive panel-audience forum. Outcome of the panel will be a discussion paper of guidance and examples of cultural resource related projects LCCs can adapt into their planning and science efforts.

Value proposition: **This interactive panel session will result in a guidance document and examples of cultural resource related projects that LCCs can adapt into conservation/science planning efforts.**

Keywords: **Cultural Resourses**

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Kevin Johnson, Southern Rockies LCC
Martha Raymond, WASO Heritage Areas Program, National Park Service
Virginia Salazar-Halfmoon, IMR Vanishing Treasures Program, National Park Service
Julie Thomas McNamee, Resource Specialist, National Park Service

Killer Potato Chips: Adaptive Management of an Endangered Seabird at Redwood National and State Parks.

5097

Paper

Adaptive management principles have been utilized to conserve the endangered marbled murrelet (Brachyramphus marmoratus), an old growth forest nesting seabird. The majority of California's marbled murrelets nest within Redwood National and State Parks. Continued marbled murrelet population decline within protected areas has been linked to high rates of nest predation by corvids, primarily Steller's jays (Cyancitta stelleri). Elevated Steller's jay densities, and subsequent elevated rates of predation on marbled murrelets, occur near high use visitor areas (e.g. campgrounds and picnic areas) because of supplemental food supplied inadvertently by park visitors. An increasingly intensive corvid management program that uses visitor education and other techniques has significantly changed over the past seven years based on feedback from biological and sociological monitoring data as well as numerous targeted scientific studies. The evolution of the parks' corvid management program, decision triggers, and general lessons applicable to similar protected area issues will be discussed.

Value proposition: **A case study of an effective adaptive management program involving a complex, visitor caused, endangered species conservation issue.**

Keywords: **Adaptive, management, endangered**

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Monitoring Trends in Burn Severity (MTBS)

5489

Poster

Monitoring Trends in Burn Severity (MTBS) is a multi-year project designed to consistently map burn severity and perimeters of both wildfires and prescribed fires across all lands of the United States from 1984 to the present. MTBS relies on Landsat imagery to map burn severity of all fires greater than 500 acres in the east, and 1000 acres in the west. The number of historical fires combined with recent fires has resulted in MTBS mapping more than 14,000 large fires. The data generated by MTBS is used to identify national trends in burn severity, provide information necessary to monitor the effectiveness and effects of the National Fire Plan and Healthy Forests Restoration Act, and help fire and resource managers understand and evaluate the effects of large fires.

Value proposition: **Resource and cultural managers will have a better understanding of scientific resources available to support wildland and prescribed fire management.**

Keywords: **Fire, Severity**

Lead author • session organizer • poster / demo / exhibit presenter:

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Protected Planet Report 2012: Tracking Progress towards Global Targets for Protected Areas

5645

Paper

For over a century the establishment of protected areas has been a fundamental strategy to conserve biodiversity. Today we know that well-managed protected areas support not only healthy ecosystems and threatened species, but also provide multiple benefits to people. These benefits include a wide range of ecosystem services such as clean water provision, food security, disaster risk reduction and climate regulation. Thanks to their contribution to local and national economies, protected areas are now recognised as an integral part of sustainable development strategies. They are a tried and tested approach that is widely applied to conserve nature with associated ecosystem services and cultural values. The Protected Planet Report 2010 reviews progress towards the achievement of international protected areas targets through analysis of status and trends in global biodiversity protection. The resulting synthesis is a key source of information for decision makers and the conservation community.

Value proposition: **The audience will benefit from learning about global trends in protected areas, international protection targets and the successes and challenges of protecting our planet.**

Keywords: **targets, protected planet, WDPA**

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James Kernsey -

Siobhan Kenney - Programme Officer - UNEP-WCMC

Corinna Ravilious - Senior GIS Analyst - UNEP-WCMC

Charles Besancon - Lifeweb Initiative Coordinator, Secretariat for the Convention on Biological Diversity

Neil Burgess - Senior Advisor, Conservation Science and Africa Programme - WWF

The Breadth and Mass of Solitude: A Comparison of Backcountry Soundscape Monitoring Techniques

5201

Paper

Federally-designated wilderness areas protect some of the last refuges of natural solitude remaining on public land, a quality that requires adequate information to manage. The condition of solitude as affected by noise can be monitored by park staff working in the backcountry or with long-term automated sound recording stations. Although both techniques have been utilized separately in the past, no adequate comparison exists to describe the balance in spatial and temporal inference nor practical limitations on budget and staff. In 2012, Denali National Park and Preserve reinstated aircraft overflight observation by backcountry staff alongside automated monitoring efforts, offering an opportunity to compare the techniques. Mobile observation data were documented categorically then compared to automated records that were analysed using NPS Acoustic Monitoring Toolbox software. An understanding of how these monitoring techniques differ could assist managers in collecting acoustic information that is best suited to the wilderness they protect.

Value proposition: **In describing two differing techniques to monitor natural quietude/solitude, this presentation attempts to clarify which method may suit the management of a given wilderness area.**

Keywords: **wilderness, soundscape, solitude**

Lead author • session organizer • poster / demo / exhibit presenter:

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Air Atlas: A Web Mapping Tool for Sharing Air Quality Data

5212

Poster

The Air Atlas project demonstrates an effective method for making accessible important air quality data for use in resource management planning. Through a customized interactive web application, it facilitates the understanding and sharing of information of what can often be complex issues. Air Atlas is a series of web maps that provide visualization of estimated air quality statistics for atmospheric deposition, ozone, and visibility in the contiguous U.S. Using 5-year averages, it provides interpolation estimates for each NPS unit, allowing even parks without direct monitoring to obtain an approximation of the air quality at their location.

Value proposition: **Audience members will learn about an easily accessible, interactive method for displaying and disseminating data, in this case about air quality.**

Keywords: **Air, web mapping**

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Genetic and Geographic Distributions of Pinus contorta (ssp. murrayana, latifolia, contorta, and bolanderi)

5101

Paper

As changing climate continues to alter habitat, species may be exposed to unsuitable habitat. Long-lived, immobile tree species will be especially vulnerable to habitat loss. Pinus contorta, the most widespread conifer of western North America, plays a central role in the structure and function of montane forests from Baja California to the Yukon Territory. This broad distribution is divided into four geographically and morphologically distinct subspecies (ssp. murrayana, latifolia, contorta, and bolanderi), with each growing under and hypothesized to be locally adapted to a unique set of environmental and climatic conditions. Climatic changes may have variable effects on populations across the species, and conservation may require subspecies-level action. To evaluate species vulnerability to climatic change, this study quantified genetic population structure and predicted habitat suitability. Genetic analyses suggest the species consists of three genetic clusters, while modeling results show significant loss of suitable habitat for two of the subspecies.

Value proposition: **This research on the population structure and potential range shifts of Pinus contorta can be used to inform management and conservation of this widespread species.**

Keywords: **forest conservation, pines**

Lead author • session organizer • poster / demo / exhibit presenter:

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Dr. Amy Angert, co-advisor, University of British Columbia

Dark nights and northern lights – measuring and protecting night sky quality in Denali

5014

Poster

Seasonal extremes are pronounced in Alaska, and one unusual result is that twilight persists throughout the night all summer long, making the stars disappear for several months at a time. In the winter, night sky viewing becomes an important activity for local residents and the handful of park visitors willing to face cold temperatures in order to enjoy spectacular views of the stars and the aurora borealis. In September 2010, researchers from the NPS Night Sky Program collected baseline night sky quality data in Denali National Park & Preserve, documenting relatively pristine conditions. Very dark night skies are particularly sensitive to small changes in artificial light, whether from park infrastructure or from the human landscape outside park boundaries. Denali NP&P is developing a strategy to preserve night sky quality through sustainable design of outdoor lighting, outreach and education, and long-term night sky monitoring.

Value proposition: **Viewers of this poster will learn about techniques for monitoring and mitigating artificial light pollution. Managers may be inspired to implement these ideas too.**

Keywords: night sky

Lead author • session organizer • poster / demo / exhibit presenter:

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Cultral Values of Public and Private in the North Woods of Maine

5619

Paper

Changes in landownership have afforded many conservation opportunities in the North Woods of Maine. Between 1990 and 2000, approximately 11.1 million acres of forest land changed hands in transactions of over 10,000 acres or more. Conservation groups acquired land for new protected areas in this way, including a 70,000 acre proposed as a national park. Another effect of land ownership changes has been rural people's access to land. As investors bought and sold land in the North Woods rural people have had to deal with changed rules of access. This paper explores rural people's cultural values regarding public and private lands in light of these changes presenting data from ethnographic research in progress.

Value proposition: **Attendees will come away with an understanding of how investors' buying and selling of land has reframed the debates about protected areas in Maine.**

Keywords: **Maine, ownership, culture**

Lead author • session organizer • poster / demo / exhibit presenter:

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Cougar Use of Colorado's Front Range Protected Areas

5234

Paper

The Colorado Front Range has experienced drastic urbanization over the last two decades, and public open spaces, which overlap excellent cougar (Puma concolor) habitat, have been created and heavily used by people for recreational activities. GPS collar data collected on a sample of cougars in the Front Range, was used to determine the locations where each individual cougar carried out feeding and non-feeding behaviors (i.e. travelling/ resting). In an ongoing analysis, Resource Selection Probability Functions, conditional on behavior, are being used to model the effects of recreational trail use, property hunting status, and juxtaposition of housing developments to protected areas on cougar selection of feeding behaviors. Knowledge of how management schemes employed on protected areas have an influence on cougar behavior is important to managing: cougar/human conflicts within open space lands, cougar/human conflicts with neighboring landowners, visitor usage of open space lands, and wildlife prey species commonly used by cougars.

Value proposition: **Audience will gain a better understanding of the influences of protected areas and urbanization on cougar behavior, important to managing human-wildlife conflicts.**

Keywords: **predators, urban-wildland, behavior**

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Co-author Dr. Mat Alldredge is a researcher with Colorado Parks and Wildlife.

Shared Species Rocky Mountain NP and Monteverde, Costa Rica: Connecting the Dots for Species Conservation

5324

Poster

Sister Cities Estes Park, CO, and Monteverde, Costa Rica are gateways to the protected areas of Rocky Mountain National Park (RMNP) and the Monteverde rainforest and cloudforest reserves. These areas provide important habitat for a variety of plant and animal species, including migratory birds. Many of the bird species that breed in RMNP migrate south during the winter, with some spending time or stopping in the Monteverde area of Costa Rica. Collaboration across the boundaries of these and other seemingly unrelated protected areas is important to the conservation of shared species, especially as pressure from factors such as development and climate change increase. We will provide an overview of shared conservation strategies for this emerging program.

Value proposition: We demonstrate a novel partnership towards the improvement of species conservation of migratory species.

Keywords: Migratory, International, Conservation

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Summer Olsen, Utah State University

Rocky Mountain National Park Sister Park Relationship: The Tatra Mountains of Poland and Slovakia

5341

Poster

Rocky Mountain National Park (ROMO) signed a sister park agreement with the Tatra National Parks in Poland and Slovakia in September 2007 and again in April of 2012. All three parks are mountain parks and International Biosphere Reserves, thus sharing mutual issues and concerns. These concerns involve the conservation, preservation, and management of national parks, including natural and cultural resources for the purpose of conservation, recreation, and public education. Since 2007, we have engaged in and initiated numerous staff exchanges, conferences, joint science projects and shared numerous work products, lessons learned, and ideas. We will share highlights of these experiences and demonstrate the successes of a conservation strategy focused on collaborative technical assistance, education, and research.

Value proposition: **We will demonstrate the importance of global community in the conservation of protected areas.**

Keywords: **partnership, international conservation**

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Kyle Patterson, Rocky Mountain National Park

Michele Bratschun, Rocky Mountain National Park

Alison Foster, Rocky Mountain National Park

Modeling Audibility Due to Simultaneous Aircraft Events

5141

Paper

In order to better account for noise from simultaneously occurring aircraft in the Federal Aviation Administration Office of Environment and Energy's (FAA AEE) Aviation Environmental Design Tool (AEDT) and Integrated Noise Model (INM), empirical- and statistically-based relationships were developed for time-based metrics; referred to as "time compression algorithms." The purpose of this analysis is to (a) review the two time compression algorithms under consideration; (b) evaluate the performance of the algorithms using several National Park noise model studies; (c) evaluate the impact of changing inputs to the algorithms, such as ambient noise input type and sampling duration of ambient types; and (d) derive conclusions regarding the applicability of the time compression algorithms over a variety of modeling scenarios.

Value proposition: **Methods for more accurate prediction of the duration of cumulative noise impacts will be presented. Accurate accounting of overlap between adjacent noise events is critical.**

Keywords: **noise, soundscape, audibility**

Lead author • session organizer • poster / demo / exhibit presenter:

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Organizational Shifts within the U.S. Forest Service: A Case Study of Willamette National Forest Employees

5378

Paper

Over the last several decades the U.S. Forest Service (USFS) has seen significant change in the size and makeup of its staff. Much of this can be attributed to external events such as the implementation of the Northwest Forest Plan, lawsuits, dramatic shifts in political administrations, and the downsizing of many federal agencies due to congressional budgetary restraints. As a result of these and other changes, a resource management paradigm within the USFS has emerged that stresses interdisciplinary collaboration and balanced resource use. This study, through the use of interviews and qualitative analysis, sheds light on the organizational shifts that have occurred over the last thirty years at one of the most prominent and productive forests in the country, the Willamette National Forest. Furthermore, nuanced commonalities and differences among staff are identified, which in turn may provide forest supervisors with a useful tool for managing agency personnel in the future.

Value proposition: **Audience members will better understand the dramatic management shift the U.S. Forest Service has been challenged to adapt to over the last thirty years.**

Keywords: **USFS, management, organization**

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An Intricate Dance: Diplomacy, Science and Protected Areas in Treaties and International Agreements

5587

Panel Discussion

This panel will focus on the highly controversial nature of international agreements regarding ecosystem services and species from the policy and science perspectives. International protected areas (Marine protected areas in particular) along with highly migratory species that cross international boundaries can be some of the most intricate negotiations for policy makers. Understanding the science of poorly known populations, such as marine species, and the dependence of people on stable ecosystems (such as food security) is critical for policy makers. Food security and science cooperation, for example, are key policy drivers in many international agreements, yet, the impacts of this focus on national and international parks and protected areas may be significant. This panel hopes to highlight international policy that directly and

indirectly affects parks and protected areas world wide using perspectives and examples from North America, East Africa and other regions.

Value proposition: **This panel highlights treaties and international agreements often associated with protected areas, migratory species or technology but which not well known outside of the UN.**

Keywords: **diplomacy, science, policy**

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John Waithaka, Parks Canada

How to reduce prevalence of tort cases in protected areas and costs associated with them

5347

Poster

My poster will explain the problem (money spent because of the tort cases stemming from incidents in protected areas and the prevalence of these cases), how the problem could get worse (major budget cuts to park budgets), and possible solutions (signs that better explain the risk involved, proper documentation of decisions, more timely decisions, etc.). Tort liability is a major issue for protected areas. Between 2002-2009, the federal government paid five million dollars annually for claims stemming from NPS tort liability. Taking action to reduce tort liability will have the double benefit of increasing safety for visitors and reducing much-needed funds being spent on tort claims. Unfortunately, tort liability cases are likely to increase since budget constraints have led to maintenance failures—the primary cause of liability in parks. They need solutions to protect against greater tort liability, and my poster will provide possibilities applicable to any protected area.

Value proposition: **Learn about the prevalence of protected area tort cases, as well as the most efficient means to prevent such incidents and to protect against liability.**

Keywords: **Legal, Budget, Maintenance**

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Names of additional authors / panelists / presenters (if any):

Tourism and Biodiversity Conservation Hotspots: Results of a Meta-Synthesis

5539

Paper

The overall goal of this research synthesis was to determine the current status of case study research on tourism and environment relationships, and the impact on protected area management. This presentation is partially driven by the following goals: To understand what has been studied and which approaches to sustainable tourism have been effective in creating positive environmental, economic and social change. The general hypothesis guiding this analysis of tourism impacts in biodiversity hotspots was: "Tourism development implemented according to the principles of environmental sustainability, nature conservation, and contributing to the well being of local peoples will have a net positive or a neutral impact on biodiversity." The case studies that will be presented draw from a meta-synthesis in which almost 900 peer-reviewed articles from 6 continents were reviewed to determine the effectiveness of implementing sustainable practices.

Value proposition: **This presentation will provide attendees with both a macro and micro view of sustainable tourism practices and protected areas.**

Keywords: **synthesis, biodiversity, tourism**

Lead author • session organizer • poster / demo / exhibit presenter:

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Zachery Schwing, MS Candidate, University of Utah

Proposing the Albany Pine Bush Preserve as a National Natural Landmark

5552

Poster

The National Natural Landmarks (NNL) program recognizes sites which demonstrate the most outstanding geologic and biologic features of the United States. Sites are evaluated for both ecologic significance as well as educational and conservational value, with the goal of strengthening the public's awareness and appreciation for America's natural heritage. Located just outside the city of Albany, the Albany Pine Bush Preserve straddles the Appalachian Plateau and Appalachian Ranges biophysiographic regions in upstate New York. It has been proposed for NNL evaluation as the best example of an eolian landform supporting periglacial sand dunes in these regions. This fossil landscape is carpeted by globally rare pitch pine scrub oak fire-dependent communities, creating a dynamic mosaic that is home to a diverse assemblage of rare plants and animals, especially moths and butterflies. The Albany Pine Bush Preserve is an integral and illustrative site in America's natural history.

Value proposition: **Audiences will come to understand the value and significance of the National Natural Landmarks conservation program as well as knowledge of inland pine barren ecosystems.**

Keywords: **Conservation, Parks, Eolian**

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Nations Collaborating: The Bighorn Canyon Native American Field School

5085

Paper

Bighorn Canyon National Recreation Area has hosted Archeological Field Schools in the Park for the last 7 years. Over the years, these have involved many different tribal, university and tribal college partners. For the past several years the emphasis has been on training Native American students in an accredited field school, and in including tribal elders among the presenters for the program. In 2012 the class included 5 Crow students, 4 Northern Cheyenne, and 16 other students from 3 different colleges or Universities. Participants were trained in archaeological field methods, and in cultural resource management (CRM) with an emphasis on applying cultural resource law. The park has been able to use project funding for block surveys to partially fund the field schools. Most of the Native American students trained by the program have been employed by their tribe's THPO office as project monitors.

Value proposition: **Our partnership Archeological field school is training tribal members for Tribal Historic Preservation Offices, and is an economical method of completing archeological survey.**

Keywords: **Native American, Archeology**

Lead author • session organizer • poster / demo / exhibit presenter:

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Chris Finley, Archeologist, Bighorn Canyon National Recreation Area

Marine Fishing Visitor Use: Guidance Needs of Park Staff

5474

Workshop

Marine Fishing Workshop Purpose: - to gather input for a draft report listing marine fishing issues, priorities and timelines in national parks. The input will be tallied and summarized to produce a draft report on anticipated information needs and timelines. The draft report will be distributed to Ocean and Coastal Parks for comments and be utilized to inform NRSS Ocean and Coastal Branch marine fishing work allocations. Potential categories for issues include fishing: Interpretation and Education, Safety and Enforcement, Visitor and Other Use, Biological Resources, Laws-Regulations-Executive Orders, Planning, Policy, Boundaries and Neighbors, Cultural Resource, Backcountry & Wilderness, Facilities, and Commercial Visitor Services.

Value proposition: **Provides attendees an opportunity for direct input to NRSS marine fisheries about information, training and research needs, priorities and timelines; and to guide work allocations.**

Keywords: **Marine Fishing input**

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none

A Dialogue among Philanthropic Leaders on Conservation in a Changing World

5526

Panel Discussion

Philanthropies have long played a crucial role in focusing resources and attention on conservation issues in North America and globally. In recent years many foundations have become increasingly well placed to undertake strategic studies of emerging threats and opportunities to inform their grantmaking. Meanwhile the world of philanthropy is changing with the emergence of new foundations, and an increasing interest in collaboration and more systemic work across local-global scales, and with greater attention to the underlying drivers of change. This panel will bring together leaders of 5 – 6 foundations whose missions include a focus on conservation and protected areas in North America and/or internationally. Session leaders will use an interview format to create a dynamic dialogue among panelists and audience. This session is modeled after a similar dialogue (also moderated by CGBD) at the recent IUCN World Conservation Congress, which attracted considerable interest.

Value proposition: **This session will gather the leaders of environmental philanthropies to discuss how foundations are viewing conservation threats and opportunities of the coming decades.**

Keywords: **Trends, philanthropy, global**

Lead author • session organizer • poster / demo / exhibit presenter:

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Lynn Lohr, Consultative Group on Biological Diversity (CGBD), moderator
Denise Joines, Wilburforce Foundation*
Jessica Brown, New England Biolabs Foundation
Ken Wilson, Executive Director The Christiansen Fund
Staff, National Park Foundation
Representative of a community foundation or trust TBD

Landscape-based Learning: A Framework for Interdisciplinary Experiential Education

5595

Paper

Landscape-based education emphasizes a holistic expeditionary learning model. In the Fall of 2011 Grand Canyon National Park cooperated with multiple universities to offer a semester of undergraduate study focused on the Grand Canyon region and contemporary approaches to park management. Through park workshops, stakeholders, service-learning projects and hearing from experts on issues facing the Grand Canyon students worked to understand the multi-faceted aspects of contemporary park management. Simultaneously students were trained in outdoor leadership: to run the Colorado River and lead themselves in the backcountry. These intimate connections between place and people, mixed with curriculum ranging from geology to political science, coincided in the formulation of an informed and dedicated group committed to understanding the integrated nature of natural resource issues. New developments in the field of neuroscience support this spatially-based approach. The model can be applied universally and results in leaders well trained at bringing solutions to emerging issues.

Value proposition: **Colleagues will learn of a progressive educational framework and its universal application to benefit park resources, foster land management and contribute to stewardship.**

Keywords: **Education, Landscape Studies**

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Using Time-lapsed Photography for Monitoring Backcountry Crowding Conditions at Pinnacles National Monument

5226

Paper

Park professionals and researchers often determine standards for crowding using evaluations of visitors' preferences for conditions. Afterwards, conditions should be continually monitored to ensure that crowding does not violate visitors' standards. However, monitoring at backcountry attraction sites is staff intensive, involves observer error, and assumes that limited monitoring is representative of seasonal conditions. As a result, monitoring at backcountry sites is often neglected or inconsistently performed. Therefore, in 2012 researchers addressed this issue by implementing and evaluating a monitoring procedure using time-lapsed photography at a heavily visited backcountry reservoir and a vista location at Pinnacles National Monument. The cameras recorded frames every ten minutes throughout a season resulting in approximately 15,000 photographs. Results suggest that time-lapsed photography can provide a low cost and effective method for monitoring crowding at backcountry sites through an entire a season. The presenters highlight suggestions for camera placement, ethical considerations, data management, and future research.

Value proposition: **Audience members will leave with an understanding of the benefits and drawback of using time-lapsed photography for monitoring back county crowding conditions.**

Keywords: crowding, visitors, photography

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Communicating about Floristic Biodiversity: The Relevance of Floristic Information Systems

5140

Paper

The Flora Project is a product of the Sonoran Desert Network's (SODN) vegetation mapping program. It includes a comprehensive floristic database covering the more than 2,400 species, subspecies, and varieties of plants found in the eleven national park units of SODN. This database will ultimately be available online and translates directly into comprehensive publicly available park-specific field guides. The final products of these efforts are not field guides alone, but a cross-platform floristic information system being developed for use by resource managers, researchers, and the public. Products range from online databases to printed field guides, to apps for mobile and handheld digital devices, to a range of other digital and print educational tools and resources. Additional collaborators include two NPS I&M networks and the US Fish and Wildlife Service. The Flora Project is setting the standard for floristic research and information dissemination about protected lands in the desert southwest.

Value proposition: **Floristic information systems generate novel solutions for the distribution of information and develop critical data sets addressing the challenges of climate change for botanical conservation.**

Keywords: **Science communication, Floristics**

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Integrating Maintenance Personnel into Long Term Resource Monitoring

5415

Poster

National parks and historic sites attract individuals from around the world who come to experience our nation's finest cultural and natural resources. Similarly, resource agencies attract individuals interested in their preservation and protection. Acadia National Park has identified a need for consistent long term monitoring of key natural resources and has begun a pilot program involving our maintenance staff to assist us in the monitoring and protection of these resources. This poster will demonstrate successful projects maintenance personnel have assisted with and shares how our model can be adapted and implemented at parks across the country. Valuable concepts and lessons learned for making these types of collaborations work would be shared as would an abstract about how the observations of one of our employees changed the way we think about peregrine falcon migration.

Value proposition: Registrants will learn techniques for involving maintenance staff in long-term resource monitoring; what has worked well and why, lessons learned from Acadia National Park

Keywords: Maintenance, Monitoring, Resources

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Keith Johnston; Chief of Maintenance, Acadia National Park

Acoustical maps of Grand Teton National Park

5082

Poster

Novel visual techniques are being developed to convey soundscape and acoustic resource information to visitors and park management. Acoustical conditions vary widely by both location and time. Addressing simple questions such as what does a particular area sound like involves far more than simple answers. Acoustical maps begin to answer what sound sources are present and the range of sound levels. Maps of natural sounds can be compared to maps of human-caused noise permitting visitors to choose activities and areas that will most likely suit their expectations. Sound monitoring data collected in the field was incorporated with acoustic computer modeling results in a geographic information system to produce acoustical maps of areas within Grand Teton that spanned the range from pristine wilderness to highly visited and developed areas. These maps provide detailed acoustical data in a readily understandable and useful format.

Value proposition: **Two- and three-dimensional acoustical maps offer a novel presentation of park soundscapes for enhanced park management and visitor experience.**

Keywords: **Soundscape, Acoustics, Maps**

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Residents' Images and Perceptions of their Community and a Neighboring Park

5233

Paper

The travel research literature identifies the image of a destination as a critical factor in tourist's destination choice (Echtner & Ritchie, 1993). Nearby residents of parks are commonly the expected visitors of such areas. However, the resident's images and perceptions of neighboring parks have been minimally explored in the literature. Furthermore, little is known about the resident's community images and perceptions as compared to perceptions of a neighboring park. Thus, the purpose of this study was to explore the dominant image themes resident's associate with their community and the park adjacent to the community. Cross-sectional data were collected (June – October, 2009) from 260 residents in nine communities adjacent to Retezat National Park in Romania. The words emerged from the open ended image questions were classified into themes which were validated for content validity by three researchers. Resident's images should be integrated in the development of tourism planning strategies.

Value proposition: **The participants will understand the importance of involving residents in developing tourism strategies that could have a higher ability to boost visitation to the area.**

Keywords: **image, community, parks**

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Names of additional authors / panelists / presenters (if any):

Is Exclusion Enough? Managing Zoonotic Disease and Risk at the Human–Wildlife Interface

5401

Panel Discussion

The national parks provide unique opportunities for humans and wildlife to be in close proximity. Wildlife in human-occupied structures and habituated wildlife can be a common occurrence, with potential wildlife and public health implications. Responding to and managing such incidents have important consequences for resource conservation, public perception, and risk communication to be consistent with NPS policy. Long-term solutions require a science-based, holistic approach and must incorporate integrated pest management, wildlife health, human dimensions, and public health, with involvement of park and concessions management alike. This panel discussion will be interactive and include representatives and expertise from each of these subject areas. Topics include defining acceptable risk in a natural setting, techniques for risk-analysis and reduction, and response. This session will use the expertise of the panel and the experience of the audience to identify programmatic needs for risk reduction in settings where wildlife and humans are in close proximity.

Value proposition: **Participants will leave with a better understanding of the complex issues and approaches to wildlife-associated disease risks and resources available to approach these issues.**

Keywords: **disease, risk, management**

Lead author • session organizer • poster / demo / exhibit presenter:

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Carol DiSalvo, Integrated Pest Management
Dan Decker, Cornell University Department of Natural Resources, Human Dimensions Unit
Concessions managment representative, National Park Service

Expanding Parks and Reducing Human Numbers: A Superior Alternative to Embracing the Anthropocene Era

5269

Paper

Recently conservationists have been advised to embrace the Anthropocene Era, in which humanity rightfully dominates the biosphere. We are told to give up outdated goals, such as protecting all Earth's species from anthropogenic extinction, or minimizing human interference in relatively wild ecosystems. Instead, we should accelerate economic development, protect ecosystem services for a growing human population, and content ourselves with preserving whatever biodiversity ten or twelve billion people find useful or interesting. I argue that conservationists should reject this bold call to selfishness and human racism. Instead, we should work to expand parks and protected areas; lessen human impacts that degrade wildlife habitat; and reduce human numbers, gradually and non-coercively. We should recognize ecological limits to economic growth, and affirm the right of every species to pursue its unique destiny free from human-caused extinction. Such a course is morally and prudentially superior to uncritically embracing the Anthropocene.

Value proposition: **Will allow exploration of a positive conservation alternative to embracing human domination of the biosphere, complementing the "Rambunctious Garden" keynote**

Keywords: **population, biodiversity, Anthropocene**

Lead author • session organizer • poster / demo / exhibit presenter:

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Working across Agency Lines to Improve Visitor Use Management on Public Lands

5434

Panel Discussion

Federal land managers strive to provide maximum opportunities and benefits from public use and access, while at the same time ensuring natural and cultural resources are protected. Performing this balancing act is core to agency missions. An Interagency Visitor Use Management Council was recently chartered by the NPS, USFS, BLM, USFWS, and USACE. Its purpose is to develop clear and consistent guidance for visitor use management and visitor capacity, shared investment in tool and training development, and raised awareness and commitment to a professional and scientific approach to managing visitor use on public lands. The panel discussion will share background on the formation and mission of the council, guidance and tools being developed, and relationship of these efforts to other programs, including the Federal Interagency Council on Outdoor Recreation. The audience will be encouraged to share ideas with the council on high priority action items and opportunities for pilot projects.

Value proposition: **Learn about a newly formed collaborative interagency council working to help shape the future of visitor use management on public lands.**

Keywords: **visitor, interagency, use**

Lead author • session organizer • poster / demo / exhibit presenter:

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Patrick Gregerson, NPS
Jeff Brooks, USFWS
David Cole, USFS
Keith Brown, BLM

Integrating Participator GIS and Archaeological Research at the Sand Creek Massacre National Historic Site

5377

Paper

Multiple lines of evidence have supported various interpretations of the locations of specific events during the Sand Creek Massacre from November 29 to December 1, 1864. For example, the location of the Cheyenne and Arapaho encampment has been interpreted in various loci by scholars and tribal descendants within a two mile stretch of Big Sandy Creek. The result is that no conclusive map of the massacre site has been developed and in turn, interpretation at the park is lacking. To address this situation, the NPS hosted a series of mapping workshops which brought together scholars, tribal descendants, and park managers and evaluated existing and new information. Utilizing a Participatory Geographic Information System (PGIS) we were able to provide a basis for new and expanded interpretation at the massacre site.

Value proposition: **Participatory Geographic Information Systems (PGIS) and how it aids in contentious or conflicting perceptions of cultural landscapes and historical events.**

Keywords: **ParticipatoryGIS, Cultural Landscapes**

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Karl Zimmerman- NPS

Alexa Roberts- NPS

Getting Down to Business: A Call to Action from the Canadian Parks Council

5609

Café Conversation

For the first time in five years, Canada's Deputy Ministers responsible for Parks and Protected Areas at the Federal, Provincial and Territorial levels met in the fall of 2012. Inter-jurisdictional priorities were established and new areas of national collaboration were broached. This Café Conversation session offers participants a unique view into the future of Canada's system of parks and protected areas through the work of the Canadian Parks Council (CPC). Through active round table participation, session leaders invite participants to debate and discuss specific political, environmental, social and economic topics that challenge park agency management. The topics chosen require integrative thinking and relate to questions raised by park agencies and governments across borders. The outcome(s) of this session will inform the work of the CPC and help shape the dialogue of park management and service delivery in our changing world.

Value proposition: **Participation among big thinkers is encouraged who can inform questions of relevancy, management, and the future of issues facing park agencies in Canada and beyond.**

Keywords: **Relevancy, Inter-jurisdictional, Forward-looking**

Lead author • session organizer • poster / demo / exhibit presenter:

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Steve Donelon, Executive Director of Alberta Parks will be co-leading this session. Steve also sits on the 2012-13 Executive Committee of the Canadian Parks Council. If possible, please include Steve on email communications, should we be successful with this submission: Steve.Donelon@gov.ab.ca

Regional-scale Vulnerability Assessments of Species and Systems Most at Risk to Climate Change

5176

Paper

Vulnerability Assessments (VAs) are popular tools for informing climate change adaptation planning and have recently been highlighted as important research activities within the US Department of Interior (DOI). In 2011, DOI requested all agencies to report ongoing or completed VAs that pertained to a specific suite of assessment targets (e.g., wildlife habitat) and threats (e.g., sea-level rise). Approximately 399 projects (12 from NPS, 10 from BOR, 189 from USGS, 51 from BLM, and 137 from USFWS) were reported in all 21 Landscape Conservation Cooperative regions. Our objectives were to: 1) evaluate how elements of vulnerability were assessed (i.e., sensitivity, exposure, and adaptive capacity), 2) summarize VA activities according to the assessment target, geographic extent, timeframe, and models used (e.g., climate, ecological response), and 3) define specific linkages to adaptation planning efforts. We also define specific VAs well suited to describe regional-scale impacts of climate change.

Value proposition: **The audience will learn key elements of regional-scale assessments, what makes them successful, and how products can be used in adaptation planning.**

Keywords: **Vulnerability, Assessment, Adaptation**

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Laura M. Thompson - USGS, National Climate Change and Wildlife Science Center

Biodiversity in a Changing Climate: Synthesis of Current and Projected Trends in the United States

5181

Paper

We reviewed the recent literature and synthesized the state of knowledge of how global biodiversity is being impacted by climate change and is projected to respond in the future. Recent studies reinforce earlier findings of significant existing and projected impacts and have documented new, more subtle climate-change effects. For example, many species are shifting their distributions and phenologies at faster rates than were documented just a few years ago. Shifts have been idiosyncratic, counterintuitive, and are expected to result in new communities, and altered biotic interactions. Although genetic diversity enhances the potential for biodiversity to respond to variable environmental conditions, climate change may outpace intrinsic adaptive capacities and increase the relative vulnerabilities of some organisms. Developing effective biodiversity conservation strategies that can address these changes will require explicit consideration of ecological interactions, uncertain future projections, flexible decision-making approaches, and broader, more coordinated monitoring efforts.

Value proposition: **Presented are key findings of an expert review for observed and projected climate impacts on biodiversity, with emphasis on genes, species, and assemblages of species**

Keywords: **biodiversity, climate, impacts**

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Molly S. Cross, Wildlife Conservation Society, Bozeman, MT

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J. Emmett Duffy, Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, VA

Carolyn Enquist, USA National Phenology Network, Wildlife Society National Coordinating Office, School of Natural Resources & the Environment, University of Arizona, Tucson, AZ

Roger Griffis, NOAA Fisheries Service, Silver Springs, MD

Jessica J. Hellmann, Department of Biological Sciences, University of Notre Dame, Notre Dame, IN

Integrated Pest Management, Rodent-proofing Structures, and Hantavirus Risk Reduction

5132

Poster

Hantavirus pulmonary syndrome (HPS) is a serious, sometimes fatal disease associated with rodents throughout the contiguous United States and the Americas. Structural rodent-proofing needs to be done as the first and most important step in an integrated pest management (IPM) process for hantavirus (and other zoonotic disease) risk reduction. Some examples of rodent-proofing techniques will be provided, and additional information will be available through handouts and listed websites. Additional integrated pest management practices to reduce rodent activity in and around structures will be outlined, including proper trapping techniques. Appropriate cleanup of rodent urine, droppings, contaminated surfaces, rodent nests, and dead rodents will also be briefly described, with additional information available through handouts or listed websites. These integrated pest management practices apply to all employees in the NPS, or anyone else, both at their work site as well as in their homes.

Value proposition: **The audience will learn IPM techniques applicable to them in their work and home environments on rodent-proofing structures and other strategies for hantavirus risk reduction.**

Keywords: **Hantavirus, Rodents, IPM**

Lead author • session organizer • poster / demo / exhibit presenter:

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Carol DiSalvo, National Park Service

Climate and Conservation: Landscape and Seascape Science, Planning and Action

5477

Paper

"Landscape-scale conservation" has become a common policy prescription for protecting biodiversity from the threat of climate change. But what does this prescription look like in practice? A recent compilation of nineteen geographic case studies sheds light on this question, showing how scientists, conservationists, and sometimes policymakers are working to incorporate climate change considerations into landscape and seascape science, planning, and action. A broad analysis of the case studies ranging from the familiar (e.g., Amazon) to the less familiar (eg, the Altai-Sayan Mountains) found both similarities and differences in approaches, tools used, and challenges faced based on local ecological, political, and socio-economic circumstances. In sum, the case studies represent an ongoing set of experiments as to how best to conserve biodiversity under conditions of rapid climate change. The volume is entitled "Climate and Conservation: Landscape and Seascape Science, Planning and Action" (Island Press 2012).

Value proposition: **Review of nineteen case studies from polar, equatorial, marine, montane, and other systems assessing how to incorporate climate change into landscape and seascape scale conservation.**

Keywords: **climate, landscapes, seascapes**

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Molly Cross, Wildlife Conservation Society

Examining Korean National Park Visitation: The Case of Older Adults

5259

Paper

This study explores the use and characteristics of older adult visitors (50 years of age or older) to Korean national parks. Data were collected on-site at 17 national parks in 2010 (n=1825). Variables included patterns of visitation (number of visits, length of visit, group type, transportation, motivation, and satisfaction) and demographics. The results show the top motivations for visiting parks were: relaxing, building friendships, experiencing nature, and improving health. Visitors tend to go more with friends, family or alone. The majority stays less than 24 hours and travel less than two hours. The highest percentage of visitors comes from large metro areas, e.g., Seoul. The study results are valuable to park managers and marketers so they can better promote national parks to a growing market. Managers will learn more about effectively meeting the needs of this population so they can target programs, services and amenities.

Value proposition: **This research identifies visitor preferences among older adults (50+) visitors to Korean national parks and provides a better understanding of a growing market.**

Keywords: **Korean National Parks**

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National Water Trails System: Connecting Americans to the Nation's Waterways

5286

Poster

A National Water Trails System (NWTS) has been established by the National Park Service. The purpose of the NWTS is to create a steadily growing network of quality national water trails designated to promote recreational and conservation values and to provide support to the water trail community. The foundation of this system is in broad-based community partnerships that span federal, state, local, and nonprofit programs. The role of the NWTS is to support and assist water trails managers as they seek designation and as they maintain and expand their efforts. The program serves to foster the sharing of information, knowledge, and expertise within the water trail community. This poster will provide an overview of how the NWTS was established, details of how individuals and groups can become involved as partners in existing water trails and step-by-step explanations of how to apply for this designation.

Value proposition: **Information will be provided on how individuals and groups can become involved with the NWTS, including how to apply for a water trail designation.**

Keywords: **National Water Trails**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Effects of Stock and Backpackers on Water Quality in Sequoia and Kings Canyon National Parks

5304

Paper

During 2010-2011, a study was conducted in Sequoia and Kings Canyon National Parks to evaluate the influence of stock and backpackers on water quality in wilderness lakes and streams. Although Escherichia coli (E. coli) concentrations generally were low, they were slightly elevated in areas with high visitor use. Sites with mixed use (stock and backpackers) tended to have significantly higher E. coli concentrations than those with minimal-use; concentrations at backpacker-use sites were intermediate. Paired sampling above and below grazed meadows indicated that E. coli, total coliform, and particulate phosphorus concentrations were significantly greater in streams below grazed meadows than above, suggesting an influence from stock grazing. Large increases in concentrations of E. coli, total coliform, dissolved organic carbon, turbidity, and particulate nitrogen, carbon, and phosphorus occurred during thunderstorms. Park visitors should take care to treat drinking water collected from streams during or immediately after storms, particularly in high visitor-use areas.

Value proposition: **This presentation will provide the audience with new information on the effects of stock use and backpackers on water quality in wilderness lakes and streams.**

Keywords: **stock, backpackers, water**

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Toward a Cultural Resource Management Strategy at Glen Canyon NRA: A Collaborative Project

5680

Poster

Glen Canyon National Recreation Area (GLCA) featuring Lake Powell offers exceptional outdoor recreation opportunities such as boating, fishing, camping and natural/cultural learning, with annual visits exceeding 2 million. The proximity of archeological and cultural sites to the 1900 miles of Lake Powell's shoreline where myriad recreation activities occur has created significant management challenges. Indeed, cultural sites along the lakeshore have experienced decades of cumulative and unacceptable impacts, predominately from members of the boating public. Common impacts include graffiti, human deconstruction of structural walls and timbers, and the improper disposal of human waste. To address these challenges GLCA has partnered with researchers from three universities to develop a comprehensive strategy that comprises a coordinated set of specific management actions. This poster provides an overview of this collaborative project, including highlights of the recommended strategy and actions as well as implications for other NPS units with similar cultural resource challenges.

Value proposition: Learn about cultural resource management challenges associated with visitor use at Glen Canyon NRA and a proposed strategy for addressing these challenges

Keywords: archeology, impacts, management

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Ms. Rosemary Sucec, Glen Canyon National Recreation Area, USA
Dr. Dorothy H. Anderson, North Carolina State University, USA
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Commercial Outfitting in Wilderness: "Uncommon Dialogue" Moves the Conversation Forward

5257

Poster

As the 50th anniversary of the Wilderness Act approaches, there are still vigorous debates about how to implement the Act. Conflicts over commercial uses in wilderness areas (e.g. guiding for hunting, hiking) have erupted into courtrooms. Stanford University convened an "Uncommon Dialogue" in February 2012 on the legal, scientific, and policy challenges and opportunities of commercial outfitting in wilderness, with pack stock use in the Sierra Nevada mountain range (California) as a case study. The dialogue provided a novel, neutral forum for stakeholders to engage with each other and move beyond entrenched positions. Through the "Uncommon Dialogue" process, land managers, scientists, historians, legal experts, environmental groups, commercial outfitters, and trade associations identified potential common ground and opportunities for collaboration. New personal connections were established, bridging traditional divides. Lessons learned were shared across agencies, regions, and stakeholders. Brainstorming of next steps provided participants with potential paths to pursue, individually and collectively.

Value proposition: **This poster describes the process and replication potential for "Uncommon Dialogues," and details the outcome of one dialogue focused on commercial outfitting in wilderness areas.**

Keywords: **Wilderness, Conflict Resolution**

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Accessing and Utilizing Protected Areas Datasets, Tools, and Networks

5465

Workshop

The Data Basin Protected Areas Center (PAC) is an open-access, on-line mapping and analysis platform developed by the Conservation Biology Institute. The PAC (http://databasin.org/protected-center) is a centralized place for critical national and global protected areas datasets and information, analysis tools, and social networks. This workshop will show how important issues related to the conservation status of land and water can be addressed through better integration of credible ecological, physical, and socio-economic information. Working in small groups, participants will complete exercises that demonstrate: (1) How to access and contribute to available protected areas resources in PAC (2) How to create customized maps, drawings, filters, data queries, time-enabled animations, and summary reports; and, (3) How to establish groups for sharing and reviewing public and private protected areas information. The workshop instructors are Dr. Tosha Comendant, Senior Scientist, and Kai Henifin, Cultural Anthropologist/GIS Analyst.

Value proposition: **Workshop participants will learn how to access and utilize well-documented spatial datasets, non-technical mapping tools, and working groups supporting protected areas management, policy, and education.**

Keywords: **mapping, science, conservation**

Lead author • session organizer • poster / demo / exhibit presenter:

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Kai Henifin, Cultural Anthropologist and GIS Analyst, Conservation Biology Institute

Wilderness Building Blocks: A Foundation for Integrating Wilderness Character into Planning, Management, and Monitoring

5128

Workshop

Wilderness character has been a topic of planning and collaboration between the NPS, FWS, and USFS. Wilderness building blocks provide the foundation for effectively integrating wilderness character into planning, management, and monitoring. These adaptable documents break down the components of outstanding wilderness stewardship into achievable and meaningful steps. NPS practitioners, planners, and experienced wilderness fellows who have developed building blocks with parks will provide (1) an overview, (2) instruction for writing wilderness character narratives, (3) information on selecting measures and collecting baseline data, (4) a wilderness character database demo, and (5) information on how to tie all the pieces together. Attendees will outline an approach they can use at their wilderness unit and will be provided a starter kit with materials to help them develop wilderness building blocks at their park. While this process is NPS-specific, attendees from a broad range of backgrounds may be interested in this adaptable process.

Value proposition: **Attendees will create an action plan for developing wilderness building blocks, the foundational elements for wilderness management and/or planning at their wilderness unit.**

Keywords: **wilderness, planning, stewardship**

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Reconnecting Waterways, Fish, and Partners in Grand Teton National Park

5172

Paper

Grand Teton NP, with Trout Unlimited and other partners, removed the Spread Creek diversion dam to 'reconnect' native trout between the Snake River and 50 miles of upstream habitat. Efforts to remove a second dam on the Gros Ventre River are underway. Both projects remove aging assets expensive to replace and maintain and for which need has changed. TU provided funding for dam removal as well as research on fisheries and have led discussions with neighboring water rights holders about best practices to reduce or eliminate dewatering of the river. This talk explains 1) how the park and TU accomplished dam removal and restoration while retaining appropriate diversion for water rights holders, and 2) ongoing work to 're-wet' the Gros Ventre River, increasing the park's 'connections' with neighbors, researchers, other partners, and visitors regarding stewardship of and beyond the park.

Value proposition: **Listeners hear options for dam removals on a less than 'Olympic' scale and how partners are discussing improved water use practices to benefit ecosystems.**

Keywords: **water, diversions, partnerships**

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Names of additional authors / panelists / presenters (if any):

A Climate-based Interpretation of Limber Pine Management Scenarios in Rocky Mountain National Park

5441

Poster

Managing species' responses to climate change requires that we understand with a degree of confidence when and where species will be climatically "pushed" into new areas and lost from existing areas. Such insights are critical for answering two management-relevant questions: (1) how long will areas within a species' current distribution remain climatically suitable (manage for stasis), and (2) when and where will areas outside the current distribution become more climatically suitable than present (manage for change)? Concentrating on limber pine (Pinus flexilis), a focal conifer species of management concern in Rocky Mountain National Park, we show using correlative maximum entropy models projected under both high and low emissions scenarios that limber pine may be pushed upslope and largely outside of its current range during the 21st century. We detail key elements of uncertainty in these projections and conclude with discussion of how species-climate models are useful for building management scenarios.

Value proposition: **We demonstrate a model-based tool for evaluating potential impacts of climate change on species at management-relevant scales, illustrated for limber pine in Rocky Mountain NP.**

Keywords: **vegetation, climate change**

Lead author • session organizer • poster / demo / exhibit presenter:

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Forrest Melton, NASA Ames Research Center

Jeff Connor, Rocky Mountain National Park

Ben Bobowski, Rocky Mountain National Park

Wikitawa: The Field Guide to Natural Communities

5547

Paper

Taking inspiration for its name from a Lakota word for "natural," Wikitawa: The Field Guide to Natural Communities provides an immersive online resource that uses maps, narrative, and photos to help users identify and understand the natural communities that occur in the national parks. Launched with an initial prototype focused on Washington, D.C.'s Rock Creek Park, Wikitawa serves to translate technical scientific information from the field into materials accessible to park staff and visitors alike. Developed through a collaboration between the National Park Service's National Capital Region and NatureServe, Wikitawa extends a long-standing collaboration between NPS and the conservation science nonprofit. In addition to highlighting ROCR's natural communities, characteristic plants and animals, and natural history and resource management issues, Wikitawa provides basic analytical tools for land managers and interpretive functions like a "build-a-hike" feature useful to cultural staff and park visitors.

Value proposition: **Attendees will learn about a unique effort to translate scientific and technical resource management information into formats meaningful and accessible to cultural and interpretive uses.**

Keywords: **biodiversity, science, communication**

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LandScope Chesapeake: Establishing a Shared Conservation Priority System for Large Landscapes

5562

Paper

To measure and guide progress toward goals established under the Chesapeake Bay Executive Order, NatureServe, National Park Service, and U.S. Geological Survey are collaborating on the development of LandScope Chesapeake (http://www.landscope.org/chesapeake). This tool helps partners focus collaborative conservation and citizen engagement throughout the Chesapeake Bay watershed. The partnership leverages private investment in the existing LandScope America platform initially developed by NatureServe and the National Geographic Society. This conservation guide offers users easy public access to authoritative maps and compelling place-based narratives, photography, and data-rich maps. The map viewer at the heart of LandScope enables practitioners and policy-makers from non-profits, land trusts, state and local agencies, and foundations to see quickly how and where different conservation values align and overlap. This common system makes it easier to prioritize places with the highest conservation value while building public support and directing resources toward them.

Value proposition: **LandScope Chesapeake models the use of a shared technology platform for convening stakeholders across large landscapes while measuring progress toward quantifiable long-term goals.**

Keywords: **collaboration, conservation, priorities**

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Conflict, Collaboration, and Sustainability: Can Institutions Learn?

5429

Paper

Can governance institutions learn to manage their relations successfully when everyone anticipates conflict? In 1987 UNESCO designated the archaeological zone of Monte Alban and the city of Oaxaca as one of Mexico's new World Heritage Sites. This set in motion a series of frictions and struggles between national and local institutions requiring police intervention, invasion and destruction of heritage resources,and calling into question the capacity of governance institutions to address such basic matters as the location of boundaries and the collection of waste. In 2010 UNESCO declared a complex of caves thirty miles east of the city as a second World Heritage Site. Given the history of turbulence at the first site there is grand uncertainty as to whether institutions have learned from experience or whether the second site is doomed to repeat the history of the first.

Value proposition: **Conflict is not automatically pathological and a threat. The uncertainty is how to learn from conflict.**

Keywords: **conflict, Mexico, governance**

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Integration & Application Network. Communicate better. Empower Change.

5294

Exhibit

The Integration and Application Network (IAN) is a dedicated group of scientists intent on solving, not just studying environmental problems. IAN is an initiative of the University of Maryland Center for Environmental Science. IAN's mission is to inspire, manage and produce timely syntheses and assessments on key environmental issues. By creating innovative ways to visually present science, we make it more accessible to managers, stakeholders, and the general public; meaning that your data will reach a much wider audience than just your peers. Our expertise includes: Science communication services; Environmental report card production; Training and capacity building. IAN is actively working with the National Park Service around the country producing Natural Resource Condition Assessments and online educational materials on a range of topics including climate change and associated impacts.

Further information can be found at www.ian.umces.edu

Value proposition: **Our unique data synthesis, interpretation and presentation can benefit conference participants in making their science more accessible to managers, stakeholders, and the general public.**

Keywords: **Communication, NRCA, Synthesis**

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The Collaborative for Innovative Leadership: Exploring New Ways of Working in the National Park Service

5364

Sharing Circle

National Park staff create new programs and solve old problems across the system, but these ideas are rarely shared among other parks and programs. NPS Call to Action 31 seeks to accelerate the spread of ideas, encourage innovation, and inspire peer-to-peer collaboration across the Service. A multi-disciplinary team has been responding to the call, facilitated by the Conservation Study Institute. Starting with themes of urban parks and programs, and youth engagement, the emerging Collaborative for Innovative Leadership is combining new communication tools with strategic networking to embed values of innovation and collaboration into the culture of the Service. Participants will share their stories of innovation, and explore how they can participate in this new collaborative paradigm to rapidly share new insights and solve mission-critical problems.

Value proposition: **Participants will learn about the objectives and activities of the Collaborative; provide feedback; and learn how to get involved.**

Keywords: **collaboration, innovation, leadership**

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Urban Parks and Programs: Stepping into Their Power

5369

Workshop

By their nature, urban parks and programs hold the potential to connect to more Americans—and more underserved Americans—than perhaps any other segment of the National Park System. National Park units in urban areas have grown in recent decades, and programs such as Rivers, Trails, and Conservation Assistance, the Historic Register program, Historic Tax Credits, Land and Water Conservation Fund, etc. reach urban cores across the country. Despite those successes, the potential of urban parks remains largely untapped. To help urban parks and programs "step into their power," a group from across the National Park Service has been developing an initiative under the auspices of the Collaborative for Innovative Leadership. This workshop will illuminate urban successes, review issues and roadblocks, and invite wider participation in this growing movement. The session will reserve at least half the time for audience participation, in the form of questions, feedback and recommendations.

Value proposition: **Participants will learn about pioneering initiatives in urban parks and programs and have an opportunity to "step into their power" as urban park leaders.**

Keywords: **urban, innovation, collaboration**

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The Pacific Northwest Contaminants Workgroup: Science, Communication, Collaboration and Action on Airborne Toxic Pollutants

4882

Poster

Recent studies have found elevated levels of, and effects from, atmospherically-deposited contaminants including mercury, pesticides, and industrial chemicals in national parks and other protected areas in the Pacific Northwest. Concerned about the results, representatives from United States federal and state agencies, Environment Canada and universities held a workshop in 2010 to discuss airborne toxics deposition and accumulation in the region. The workshop resulted in formation of the interagency Pacific Northwest Contaminants Workgroup to coordinate and facilitate science, education and outreach related to contaminants issues in protected areas in the region. One collaborative product that has resulted, and will be highlighted, is a Workgroup website which includes an interactive map showing contaminants study sites with links to data. Participating in the Workgroup has benefitted the National Park Service by attracting new contaminants-related research in parks.

Value proposition: **Understand benefits of agencies collaborating on contaminants-related issues in the Pacific Northwest. The effort has improved information exchange and increased amount of research taking place.**

Keywords: **contaminants, interagency, collaboration**

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Monitoring Sea Level in Parks

5195

Poster

Average global sea level has been rising and is predicted to continue this trend at an accelerating rate. But changes in relative sea level vary greatly depending on the specific location. In some areas where land subsidence rates are high, local relative sea levels are rising more quickly than in areas with no subsidence. And in areas where the land is rising (due to isostatic rebound caused by retreating glaciers, for example), local relative sea levels are actually falling. It is difficult for predictive global sea level models to capture this variability at a local scale.

In order to plan for local sea level changes, park planners need three basic datasets:

1. Precise local water levels

2. High resolution digital elevation model

Value proposition: **Learn what three datasets are needed to monitor local sea levels and what steps are being taken by OCRB to establish protocols.**

Keywords: **sea level, monitoring**

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Understanding Visitor Perceptions of Recreation Resource Impacts: A Comparison of Climber and Hiker Perceptions

5156

Paper

Recreation resource impacts have the potential to affect the quality of visitor experiences in parks. Certain impacts may be seen as beneficial for certain recreational activities but viewed negatively by participants of other activities. An understanding of how visitors perceive environmental conditions, which recreation impacts visitors deem unacceptable, and visitor characteristics – including activity type - that influence individual perceptions can provide guidance for management decisions. An on-site questionnaire was administered in Joshua Tree National Park (JOTR) to both climbers and hikers to examine visitor perceptions of specific resource conditions. Results indicate that hikers and climbers differ in their experience at and knowledge of JOTR. Additionally, hikers and climbers differ in their perceptions and judgments of specific resource impacts such as off-trail use and informal trails. Findings from perceptions studies which compare user group perceptions can help managers provide quality experiences for all activity types in multi-use settings.

Value proposition: **They will learn about new scales and techniques to examine visitor perceptions of impacts and gain understanding about how perceptions vary across different user groups.**

Keywords: **visitor perceptions, recreation**

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Marine Protected Area Professionals Peer-to-Peer Networks: Are They Good Investments?

5105

Café Conversation

Many marine protected area (MPA) professionals (e.g., managers, educators, scientists) labor in remote, isolated places in relatively new and specialized professional fields, cut off from ready contact with peers. After hearing from such MPA professionals, the U. S. National Marine Protected Area Center tasked its Marine Protected Areas Federal Advisory Committee to explore peer-to-peer networks to improve MPA stewardship and facilitate MPA professionals career development. The Committee will lead this café conversation to help protected area professionals address three critical issues regarding professional networks and share the findings with peers: 1. Identify potential costs, benefits, and options for such networks, 2. Discuss existing protected area professionals networks and how well they meet needs, and 3. Seek commitments from participants to take next steps to craft networks via social or other communication media. The MPA Center will help facilitate follow-up to this session to strengthen and expand MPA programs.

Value proposition: **Explore with peers the costs, benefits and options for professional networks, meet kindred souls, and take steps to develop MPA professionals networks.**

Keywords: **networks, MPA, careers**

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Brad Barr, National Marine Sanctuaries Program, National Oceanic and Atmospheric Administration
Cliff McCreedy, National Park Service

Leopold 1963 Redux: Now What?

5648

Focus Session

The 1963 Leopold Report "Wildlife Management in the National Parks" guided a generation of park stewards. The U. S. National Park Service recently asked its National Park System Advisory Board to revisit this landmark advice and update its guidance regarding appropriate goals for park stewardship and policies and actions needed to achieve them, given much-changed knowledge and circumstances. Panelists will review the Leopold 1963, describe environmental and social changes influencing park stewardship since 1963, and describe key findings and recommendations of the 2012 report "Revisiting Leopold: Resource Stewardship in the National Parks" to frame a discussion with attendees of how this advice may influence U. S. National Park Service stewardship goals, policies and practices. Introduction—Davis (5 minutes), Leopold Report—Graber (10 minutes), What has changed: 1963-2012—Machlis (10 minutes), Revisiting Leopold—Davis (20 minutes), Next Steps—Machlis (5 minutes), Discussion—Berger (30 minutes), Conclusion—Davis (5 minutes)

Value proposition: **Learn why 1963's "Wildlife Management in the National Parks" (Leopold Report) was so influential and discuss how its 2012 redux will affect future park stewardship.**

Keywords: **stewardship, policy**

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Gary Machlis, U.S. National Park Service (confirmed)
Gary Davis, GEDavis & Associates (confirmed)
Joel Berger, University of Montana, Missoula and Wildlife Conservation Society (invited)

The GeoCorps America Program – Meeting public land needs in the geosciences and beyond

5570

Paper

GeoCorps America helps meet the geoscience needs of a wide variety of public lands throughout the United States. Since 1997, GeoCorps has placed over 750 geoscientists on sites managed by the National Park Service, the U.S. Forest Service, and the Bureau of Land Management. These geoscientists carry out vital projects related to geoscience research, inventory, monitoring, impact mitigation, interpretation, and education. GeoCorps participants excavate fossils, monitor rockfall, measure water quality, produce educational resources, lead interpretive geology hikes, and more. Recently, GeoCorps has been adding new partners, such as the California Department of Conservation and the U.S. Geological Survey (planned for 2013). GeoCorps has recently increased efforts to recruit and select participants from groups that are underrepresented in its partner organizations and in geoscience as a whole. These and other recent developments are strengthening and diversifying the GeoCorps America program, enabling it to meet the evolving needs of its partners.

Value proposition: **Real examples of how GeoCorps meets the needs of public lands in geoscience and related fields, and how the program is evolving.**

Keywords: **Geoscience, STEM, education**

Lead author • session organizer • poster / demo / exhibit presenter:

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EarthCaching – Technology-based experiential education in geoscience for people of all ages and backgrounds

5571

Paper

EarthCaching, a program of the Geological Society of America, engages the public in the fascinating world of geoscience. An EarthCache consists of two parts: a place with interesting geoscience features and an online description providing the GPS coordinates, the scientific background, and educational tasks to perform at the site. Anyone with a GPS-enabled device can navigate to the site and experience a real-world, field-based lesson in geoscience. EarthCaching, which blends technology with experiential learning, has over a million participants and highlights over 12,000 geoscience sites of interest around the world. A growing number of EarthCache sites are on public lands, including areas managed by the National Park Service, U.S. Forest Service, Bureau of Land Management, and other land managing agencies. EarthCaches can help public lands in various ways, by encouraging more visitation, providing learning experiences for visitors, tracking visitation patterns, and engaging visitors in dialogue about an area's natural resources.

Value proposition: **Real examples of how EarthCaching blends the outdoors with technology to teach visitors about geology and support the educational missions of public lands.**

Keywords: **Geoscience, education, GPS**

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The Effects of Habitat Fragmentation by Urban Development on Terrestrial Herpetofauna

5418

Paper

Habitat fragmentation by urbanization causes animal and plant populations to be isolated in patches of suitable habitat that are surrounded by altered vegetation, asphalt, and structures. Urban sprawl can lead to population extirpation and decreased biodiversity within patches. Critical habitat for many reptile and amphibian species has already been lost in Santa Monica Mountains National Recreation Area where one-third of species are listed as rare, threatened, or endangered. We will present species richness and diversity results and relate them to habitat patch size, isolation, and age. We will also discuss DNA analysis that revealed fine-scale genetic structure in three common lizard species. All three species showed significant reductions in gene flow over relatively short geographic and temporal scales. Our results suggest that intense urban development may represent the most severe form of fragmentation, with minimal effective movement through the urban matrix.

Value proposition: **Educate audience members of the detrimental effects of urban sprawl on biodiversity, to inspire protection of threatened ecosystems.**

Keywords: **urbanization, reptiles, biodiversity**

Lead author • session organizer • poster / demo / exhibit presenter:

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Natural Resource Management within the Mesoamerican Biological Corridor of Panama

5560

Poster

The land management techniques of small-scale farmers in communities around Santa Fe National Park and the Santa Maria watershed in central Panama have been identified as a cause of biodiversity loss. This is an area of biological importance as it forms part of the Mesoamerican Biological Corridor. To reconcile conservation and development needs around the park and within the watershed, reforestation projects targeting farming associations have been promoted by government agencies and organizations. These efforts are designed to protect biodiversity, conserve water resources and improve livelihoods through income generation. Drawing on semi-structured interviews, this research explores the interactions of institutions acting at various scales to influence land use decision-making processes of small-scale farmers, NGO personnel, and government agencies involved in reforestation projects in and around the park and within the larger context of the Santa Maria watershed.

Value proposition: My poster will expose the audience to current challenges of managing natural resources at various scales within the Mesoamerican Biological Corridor in central Panama.

Keywords: farmers, Panama, park

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Arthur Carhart National Wilderness Training Center

5071

Exhibit

The display, and associated materials, explores the Arthur Carhart National Wilderness Training Center's opportunities in fostering interagency excellence in wilderness stewardship. The displays primary message is preserving the values and benefits of wilderness for present and future generations by connecting agency employees and the public with their wilderness heritage through training, information and education. Training: serves to improve consistency and collaboration in the on-the-ground wilderness decisions among managers, stewardship skills among wilderness staff and wilderness awareness among agency employees. Information: enhances knowledge transfer among the natural/cultural resource workforce, scientists, educators, students and the public through ready access to a broad base of current and timely wilderness information on www.wilderness.net. Education: fosters a development of a personal stewardship ethic and support for wilderness among American public by increasing awareness, knowledge, and understanding of their wilderness heritage.

Value proposition: **Learn what the interagency Arthur Carhart National Wilderness Training Center offers in wilderness training, information and education enhancing stewardship of the National Wilderness Preservation System.**

Keywords: **Wilderness, Training**

Lead author • session organizer • poster / demo / exhibit presenter:

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Bighorn Sheep Response to Restoration of Winter Range at Kootenay National Park, BC

5144

Paper

Since 1985 a trans-boundary herd of bighorn sheep (Ovis canadensis) at Kootenay National Park has abandoned traditional winter range in favour of artificial habitats within a residential community. This has led to habituation of sheep to humans and high rates of sheep-vehicle collisions along an adjacent highway. Our multi-jurisdictional team carried out ecosystem restoration activities, including tree removal, brushing, non-native plant control, and prescribed burning, beginning in 2003 on a 200 ha block of potential bighorn winter range. We monitored bighorn sheep response using GPS radio-telemetry. Study animals increased their use of the treated area from < 1.0% of annual daily locations in 2002 (pre-treatment) to 4.8% from 2004 to 2008 (post-treatment; $P < 0.001$). Our results demonstrate that even mountain ungulates with poor ability to exploit new habitats may occupy restored areas if habitat suitability is high and the areas are located adjacent to occupied ranges.

Value proposition: **Case study of large mammal response to restoration with pre- and post-treatment habitat use telemetry data.**

Keywords: **bighorn, restoration, telemetry**

Lead author • session organizer • poster / demo / exhibit presenter:

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Rick Kubian, Banff, Yoho, and Kootenay National Parks

Connectivity Beyond Park Boundaries: Using Regional Data to Help Manage NPS Water Resources

5386

Paper

Water quality issues do not begin or end at the boundaries of our national parks. The 2012 Revisiting Leopold report challenges us to practice large-scale stewardship and understand connectivity across seascapes. New efforts to integrate local and regional water quality data give park managers a more holistic perspective on park water quality issues and help identify needed management actions. Two approaches to developing a broader view of water quality will be described and illustrated with park examples. The first approach synthesizes existing water quality data and places national park water quality into a regional context. The second approach uses the US Environmental Protection Agency's (US EPA) National Coastal Condition Assessment (NCCA) methods to advance regional-scale water quality monitoring. A comparison of these approaches to understanding water quality at the seascape level will be presented.

Value proposition: **The audience will learn about two pilot projects, and how the results from this work can assist NPS in large-scale stewardship of our coastal waters.**

Keywords: **water quality,stewardship**

Lead author • session organizer • poster / demo / exhibit presenter:

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Hydraulic fracturing and national parks: impacts of the changing energy landscape

5348

Poster

Hydraulic fracturing is used to extract oil and natural gas from deep shale formations in shale plays and basins. This puts hydraulic fracturing in close proximity to national parks, introducing significant risks to park resources and values. The National Parks Conservation Association's Center for Park Research evaluated the current research on hydraulic fracturing and its resource impacts to catalog known or expected impacts to national parks. Parks nearby to oil or gas fields might expect to suffer immediate impacts to park viewsheds and soundscapes, while impacts to park wildlife from habitat loss and fragmentation might unfold over longer time periods. Contamination of surface and groundwater is a potential risk parks face; furthermore, the long-term consumptive water use for fracturing threatens water-dependent resources. America's changing energy landscape has many potential benefits, but mindful planning and careful analysis will be necessary to mitigate impacts to parks and protect park resources.

Value proposition: **Viewers will gain a better understanding of the threat of hydraulic fracturing, particularly the geographic variability and the different time scales of possible impacts.**

Keywords: **fracking, impacts**

Lead author • session organizer • poster / demo / exhibit presenter:

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Joseph Suess, National Parks Conservation Association

James Nations, National Parks Conservation Association

Urbanization and the Refuge System: A Case Study of Visitors to National Wildlife Refuges

5529

Paper

Urbanization is impacting how people think about and interact with the great outdoors. For example, urban residents exposed to fish and wildlife through indirect means only (e.g., television, internet) may consider certain types of interactions with wildlife acceptable (e.g., feeding, petting), inviting potential wildlife-related conflict. Urbanization has also been implicated in increased participation in wildlife observation, decreased participation in hunting and trapping, and changes in public thought regarding how fish and wildlife should be managed. In light of these changes, the Refuge System is exploring options for understanding and meeting public expectations across different levels of urbanization. Do urban residents differ from people living in rural areas, and, if so, in what ways? Furthermore, are visitor expectations different at "urban refuges" versus "rural refuges"? To explore such questions, we present results from an analysis of data collected during a 2010-2011 nationwide survey of visitors to national wildlife refuges.

Value proposition: **Results provide an understanding of visitors and their experiences across different urbanization gradients in the context of fish, wildlife, and habitat management.**

Keywords: **urbanization, refuges, visitors**

Lead author • session organizer • poster / demo / exhibit presenter:

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Natalie Sexton, U.S. Fish and Wildlife Service

Visitor Experience Considerations in Transportation Planning for Protected Areas

5205

Paper

As federal land management agencies begin to undertake long range transportation planning, considerations of how transportation systems can enhance visitor experience are critical to setting the course for future initiatives. Transportation plays a major role in visitor experience, as it facilitates the movement of visitors to, within, and from the destination. Visitors have obvious, direct experiences with transportation systems, in which elements such as the comfort of the trip and the ease of access are consciously or unconsciously evaluated by the visitor. Equally as important to remember is that transportation systems and their infrastructure also impact visitors indirectly, such as by creating noise and impacting viewsheds. This session will cover important themes for analyzing visitor experience related to transportation, including assessing needs associated with wayfinding/information, access, parking, connectivity, and safety. Guidance for possible data sources and qualitative analysis will be provided along with case studies.

Value proposition: **Learn how to incorporate a highly subjective, qualitative subject area into an established, data-driven process in a way that enhances the process and the product**

Keywords: **visitor experience, transportation,**

Lead author • session organizer • poster / demo / exhibit presenter:

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PAD-US State Data Steward Workshop

5515

Workshop

The USGS Gap Analysis Program (GAP) invites Protected Areas Database of the United States (PAD-US) State Data Stewards to share their data aggregation experiences and address challenges to build capacity in the steward network and improve the PAD-US Standard. State stewards aggregate state, local government and private protected areas into a common geodatabase schema that increases the efficiency and accuracy of PAD-US updates. USGS GAP compliments state steward data with national updates from federal land managers, the National Conservation Easement Database (NCED) and NOAA Marine Protected Areas Inventory to complete the map of protection across the nation. PAD-US is updated annually to facilitate numerous land management and policy decisions. Limited travel scholarships are available.

Value proposition: **Stewards will learn from GIS colleagues and improve the PAD-US Standard as they share protected areas data aggregation experiences with USGS GAP and each other.**

Keywords: **GIS, protected areas**

Lead author • session organizer • poster / demo / exhibit presenter:
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Names of additional authors / panelists / presenters (if any):

"Connecting Students with Natural Sounds and Night Skies through Travel"

5422

Exhibit

Since 2008, nonprofit organization Global Explorers has partnered with the Natural Sounds and Night Skies Division of the National Park Service. A winner of the DOI Partners in Conservation Award, this partnership exemplifies how to successfully raise awareness of park-protected resources in diverse youth populations. The group works to use meaningful travel experiences to help young people create their own connections to threatened resources in NPS units and around the world. We will feature products of this partnership, including a podcast created by hearing impaired students at Grand Canyon, a natural sounds curriculum, a PSA about the importance of protecting the night sky, field activities, students' quotes, photos, and artwork, and more. The most important aspect of our work together is fostering a youth connection to natural sounds and night skies as threatened resources.

Value proposition: We hope to interact with the audience and encourage them to reach out to youth for resource preservation.

Keywords: Youth, Resource Awareness

Lead author • session organizer • poster / demo / exhibit presenter:

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Global Explorers partnership with Natural Sounds and Night Skies Division) julie@globalexplorers.org

Names of additional authors / panelists / presenters (if any):

Protected Areas as Tools to Address Climate Change and Protect Ecosystem Services

5244

Panel Discussion

The Convention on Biological Diversity's Strategic Plan for Biodiversity and associated "Aichi Targets" lay out a blueprint for stemming biodiversity loss by 2020. Target 11 identifies the need to expand protected areas to at least 17% of terrestrial and 10% of marine areas globally. Stronger social and economic arguments are needed to build political support for effective action, looking beyond biodiversity conservation to the range of other benefits supplied by protected areas. The panel, organized by the IUCN World Commission on Protected Areas, will focus on how protected areas can provide ecosystem-based approaches to mitigation of, and adaptation to, climate change: sequestering carbon, combating desertification, maintaining water services, safeguarding biodiversity and contributing to food security and disaster reduction. Case studies will show these ideas being applied in practice. People will be invited to contribute their experience and thus build collective understanding of protected areas as tools for supplying ecosystem services.

Value proposition: **Understanding of how protected areas can help mitigate and adapt tp climate change: assessing potential; tools for implementation and associated national and international political processes**

Keywords: **climate, ecosystem services**

Lead author • session organizer • poster / demo / exhibit presenter:
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Names of additional authors / panelists / presenters (if any):

Ernesto Enkerlin, Chair, IUCN World Commission on Protected Areas (WCPA)
Stephen Woodley, Parks Canada (on secondment to IUCN)
David Reynolds, US National Park Service (on secondment to IUCN)
Nigel Dudley, Equilibrium Research

Achieving Economic Efficiencies and Sustainability of Wildland Fire Programs in the National Park Service

5190

Poster

Faced with constrained budgets and the need to create a sustainable organization that meets agency mission needs, a system was developed to facilitate cost-effective allocation. The system evaluated four different program attributes: number of wildfires, frequency of large wildfires, amount of area within each park that is proximal to park infrastructure and park boundaries where a need for recurring treatment of hazardous fuels is evident, and amount of area within each park that should burn annually in order to maintain the historical fire regimes. The analysis provided a method to stratify park units with similar workloads into "bands". Each band was examined in detail in order to characterize the workload and establish a minimum level of permanent staffing. A regression analysis was used to establish minimum permanent staffing for each individual park. The staffing levels suggested by the system are being used by agency leadership to adapt to budget fluctuations.

Value proposition: **The NPS must have a process for prioritizing it's investments in dealing with wildland fire and fire-dependent ecosystems.**

Keywords: **wildland fire**

Lead author • session organizer • poster / demo / exhibit presenter:

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Andy Kirsch, Wildland Fire Management Analyst

Liz Struhar, Wildland Fire Planning Specialist

Towards Metrics and Policies to Protect Natural Lightscapes

5548

Paper

With the advancement of instrumentation to quantify night sky quality, the NPS has developed a range of metrics to inform land managers regarding the degree of degradation from anthropogenic light. These metrics are based around a natural sky model, which are used as a reference condition. Metrics address the total brightness of the celestial hemisphere as well as the glare, or light trespass, which illuminate the landscape. Where possible, functional effects of exceeding certain values are explained. The initial forays of applying these metrics will be discussed. First, for the selection and management of outdoor lighting in or near protected areas. Second, for the use in policy development and the environmental compliance process.

Value proposition: **Learn about the metrics and standards NPS Natural Sounds & Night Skies Division has been working on to protect night skies.**

Keywords: **metrics, lighting, compliance**

Lead author • session organizer • poster / demo / exhibit presenter:

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Chad Moore (co-presenter)

Frank Turina (co-presenter)

Protecting Large Wilderness Areas from Light Pollution: Challenges and Successes

5550

Paper

Large wilderness areas, especially in the southwestern U.S. and along the Pacific Slope, have long been thought of as the last refuge of pristine night skies in the conterminous 48 United States. Recent sky quality data from the National Park Service Night Skies Program is examined and compared to sky glow models for many of these areas, including North Cascades, Mount Rainier, Lassen Volcanic, Yosemite, Kings Canyon, Sequoia, Grand Canyon, Bryce Canyon, and Joshua Tree National Parks, and Walnut Canyon, Sunset Crater, and Wupatki National Monuments. The sources of sky glow that causes impairment to the sky quality within these parks is identified and analyzed with regard to mitigation or improvements that can be achieved. Wilderness land managers must find ways to influence development and maintenance of outdoor lighting in neighboring communities and large cities up to 200 km distant to effectively protect the natural night lightscape within protected areas.

Value proposition: Important science for wilderness managers or those interested in landscape scale conservation

Keywords: skyglow, lighting, wilderness

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Society for Wilderness Stewardship

5034

Exhibit

The Society for Wilderness Stewardship is the national membership organization dedicated to informing, uniting, and supporting the extensive community groups and individuals actively engaged in stewardship of America's National Wilderness Preservation System. Our mission is to advance the profession of wilderness stewardship, science, and education to ensure the life-sustaining benefits of wilderness. SWS members include a wide range of people interested in the stewardship of wilderness: researchers, managers, educators, government and private conservation workers, volunteers, students, business owners, and American citizens. This exhibit will introduce attendees to the mission and vision of SWS and highlight the partnerships that SWS has formed with federal agencies and other organizations. It will demonstrate our ongoing involvement in wilderness character monitoring projects, the development of a wilderness ranger training academy, and planning efforts related to the 50th Anniversary of the Wilderness Act.

Value proposition: **Viewers will learn how SWS and its partners are advancing the professions of wilderness stewardship, science, and education to ensure the life-sustaining benefits of wilderness**

Keywords: **wilderness, stewardship, partners**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Society for Wilderness Stewardship Annual Board of Directors Meeting

5036

Business Meeting

The Society for Wilderness Stewardship is the national membership organization dedicated to informing, uniting, and supporting the extensive community groups and individuals actively engaged in stewardship of America's National Wilderness Preservation System. Our mission is to advance the profession of wilderness stewardship, science, and education to ensure the life-sustaining benefits of wilderness. SWS members include a wide range of people interested in the stewardship of wilderness: researchers, managers, educators, government and private conservation workers, volunteers, students, business owners, and American citizens. This meeting is the annual business meeting of the SWS Board of Directors. Topics for this meeting include: strategic goals and planning, membership and recruitment, finances and fundraising, internal committee activities, and program outcomes and accomplishments. Time may also be allotted to engage and interact with conference attendees and other interested members of the public who share the goals and mission of SWS.

Value proposition: **Attendees will discuss the strategic goals and objectives of SWS. They will discuss and develop the action plans for ongoing organizational programs and efforts.**

Keywords: **Wilderness, stewardship, partnership**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Ralph Swain, Region 2 Wilderness Program Manager, USDA–Forest Service
Tom Carlson, Secretary-Treasurer, Society for Wilderness Stewardship

Understanding Gender Differences and Constraints of Wilderness Experiences

5042

Paper

Wilderness and protected area managers promote opportunities for wilderness experiences to a diversity of users. Despite these efforts, constraints for wilderness participation still exist. A recent trend study in the Boundary Waters Canoe Area Wilderness found that over the last forty years male visitors outnumber female visitors by a 3:1 ratio. While gender differences did exist, their demographic profiles, preferences of social conditions, and attitudes towards wilderness management were not significantly different. This paper examines why constraints still exist for female participation in wilderness experiences and ways individuals negotiate these constraints. It will consider how socialization into outdoor recreation skills, activity networks, family dynamics, and motivations to continue activities play a role in gender differences in wilderness. It also presents strategies to assist in the negotiation of constraints and presents recommendations for how managers can encourage and promote wilderness experiences to greater segments of the population.

Value proposition: **Attendees will gain an understanding of constraints women face in wilderness experiences. Strategies for negotiating constraints and increasing opportunities for wilderness experiences will be discussed.**

Keywords: **Wilderness, constraints, experiences**

Lead author • session organizer • poster / demo / exhibit presenter:

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Dr. Lynn A. Dominguez, Associate Professor, Central Michigan University
Dr. William T. Borrie, Professor, University of Montana-Missoula

The U.S. Fish and Wildlife Service Catalog (ServCat): Data Repository for the Service

5208

Paper

The National Wildlife Refuge System (NWRS) has created a centralized repository, called the Service Catalog or ServCat, which is a clone of the Integrated Resource Management Applications (IRMA) Data Store application developed by the National Park Service (NPS). ServCat is a centralized web application that is used to catalog, store and retrieve information, such as reports, surveys, databases, geospatial data and images. The NWRS initiated a pilot data mining effort in which data technicians were sent to at least one wildlife refuge in each region to catalog, scan and document Service information in ServCat. This pilot focused on refuge annual narratives, management plans, reports, biological surveys, maps and GIS layers. To date, there are nearly 7,000 records in ServCat with digital holdings. ServCat was developed using service oriented architecture to ensure that records are available to other applications using web services, which increases efficiency and decreases redundancy.

Value proposition: **Historically important and management relevant Service information is centrally archived and made easily discoverable and retrievable using text and geospatial search tools within ServCat.**

Keywords: **ServCat, Data, Repository**

Lead author • session organizer • poster / demo / exhibit presenter:
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Names of additional authors / panelists / presenters (if any):

How the Salmon Crossed the Road: Northwest Case Studies in Interdisciplinary Resource Protection

5122

Panel Discussion

Olympic National Park is home to wild salmon, wild rivers, a long history of human use and occupation, and both scrutiny and support from a wide range of stakeholders. Dwindling budgets, potentially conflicting resource and visitor experience objectives, and heightened stakeholder interest can challenge the ability of public land managers to meet our legal mandates in ways that also fulfill the interests of gateway communities, partner agencies, and local and Tribal governments. Through real project scenarios at Olympic National Park, we discuss how fisheries biologists, civil engineers, archeologists, planners, and other park staff worked across disciplines to develop and implement several successful projects that used innovative techniques to protect and improve resource conditions and support community goals. Panelists will describe how interdisciplinary teams can successfully navigate the sometimes turbulent waters of project management to maintain visitor access, protect and improve park resources, and build strong relationships internally and with partners.

Value proposition: **Through case studies, participants will learn an interdisciplinary approach to planning and project management resulting in improved conditions for rivers, roads, and historic properties.**

Keywords: **Interdisciplinary, team, resource**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Carl Elleard, Program Manager, National Park Service, Glen Canyon National Recreation Area
Teresa Tucker, Chief of Planning and Compliance, National Park Service, Glen Canyon National Recreation Area
Patrick Crain, Chief Fisheries Biologist, National Park Service, Olympic National Park
Dave Conca, Cultural Resources Program Manager, National Park Service, Olympic National Park

Nuisance Management in National Park Waters

5396

Poster

Aquatic nuisance species are becoming established in waters across the United States and can dramatically impact native systems that the National Park Service is charged with maintaining. Introduced animals include non-native mussels, Asian Carp, lionfish, snakeheads, and a variety of plants and algae. Spread of these species can be attributed to recreationalists, hobby collectors, ballast water releases, bait release, and targeted introductions. Impacts to water quality, plant, and animal life are varied and may result in the loss of native species and habitats. The NPS is working with partners to manage the spread and reduce the population of nuisance plants and animals across the country.

Value proposition: **Audience will learn of a variety of aquatic invaders and focused efforts to evaluate and manage impacts to native aquatic systems.**

Keywords: **aquatic nuisance species**

Lead author • session organizer • poster / demo / exhibit presenter:

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A Forward-Looking Retrospective of Leopold's "A Conservationist in Mexico"

5554

Paper

Aldo Leopold's excursions into the northern Sierra Madre Occidental in Chihuahua inspired a series of essays, including his 1937 "Conservationist in Mexico." 75 years after these forays into northern Mexico, logging, mining and cattle grazing have indeed changed the "lovely […] picture of ecological health." Old-growth forests replaced by managed stands, grasslands fragmented by fences or converted to agriculture, and streams and hydrologies severely altered. Imperial Woodpeckers, Mexican Grizzlies, and Mexican Wolves extirpated by a combination of targeted elimination and large scale degradation of ecosystem processes and function. Recent conservation efforts by government agencies and civil society groups to protect, maintain and restore ecosystem, landscape, and watershed health, are halting or reversing some of these trends. As we face this century, Leopold's words resonate to seize "the opportunity for a great international research enterprise which will explain our own history and enlighten the joint task of profiting by its mistakes."

Value proposition: **Audience members will learn about the advances made by Mexico's government agencies and civil society sector in conservation and opportunities for transboundary collaboration.**

Keywords: **transboundary ecosystem conservation**

Lead author • session organizer • poster / demo / exhibit presenter:

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Citlali Cortés Montaño - Postdoctoral Researcher, Legacy for Sustainability-Tecnologico de Monterrey

Grand Canyon Overflights: Where Are We and How Did We Get There?

5598

Paper

Grand Canyon National Park has been on the cutting edge for aircraft overflight and noise issues in parks for more than 25 years. This history of controversy, collaboration, and innovation provides context for recent proposals for changes in regulations and other events which are rapidly unfolding in 2012 and early 2013. This paper will provide up-to-date information in context at the time of the conference, with information of interest – policy, technical, scientific, planning - to many other protected areas with overflight and noise issues.

Value proposition: **Controversy! Innovations! Noise modeling! Stakeholders! Policy! Law! Learn how Grand Canyon overflight and noise issues are different from yours, and also similar.**

Keywords: **overflight, noise**

Lead author • session organizer • poster / demo / exhibit presenter:

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Pulse Disturbances in Forest Invasion: The Importance of Interactions between Propagule Pressure and Disturbance Characteristics

5438

Paper

In this study, we quantified the impact of the short-term, transient disturbance caused by gypsy moth (Lymantria dispar) canopy defoliation on the invasion of three exotic plant species (Alliaria petiolata, Berberis thunbergii, and Microstegium vimineum) in the Delaware Water Gap NRA. Gypsy moth defoliation events are often seen as a nuisance but with little long term ecological impact due to the rapid rate of recovery following disturbance. We investigated the importance of this pulse disturbance and its interaction with propagule pressure in contributing to long-term patterns of exotic plant invasion. Our results suggest that even short-term, pulse disturbances can have significant and long lasting impacts on the extent of exotic plant invasion and further highlight the need to quantify propagule pressure and it's interaction with disturbance characteristics in order to understand the complex outcomes for exotic plant abundance and community invasibility.

Value proposition: **The objective of this presentation is to improve understanding of the potential impacts of pulse disturbances on the extent of exotic plant invasion in forests.**

Keywords: **exotic, disturbance, invasibility**

Lead author • session organizer • poster / demo / exhibit presenter:

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John Battles, UC Berkeley

Assessing the thermal sensitivity of brook trout streams to climate change

5605

Paper

As part of a larger brook trout conservation study, we assessed the thermal sensitivity of streams to climate change in Delaware Water Gap National Recreational Area and considered potential management options. We developed linear regression slopes relating stream temperatures to air temperatures from data collected at 104 stream sites during the summer of 2010. Streams sites exhibited considerable variability in this regard, and cluster analysis identified groups of high sensitivity sites (mean slope = 0.60), moderate sensitivity sites (mean slope = 0.45), and low sensitivity sites (mean slope = 0.20). ANOVA models indicated a dominant effect of headwater impoundments on increasing sensitivity of stream temperatures to air temperatures. Although local factors were not negligible (e.g., local solar incidence and canopy cover), we suggest that management of headwater impoundments may have the greatest potential to decrease the sensitivity of brook trout streams to climate change in the study area.

Value proposition: **The methods and results presented will be useful to people involved with developing Climate Change Vulnerability Assessments and Adaptations, particularly regarding cold water stream fish.**

Keywords: **temperature, streams, vulnerability**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

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John Young, Research Biogeographer, U.S. Geological Service Aquatic Ecology Branch, Leetown Science Center, Kearneysville, WV.

Craig Snyder, Research Ecologist, U.S. Geological Service Aquatic Ecology Branch, Leetown Science Center, Kearneysville, WV.

State of the Park Reports for U.S. National Parks: Key Lessons Learned to Date

5049

Workshop

The National Park Service has begun developing State of the Park reports (Call to Action item #28) to communicate complex information about the condition of priority park resources and values to visitors and partners, and to our own park managers and staff. Each park's report summarizes the status and trend in the condition of natural resources, cultural resources, visitor experience, and park infrastructure, and highlights park stewardship activities and accomplishments to maintain or improve the State of the Park. This interactive workshop will provide a forum for discussing the key lessons learned from the development of the first 10 State of the Park reports, the frameworks and tools being developed to streamline the process, and the proposed plans for developing at least 50 park reports by 2016.

Value proposition: **The workshop provides an interactive forum for discussing the key lessons learned from the first year's experience with developing State of the Park reports.**

Keywords: **condition, synthesis, communication**

Lead author • session organizer • poster / demo / exhibit presenter:

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Bob Page, Director, Olmsted Center for Landscape Preservation, National Park Service

NPS Superintendents Leadership Roundtable Affinity Meeting

5151

Affinity Meeting

This two hour affinity meeting is an opportunity for participants in the NPS Superintendents Leadership Roundtable (SLR) program to share experiences and expand their network. The NPS Conservation Study Institute (CSI), in partnership with the Learning and Development Office, supports and manages the SLR program where 140 superintendents from around the country meet yearly in 10 cohort groups to participate in facilitated peer-to-peer discussions about contemporary challenges and complex leadership responsibilities. This affinity meeting will offer SLR participants the ability to network with participants from cohort groups other than their own. It will also offer the opportunity to discuss program enhancements related to the NPS Collaborative for Innovative Leadership, an agency-wide network for connecting NPS employees and partners through communities of practice to foster creativity, innovation, and transformative leadership on key issues and initiatives.

Value proposition: **Participants in the NPS's Superintendent Leadership Roundtable Program will meet members from other cohort groups, expand their network, share experiences, and discuss program enhancements.**

Keywords: **Superintendents, leadership,**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Lessons Learned during the Elimination of Non-native Animals from Channel Islands National Park

5481

Paper

The National Park Service began in the 1950s to attempt to eliminate destructive non-native animals from the Channel Islands. The first success came in 1976 with the elimination of burros from San Miguel Island. This was followed by the elimination of rabbits from Santa Barbara Island, rats from Anacapa Island, sheep and pigs from Santa Cruz Island, and pigs, cattle, deer, and elk from Santa Rosa Island. The only remaining non-native mammal on the park islands is the black rat on San Miguel Island. Each removal involved challenges. Adequate funding and the technical capability to achieve eradications are obvious requirements. Additional necessities are capable partners, planning that can withstand legal challenges, political and upper management support, and substantial ecological knowledge. The lessons learned from animal eradications can inform the bold actions that future protected area managers will need to take in order to achieve stewardship goals.

Value proposition: **They will learn the variety of challenges that we faced as we tried to eliminate non-native animals. Each project was unique.**

Keywords: **ecological restoration**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Russell E. Galipeau, Jr., NPS-Channel Islands National Park

Volunteers-in-Parks: Relmagining Service

5559

Exhibit

Volunteers play a role in every aspect of resource stewardship on public lands. They come from all over the United States, and the world, with different backgrounds, skills, and talents that enrich every division in a park. Volunteers of all ages come as individuals or groups and include Student Conservation Association (SCA), Artists in Parks, Senior Ranger Corps, Campground Hosts, Boy Scouts, and Girl Scouts. In 2011 the NPS reported a total of 229,111 volunteers contributing 6,714,493 hours of service. This is a huge benefit to parks monetarily and an avenue for civic engagement that pays dividends into the future. This exhibit explores the diversity of volunteer programs already offered in NPS sites around the country, and challenges viewers through observation and dialogue to re-imagine service as we approach the agency's centennial.

Value proposition: **Through this exhibit viewers will learn about new trends in volunteer engagement, and have the opportunity to meet NPS Servicewide and Regional Volunteer Program Coordinators.**

Keywords: **Volunteers, service, engagement**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Conflict and Confluence: Rethinking History and Cultural Heritage

5649

Focus Session

TBD

Value proposition: TBD

Keywords: history, cultural heritage

Lead author • session organizer • poster / demo / exhibit presenter:

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TBD

Monitoring Breeding Tidal Marsh Birds in NPS Northeast Coastal and Barrier Network Parks

5404

Poster

Tidal marsh habitat encompasses only 45,000 km2 world-wide. One third of this rare ecosystem is located along the Eastern Atlantic coast of the United States, making the National Park Service (NPS) a key owner and steward of this important resource. In 2011, the NPS Northeast Coastal and Barrier Network (NCBN) added long term monitoring of breeding tidal marsh birds as a component of the NPS Vital Signs Monitoring Program. The Network has taken part in a large three-year collaborative called the Saltmarsh Habitat & Avian Research Program (SHARP). The NCBN is expanding this program and has developed a sampling design and citizen-based monitoring program to continue monitoring tidal-marsh birds long-term. Birds that utilize salt marsh habitat are considered excellent ecological indicators of marsh health. This information will help to provide park managers with a better understanding of salt marsh health and the necessary information to continue to implement conservation strategies.

Value proposition: **The NCBN is developing a protocol and citizen-based program for monitoring long-term trends in tidal marsh bird populations in its parks.**

Keywords: **marsh, birds, monitoring,**

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Park Institute for the Future

5222

Café Conversation

The Park Institute would facilitate dialogue on broad policy issues facing parks and protected ares, and look beyond the boundaries of these areas for issues impacting them. It would look at the role parks can play in a dialogue for sustaining human communities and societies, and be a think tank facilitating discussion and projects on major environmental/cultural questions that impede the ability of parks to reach their significant potential to guide society actions on sustainable natural and cultural resource management. The current Institute concept focuses on creating and defining an American value system that portrays the national park idea as basic tenet underlying resource policy in American society.

Value proposition: **Members will provide constructive input to this proposal and help determine how the Institute's vision, mission and goals might interact with those of the GWS.**

Keywords: **Park Institute**

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Don Field, Executive Council Member, and possibly another EC member (Dan Sealy), and Brent Mitchell (GWS) -- invited to participate.

Integrating Social Science into Ocean and Coastal Management: Interagency Working Group on Ocean Social Science

5620

Poster

The Interagency Working Group on Ocean Social Science (IWG-OSS) comprises social scientists representing U.S. federal agencies with ocean-related responsibilities. The IWG-OSS provides input on how agencies can enhance current policy, management, and research activities through incorporation of social science, and thereby better inform ocean- and coastal-related decision-making. The working group's efforts are focused on three key areas: (1) coastal and marine spatial planning, (2) resiliency and

adaptation to climate change and ocean acidification, and (3) informed decision-making and improved understanding of ocean, coastal, and Great Lakes governance. Current efforts include addressing gaps in agency social science capacity; coordinating across scientific and management communities to identify priority data needs; providing input on best practices for incorporating social science in planning and management actions; developing guidance for evaluating site-based and program effectiveness; and fostering a robust community of practice for ocean, coastal, and Great Lakes social science.

Value proposition: **Increased awareness of the IWG-OSS and its role in coordinating and supporting U.S. ocean, coastal, and Great Lakes management, planning, research, and governance.**

Keywords: **marine, social science**

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Mercury in the National Parks: Current Status and Effects

5236

Paper

Mercury is a globally distributed contaminant that can harm human and wildlife health, and threaten resources the National Park Service (NPS) is charged with protecting. Due in part to emissions from coal-burning power plants, even remote environments receive mercury deposition from the atmosphere. Mercury monitoring initiatives indicate that mercury deposition is increasing or is elevated in many national parks; and fish and other biota in parks have been found to contain levels of mercury above toxicity thresholds for impacts to both humans and wildlife. Current research coordinated by the NPS on the effects of mercury includes broad-scale assessments of mercury in fish, dragonfly larvae, and songbirds across 30+ national parks. Fish provide the trophic link to human and wildlife health, dragonfly larvae can describe fine-scale differences in mercury levels, and songbirds shed light on the risk to terrestrial ecosystems. Findings are being incorporated into science syntheses and other communication efforts.

Value proposition: **This presentation will contribute to the understanding of mercury and what national parks can do to get involved in the issue.**

Keywords: **airborne, mercury, parks**

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Water Resources: Hands-on Learning and Community Science

5247

Sharing Circle

Stewardship of water resources is key to protecting both natural and cultural resources. Community science and hands on learning allows resource managers to promote relevant and accessible education activities. By participating in interdisciplinary hands on activities, park visitors will have first-hand knowledge of park resources. Stewardship of park resources cannot occur without relevant engagement with diverse audiences. This sharing circle will sample activities and methods used to address critical groundwater resources at Kaloko Honokohau National Historical Park.

Value proposition: **Participants will learn about the role of education and outreach in resource stewardship and participate in hands on activities that promote community science.**

Keywords: **water, community science**

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Stephanie Flores, Education Specialist, Colorado State University

Managing Barrier Island Breaches: Preserving Natural System Function and Protecting Private Property and Cultural Resources

5096

Paper

In the absence structures constructed to stabilize shorelines, breaching of barrier systems during storm events is a somewhat routine event. It is well established that barrier island breaches are ecologically beneficial resulting in an exchange of water between the bay and ocean increasing salinity and enhancing flushing and water quality. Breaching also provides the sediment pathways necessary for the formation of back-barrier sand flats and flood tidal deltas which form a diverse array of landforms and habitats enhancing biological diversity. However, along with these positive ecological benefits, high volumes of water can cause substantial flooding of homes and businesses. At Fire Island National Seashore along the south shore of Long Island, NY, the US National Park Service is working with the US Army Corps of Engineers and the USGS to develop a breach contingency plan which will maximize ecological and storm damage benefits within a highly visible and political environment.

Value proposition: **Listeners will gain a better understanding of how one national park is trying to manage a current controversial issue where both parties achieve their goals.**

Keywords: **coastal processes, breaches**

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BioBlitzes: Connecting people to nature while creating citizen scientists and natural resource stewards.

5336

Poster

The 2012 BioBlitz was hosted at Rocky Mountain National Park in partnership with the National Geographic Society; the sixth in a series of ten BioBlitzes held at a different National Park each year. The aim of the BioBlitz was to provide a unique visitor experience that encouraged discovery, create opportunities for scientists and the public to do field work together, add to the park's official species list, highlight the importance of protecting biodiversity, and encourage public stewardship of natural resources. This form of citizen science included discovery field sites in the park and a biodiversity festival in the Estes Park community. Field sites provided the opportunity for citizens and scientists to join together in making personal discoveries and conducting species counts to add to the park's official species list. The festival allowed participants to interact with biodiversity in creative and engaging ways through educational and hands-on activities.

Value proposition: How BioBlitzes as a form of citizen science are an effective tool for inspiring natural resource stewardship from diverse audiences with a focus on youth.

Keywords: bioblitz, citizen science

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The Changing Glaciers in the National Parks of the Rocky Mountain West, USA

5697

Paper

The American West is populated with over 8300 perennial snowfields and glaciers, many of which are located within National Parks. Since 1900 the glaciers have shrunk by an average of 45%, with regional variations from 24% – 66%. The magnitude of area change depends on both glacier size and regional location. Small glaciers (< 1 km2) show extreme variability in area change while larger glaciers show much less variation, probably due to the influence of local topography enhancing or diminishing regional climate variations. Glaciers in the Pacific Northwest have retreated less than those elsewhere underscoring the maritime. Long term trends in glacier shrinkage are controlled by warming air temperatures whereas precipitation is an important factor in decadal variability. Some glaciers appear to be relatively stable and even fewer are advancing. These glaciers are found on high volcanos, which provide unique conditions of elevation and geology beneficial to glacier stability.

Value proposition: **This presentation provides a comprehensive view of glacier change across all the parks in the American West over the past century.**

Keywords: **glaciers climate alpine**

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Hassan Basagic, Kristina Thorneykroft, and Steve Wilson, all of Portland State have all contributed to this study by their MS research projects.

The NPS Climate Database: A Solution for the Acquisition, Management and Reporting of Station Data

5075

Poster

Having an understanding of historical and current climatological trends is necessary for understanding the dynamic nature of park resources and their responses to climatic variations and change. However, the use of available climate data has been problematic due to the volume of observations, incompatible data formats, and the inconsistency of data access from multiple sources. To address these issues, the Inventory and Monitoring Division has developed a national-level climate data repository for the purpose of meeting the core data needs of all NPS staff. This solution includes (1) the synchronization of data with national-level data sources (i.e., GHCN/COOP, SNOTEL, SnowCourse, RAWS, and USGS), (2) the long-term management of data collected by the NPS; (3) open and timely access to all climate data in one consistent format.

Value proposition: Provides overview of climate database for use by all NPS staff

Keywords: climate, database, weather

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Evaluating and Reporting on the Status and Trend in Climate: Application of a Gridded Toolset

5385

Poster

NPScape is a landscape dynamics monitoring project that provides landscape-level data and tools for park natural resource management and planning at local, regional, and national scales. Climate data, along with its related analytical toolsets, have been recently integrated into the NPScape portfolio. The toolset provides the ability to easily acquire the best publicly available gridded climate datasets from PRISM, SNODAS, CRU, and SNAP. It then summarizes the gridded climate datasets for particular park geographies using statistical analyses. The analyses include average, percentile, and zonal statistics. With this toolset, climate data summaries are readily available to use to make informed resource management decisions. To showcase the utility of the toolset, we present an example application in Rocky Mountain National Park for the purpose of developing a standardized and reproducible methodology for the creation of annual park climate summaries.

Value proposition: Shows example use of toolset to generate an annual climate report

Keywords: climate, grids, reporting

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Geographic Approach to Wild and Scenic River Planning: Leveraging Geographic Information Science for River Management

5593

Paper

A robust GIS supports keystone elements of the current Merced Wild and Scenic River planning process—transparency, science, and public engagement. This GIS is part of the foundational planning framework, and informs natural and cultural resource management, visitor use and land use management in Yosemite National Park. Geospatial data were acquired, created, and analyzed to identify planning issues and opportunities in the Merced Wild and Scenic River Corridor. This data-driven, iterative process is being used by an interdisciplinary team of subject matter experts to understand planning constraints, identify options to protect resource values, and manage visitor access. This geographic, science-based approach to planning ensures accountability and transparency, and is being leveraged to foster public engagement in the plan. GIS is a foundational component of the planning process developed to meet the requirements of the complex legislative framework of the Merced Wild and Scenic River Comprehensive Management Plan.

Value proposition: **Learn about how to leverage GIS to organize and analyze complex issues and make informed, science-based management decisions that the public can understand.**

Keywords: **GIS, planning, involvement**

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Can a Park-based Plant Assessment Tool for Cultural Landscapes be Applied to an Entire Region?

5063

Paper

In 2010, the Presidio of San Francisco developed a protocol to evaluate landscape plants for use at the park level. Two factors were used to assess invasion risk: 1) whether the species was recorded as invasive elsewhere and 2) whether the species was invasive in similar regions. In addition to invasion risk, the Presidio added cross pollination risk, maintenance and historic compatibility. This process is now used to evaluate each species proposed for use in the designed landscape. Plants are placed on one of three lists: 1) approved, 2) prohibited or 3) approved with conditions. The collaborative process is a model for other parks. The approach is being tested for use in a similar effort for the 12 administrative park units in the National Capital Region. Applying this technique to the National Capital Region is complicated by gradients of development, ecology, and the availability of plant and historical data.

Value proposition: **Learn about a successful process to screen plants for use in cultural landscapes.**

Keywords: **Invasive, Cultural Landscapes**

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Maureen D. Joseph, Regional Historical Landscape Architect, National Park Service

Historical fire regimes of Little Bighorn Battlefield National Monument and their alteration since European settlement

5627

Paper

Mapping original fire regimes is a realistic goal for every Park and options exist for anyone having in-depth understanding of the landscape. At the Custer Battlefield I reconstructed pre-European fire regimes in 1876 using historical photos. The site had a lightning-driven fire regime, supplemented by Indians. The Little Bighorn River created a firebreak for cottonwoods, juniper and big sagebrush, all fire-refugial species, while prairies had intervals of 5-10 years on the fire exposed west side of the river and up to 50 years on the downwind side. Beginning in 1877, photos document a 135 year long cascade of changes that included saturation of the land with domestic livestock, cessation of the natural fire regime, increase in cottonwoods, juniper and sagebrush, and invasion by six plant species leading to increased fuel connectivity, increased fire spread and fire frequency and elimination of big sagebrush from all but its most fire sheltered habitats.

Value proposition: **Creation of presettlement fire frequency maps for every National Park. Participants will see one way to map of fire frequency without trees with fire scars.**

Keywords: **Fire Landscape History**

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Restoration of a Desert Spring System, Travertine Springs, Death Valley National Park

4775

Poster

Travertine Springs in Death Valley National Park were used as the primary water source for major developments in the heart of Death Valley. After valid concerns over water quality were brought to light, an EIS was approved to build a state-of-the-art water treatment system and restore spring function. In 2009 production wells went online, replacing the spring flow from Travertine Springs as the source of potable water for Furnace Creek and Timbisha Village developments. In 2010 a fire at Travertine Springs resulted in funding for the removal of over 500 non-native palm trees. The Travertine Springs Restoration Plan was completed. One of the most critical conclusions which guided the recommendations was the importance of the spring flow chemistry to threatened invertebrate species. DEVA staff are working to adjust water discharge, stabilize the site, restore surface water flow, continue monitoring efforts, and keep palms and tamarisk from reestablishing.

Value proposition: **Death Valley National Park is completing a successful multi-phase project to restore spring flow and ecosystem function in an extreme desert environment.**

Keywords: **Desert Springs, Restoration**

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Strategies for Inspiring the Next Generation of Young Scientists in our Parks

5104

Paper

In terms of parks and science, much has changed in the last generation for our youth. Studies indicate that young people today spend half as much time outdoors as their parents did, and spend an average of seven hours a day with electronic media. The proximity of the Golden Gate National Parks to many urban and suburban communities provides many opportunities to connect with local youth. Currently, this park provides a wide range of introductory and immersion experiences. How successful have these efforts been and what more can park managers do to generate an interest in ecology, a love of the outdoors and a passion for science? For this presentation, we cull through eight years of feedback from students and educational partners to provide suggestions for managers who are interested engaging more youth, developing a greater sense of connection to open space, and fostering an understanding of basic ecological concepts.

Value proposition: **This presentation will provide managers and staff with specific strategies for reaching, engaging and sustaining youth in the park programs and activities.**

Keywords: **Youth, Stewardship, Parklands**

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An Inside Look at the DOI National Interagency BAER Team Organization

5237

Poster

Since 1994, the DOI National Interagency Burned Area Emergency Response (BAER) Teams have demonstrated their worth in dealing with the aftermath of over 100 wildfires. Many of the fires have been the largest in their state. The teams have received commendations from local and state governments and many federal agencies. What does it take to put together a BAER Team? This poster will show the benefits of an Interagency, Interdisciplinary team and how a team can be put together to address the protection of life, property, and critical cultural and natural resources regardless of the disaster. This poster will identify the various disciplines to consider, their responsibilities, the products they would produce, and the technology used to hasten their aerial and ground assessments.

Value proposition: **Since 1994, the National BAER Teams have demonstrated their worth in dealing with wildfire. Its organizational structure has been adapted to address other disasters.**

Keywords: **BAER, Disasters, Wildfire**

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Dead Whales, Dead Wolves: Reconsidering Conservation and Managemen Thresholds in National Parks

5566

Paper

Cruise ships are the primary mechanism by which visitors access Glacier Bay National Park but their routes overlap with habitat used by endangered humpback whales. Consequently, there have been a number of known collisions between ships and whales both in the park and in adjacent waters. We used photographic mark-resight data to estimate population dynamics of humpback whales in Glacier Bay and forecasted population consequences under different levels of uncertainty in collision rate, collision detection, and ship density. Depending upon assumption, we found that ships could strike and a large number of whales before collisions would significantly impact or impair the population. We calculated the number of 'allowable' whale deaths before different management and conservation thresholds are exceeded. We consider an alternative approach developed in Yukon Charley Rivers National Preserve relative to wolf deaths from high levels of trapping.

Value proposition: **We consider quantitative examples when there is a clear disconnect between biological and societal values relative to wildlife thresholds**

Keywords: **wildlife, thresholds, impairment**

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Creating a Culture of Safety within NPS Field Research

5534

Café Conversation

In the summer of 2012, the Pacific West Region of the National Park Service mandated that all Inventory and Monitoring Networks in the region undertake Protocol Readiness Reviews to certify that each monitoring protocol "has sufficient resources and support to implement with full consideration for safety, field logistics, and supervisory oversight." To undertake these reviews, the San Francisco Bay Area Network held a series of site visits and meetings with field personnel and supervisors. We identified safety protocol improvements that have evolved through the history of field implementation. Lessons learned included logistical themes such as route modification and replacing or upgrading PPE, but a common theme transcending field conditions and study design was the need for diligent application of well planned and diverse communication channels. Here we will look at the interface of doing effective science in the field while ensuring that employees have the support necessary to work safely.

Value proposition: **Foster communication between groups confronting similar issues in order to share innovations and key observations that stand to improve safety performance.**

Keywords: **Safety, Program Management**

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Nita Tallent, Mojave Desert Network Inventory & Monitoring Program Manager, National Park Service

Considerations for Improving NPS Park Visitor Generated Natural History Data

5551

Poster

Different National Parks Service units have developed varied systems for tracking wildlife, plant, and other natural history observations recorded by park visitors. Park staff spend time transcribing hand-written or emailed reports into digital datasets, which sometimes vary in format between parks. In this poster, we consider the added value of consolidating these many efforts into a single, national database. Consistency of data format across the agency, a communication tool by which to reach park visitors even after they've left the park, the opportunity to join talents of both interpretation and research experts, and partnership opportunities are among the concepts we examine. Data infrastructure and outreach choices made by similar efforts at eBird, iNatualist, and Project Noah will be reviewed.

Value proposition: **Fostering communication between NPS units stands to improve data streams and staff efficiency in years to come.**

Keywords: **Citizen Science**

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What does "global climate change" mean to you? Visitors' responses across three diverse protected areas

5240

Paper

Many parks and protected areas provide climate change education but climate change is a phrase that elicits diverse images, meanings, and powerful preconceptions. Logically, it is difficult to provide education or measure opinions about the subject without using the term. Therefore, from 2010-2012, researchers investigated visitors' interpretation of the phrase "global climate change" at three diverse protected areas 1) Kenai Fjords NP (N = 337), 2) a reservoir in SC (N = 150), and 3) an estuary on the Atlantic Coast (N = 113). Researchers used semi-inductive coding to categorize visitors' responses and non-parametric analyses to evaluate the distribution of response categories across locations and demographics. Some response categories (e.g., reference to scale) demonstrated stability across locations and demographics, while other categories (e. g., risk and fear) varied significantly. The presenters highlight the implications for climate change interpretation and provide recommendations for designing scales to measure visitors' climate change perceptions.

Value proposition: **Audience members will learn about understanding the implications for climate change interpretation and necessary considerations when designing scales to measure visitors' climate change perceptions.**

Keywords: **global climate change**

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Natural Resources Recreation Planning and Management

Department of Parks, Recreation and Tourism

Protected area downsizing, downgrading, and degazettement (PADDD) in the United States

5192

Poster

Although conservation practitioners and policy makers assume that protected areas are permanent fixtures on the landscape, evidence suggests otherwise (Mascia and Pailler 2011). Efforts to document protected area downsizing, downgrading, and degazettement (PADDD) suggest that legal changes have been enacted since 1900 to change the size and strength of many protected areas. Legal changes fall into one of three categories: downsizes, downgrades (legal allowances of previously banned activities), and degazettes (complete removal of protection). PADDD is relevant to all federal agencies which manage public lands. Causes of PADDD range from industrial scale resource extraction to recreation. To understand impacts of PADDD, analyses will be conducted on one park and its corresponding ecoregion to understand the extent of landscape fragmentation. This study unites protected area policies with environmental degradation on the ground. The magnitude of PADDD across space and time suggest that protected areas should be recognized as dynamic systems.

Value proposition: **Audience members will view a map of PADDD events in the US on an interactive website (PADDDtracker.org) and learn about legal proposals affecting protected areas.**

Keywords: **policy, ecology, GIS**

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An integrated approach to coastal backcountry management and monitoring at Kenai Fjords National Park

5505

Paper

Managing visitor use impacts in coastal areas of Alaska National Parks is an increasing challenge. At Kenai Fjords National Park (KEFJ), coastal visitor use may be concentrated in more accessible areas, creating the potential for more rapid and severe impacts to resource and social values. KEFJ recently revised its campsite assessment protocol and completed surveys of site conditions. This data will be used for monitoring purposes and to analyze trends in campsite condition. Additionally, studies were initiated to identify indicators and standards of quality for coastal areas. A survey administered to backcountry visitors in summer 2010 identified several indicators of quality. Results from this phase of research informed a second survey administered in 2012 using normative and visual methods to formulate standards of quality for backcountry conditions. Results from this survey can be integrated with the campsite assessment data to identify areas where conditions are not within the visitor standard.

Value proposition: #NAME?

Keywords: standards, recreation, monitoring

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An Analysis of the Location and Impact of User-created Campsites in the Nordhouse Dunes Wilderness

5280

Paper

Nordhouse Dunes Wilderness is a small (3,500 ac) wilderness in Michigan managed by the USFS. This research was conducted to meet the Chief's Wilderness Challenge to bring all Wilderness areas up to a baseline level. We collected information about the location and impacts of user-created campsites. We analyzed the data using ArcInfo to help determine where illegal camping is occurring based on proximity to a road, trail, or water feature. We also determined how the impacts of camping vary across the wilderness which includes both sand dunes, grass, forested, and shore-line ecosystems. Management implications varied depending on the location, areal extent, density, and the magnitude of the impacts.

Value proposition: **Participants will learn about how to collect and analyze the impacts of user-created campsites as well as the management implications of the data.**

Keywords: **wilderness, campsite impacts**

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Tribal Marine Conservation and Marine Protected Areas

5379

Sharing Circle

This conversation will engage tribal and indigenous peoples, protected area managers, and marine cultural resource experts in a dialogue about tribal marine conservation interests, goals, and opportunities. This session will provide a forum to discuss current efforts, enabling practitioners to share success stories and lessons learned. Participants can discuss future opportunities to support tribal interests in marine conservation, including incorporation of indigenous knowledge and practices into protected area management, co-management of existing protected areas, and creation of new protected areas. The National Marine Protected Areas Center works in partnership with federal, state, tribal, and local governments, tribes, and stakeholders to ensure more efficient, effective use of MPAs now and in the future to conserve and sustain the nation's vital marine resources. The MPA Center can help coordinate and facilitate follow-up to this session.

Value proposition: **This session will facilitate dialogue among tribal and indigenous peoples, protected area managers, and marine cultural resource experts regarding tribal marine conservation goals and opportunities.**

Keywords: **tribal, marine, co-management**

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Stable Isotope Analysis to Determine Water Source in National Park Units in Southern Arizona

5354

Paper

Springs are one of the most rare, threatened and important resource in the arid Southwest. Hundreds of these fragile systems located in National Park Service units in Southern Arizona, face major threats from projected shifts in climate patterns, and increased human use, especially the sites in border parks. Basic information on these systems is needed to more effectively manage them. Understanding the hydroperiod of these sites is vitally important. During 2010-11, we collected water samples from 132 spring and tinajas sites in NPS units in Southern AZ, and conducted water quality and stable isotope analysis(18O 2H). This method proves useful in identifying which sites have major contributions from groundwater vs surface flow. This work allows for managers to focus management efforts on persistent sites with higher groundwater contribution, higher habitat and resource value.

Value proposition: **This talk will provide unique information to park managers and provide managers with a new tool to focus monitoring efforts.**

Keywords: **Stable Isotope, border**

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Riparian Vegetation Response to Wildfire: West Fork of the Gila River, NM

5366

Paper

The frequency, size and intensity of wildfires in the American Southwest have had a major impact on the ecosystems and management of National Park Service (NPS) units. In 2011 the Miller Fire burnt the entire riparian area of the park of Gila Cliff Dwellings National Monument in New Mexico. The NPS Inventory and Monitoring Program (I&M) is examining the impact of the fire on the riparian vegetation community structure, taxa abundance, vigor and recruitment. We collected data shortly after the fire (2011), and a year later (2012). We explain the I&M riparian vegetation sample design and methods used to conduct the survey; and report on the changes in riparian vegetation, including rates of tree mortality, recruitment, changes in composition by structure and form.

Value proposition: **An ongoing study of the response of riparian vegetation to a 2011 wildfire, including methods for monitor riparian vegetation.**

Keywords: **riparian, NPS, monitoring**

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An Adaptable Method for Monitoring Riparian Vegetation at Arid-land Springs and Streams

5380

Paper

Springs are one of the most rare, threatened and important resource in the arid Southwest. Hundreds of these fragile systems located in National Park Service units in Southern Arizona, face major threats from projected shifts in climate patterns, and increased human use, especially the sites in border parks. Basic information on these systems is needed to more effectively manage them. Understanding the dynamics of xeroriparian vegetation community in springs and ephemeral streams is important to understanding and interpreting the driving ecological processes at the sites and assess the quality and resilience of the habitat. The NPS I&M has developed an adaptable and scalable method for quantitatively monitoring xeroriparian vegetation for long-term monitoring. This method allows for maximum flexibility in light of the realities of working in remotes backcountry sites, including border areas; and fluid budget and staffing options.

Value proposition: Demonstrates a scalable method for quantitatively monitoring arid-land springs and tinajas

Keywords: springs, xeroriparian

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Progress and lessons learned from a community-led protected areas planning program in the arctic

5476

Paper

The Northwest Territories (NWT) offers a unique location for large-scale conservation planning. The NWT is a large territory over 128,000km2 and comprised mostly of intact northern boreal forests and arctic tundra. It is minimally populated with mostly aboriginal communities that retain strong cultural links to the land. There are four modern treaties signed, with additional negotiations taking place. Land use planning is occurring. The economy is dominated by the non-renewable resource sector. All of these factors must be considered during protected areas planning. To facilitate this, the NWT has a multi-stakeholder Protected Areas Strategy (PAS), a community-led program to identify and protect special natural and cultural areas, with a commitment to ecological representation. Communities identify areas of interest and stakeholders collaboratively make recommendations on boundary, land administration, and management. Considerable progress has been made despite some unforeseen challenges. This talk will highlight progress made and some of the lessons learned.

Value proposition: **Protected areas planning in a unique environment with intact arctic landscape, settled and unsettled land claims, land use planning, and a non-renewable resources dominated economy.**

Keywords: **protected areas planning**

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Karen Hamre, NWT Protected Areas Strategy

Conserving Bats and Protecting Buildings at Bryce Canyon National Park

5448

Paper

Bats have been observed emerging from historic structures at Bryce Canyon National Park for several years. In 2008, large numbers of bats emerging from the attic of the Bryce Lodge caused concern for visitor and employee safety as well as building preservation. A total exclusion of the building was proposed for the fall of 2012. To determine the seasonal time period in which bats were arriving and departing the structure, acoustic bat detectors were deployed to monitor bat activity from time of first detection through end of season departure/hibernation using three types of bat detectors. Sonobat 3.1 software was used to analyze recorded calls from all detector types. Fifteen species of bat were identified with a discrete probability of .90 or greater. Following the exclusion, seasonal monitoring of the Lodge and surrounding area will be important to assess effects to bat movement, re-colonization and species composition.

Value proposition: **The presentation is intended to share tools that can facilitate management decisions related to conserving bats while protecting historic structures.**

Keywords: **bats, detectors, structures**

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Career Academy for Natural Resources

5362

Paper

The National Park Service Career Academy concept had its origins in 2008 with approval by the National Leadership Council of a report on Learning and Development. Over the past several years individual career fields have been working to create discipline specific, competency-based learning opportunities. The Career Academy for Natural Resources began taking shape when the Training Manager for Natural Resource Stewardship led a subject matter expert group in the development of a draft framework. The framework provides a structure for organizing learning opportunities based on natural resource essential competencies at the developmental, journey and advanced levels. The draft framework was posted on the Natural Resource Training Website (www.nps.gov/training/nrs/) and is continually being refined. The effort continues with collaboration of employees from around the service. This presentation will focus on the Career Academy for Natural Resources Foundational Series currently under development with some components being delivered to natural resource professionals.

Value proposition: **Participants will learn how to utilize the Natural Resource Career Academy to advance their development as a natural resouce professional in the NPS.**

Keywords: **training, career academy**

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Factors Influencing Restoration of Three Iconic Species in the Yellowstone Ecosystem: Wolves, Bears, and Bison

5561

Paper

Over the last century, Yellowstone National Park has been the focal point for restoration of large mammal species, such as wolves, bears, and bison that were historically abundant and ubiquitous across the western United States. Efforts have been successful for all three species within the park; however, varying degrees of restoration success have been realized outside of park boundaries. Wolves and grizzly bears, although generally feared by some segments of the public, have expanded well beyond their original reintroduction site within the park and have approached recovered populations sizes throughout a large area of habitat within three surrounding states. However, while bison recovery within the park has been successful, little tolerance for migrating animals and regional range expansion outside of the park, has occurred. We review factors associated with the varying degrees of success in landscape-level restoration of these species.

Value proposition: **This presentation will help managers in other protected areas understand factors influencing restoration of controversial species and restore inact ecosystems.**

Keywords: **restoration predators migration**

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Kenyan Community Members' Perspectives of 'Environment' and 'Sustainability', and Their Connections with Protected Areas

5281

Paper

The Narok District in Kenya is an economically and environmentally fragile region, yet it is endowed with world-renowned protected areas – the Mau Forest and the Maasai Mara National Reserve. This region faces devastatingly destructive environmental practices. A study was conducted in 2012 to engage 38 community members in the construction of a shared understanding of the concepts of 'environment' and 'sustainability.' Photovoice (where researchers provide smartphones equipped with cameras so the participants could email photographs and narratives of important environmental issues), vignettes of derived themes, and focus groups were used to document and explore these concepts. Three major themes emerged during data analysis. A further examination of data and findings was conducted to explore connections between protected areas and the concepts of 'environment' and 'sustainability.' This work will contribute to increasing access for local and diverse populations to the field and discourse of environmental sustainability.

Value proposition: **Audience members will learn cross-cultural perspectives of important environmental concepts, and about critical environment/protected area issues in a globally significant area. Photovoice method demonstrated.**

Keywords: **Africa, environment, sustainability**

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Cassie Quigley - Clemson University, School of Education

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Megan Che - Clemson University, School of Education

Have Your Say! Shape How Tourism is Planned and Managed in Parks

5613

Workshop

Tourism presents challenges and opportunities for conservation. IUCN together with World Commission on Protected Areas (WCPA) plans to publish a 3rd edition of the highly popular publication, Sustainable Tourism in Protected Areas: Guidelines for Planning and Management. A new set of authors for these guidelines, affiliated with the WCPA Tourism and Protected Areas Specialist Group, plan a major redevelopment of the publication. We are seeking input from park practitioners. A proposed outline of the book will be presented to attendees, then breakout groups will be tasked to identify the park tourism topics that North American practitioners find most important, and related best practice examples. A similar workshop was recently held at the World Conservation Congress to collect input from Asian and international park operators, managers and policy makers. Input provide by GWS conference delegates will shape this important publication, which is scheduled to be released in 2014.

Value proposition: -identity North American priority park tourism issues; highlight best practice park tourism examples; learn about how to "plug into" the global protected area practitioner community

Keywords: tourism; management; guidelines

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Spatial analysis of public preferences, values and sense of place: locally compatible management

5632

Poster

Tourism and conservation are two main components of management of protected areas.. To determine visitors' impact on environment, it is necessary to understand their preferences. Factors affecting visitors' preferences can include human factors (individual characteristics, motivations, accompanying people), physical or spatial factors (geomorphology), trip factors (first-time or repeat visitor, secondary or main destination) and the time factor (length of stay, trip duration, season). As the result, visits should be an important pillar in environmental conservation, planning and policy formulation. Tourism analysis needs to consider the way individuals consume products to decrease possible conflicts between nature and tourism. This kind of analysis requires an examination of how the environment is used, by whom it is used, and upon what preferences and knowledge they are based. This poster investigates the application of value mapping to investigate the correlation of management priorities with multiple stakeholder values, sense of place and preferences.

Value proposition: **By understanding the relation of individual's values, sense of place and preferences, people can consider possibility of individualization of protected areas' management.**

Keywords: **Value, Preferences, attachment**

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Elk and Pronghorn Responses to Recreational Pathway Activities in Grand Teton National Park

5597

Paper

We conducted a Before-After-Control-Impact assessment of elk (Cervus canadensis) and pronghorn antelope (Antilocapra americana) responses to recreational pathway construction and use in an existing transportation corridor in Grand Teton National Park, USA. The number of elk viewed did not decrease and the distance of elk from the road did not increase in the treatment relative to the control after pathway installation. Further, the probability of elk behaviorally responding in the treatment was lower, not higher, compared to the control during and after pathway construction potentially suggesting tolerance or habituation to human activities. Pronghorn shifted farther from the road after construction in the treatment, supporting the prediction that pronghorn avoided pathway activities during the mid-season peak in park visitation. Despite direct habitat loss, widening the human footprint, and a shift in pronghorn groups away from the transportation corridor, pathway activities did not appear to greatly impact in the travel corridor.

Value proposition: **This case study offers insights regarding ungulate responses to new recreational pathways, particularly in parks with ungulates viewing opportunities.**

Keywords: **recreation, ungulates, pathways**

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Kevin R. Crooks

The Nature of the Sublime in Sequoia & Kings Canyon National Park

5256

Paper

The sublime as an aesthetic experience can be characterized as magnificent, evoking fear or awe, or is tumultuous, e.g. raging rivers, powerful storms, vast skies (Ferguson, 1992). Sublime experiences are frequently transformative and were central in the development of the National Park System (Nash, 1987). Therefore, it is important parks continue to foster such experiences. Understanding the role of the sublime in modern society may not only enhance park visitor experiences but also be useful in the evolution of park design and management. Using a mixed-methods approach, 172 visitors staying in Sequoia & Kings Canyon NP campgrounds during summer 2011 completed a 6-page questionnaire and photo-elicitation. Findings of this interdisciplinary study illustrate park visitors continue to have sublime experiences in SEKI; however, historical descriptions have been replaced by contemporary expressions. Further, we will discuss the relationships identified between sublime experiences, place attachment, and intentions to engage in environmentally responsible behaviors.

Value proposition: **Contemporary expressions of sublime experiences in national parks and their role in influencing environmentally responsible behaviors contextualized with contemporary park practices.**

Keywords: **sublime, aesthetic, place**

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Conserving the Future: Wildlife Refuges and the Next Generation

5344

Panel Discussion

The National Wildlife Refuge System faces unprecedented new challenges and Conserving the Future: Wildlife Refuges and the Next Generation is intended to inspire and empower current Service employees to lead the Refuge System in the coming decades. Our vision is to embrace a scientific, adaptive, landscape-level approach to managing refuge land and waters. This partner-based focus of conservation planning requires that we plan at landscape scales meaningful to wide-ranging wildlife. Along with these challenges, the organization needs leaders who are adaptive, visionary and committed to developing the next generation of conservation stewards. Our goal must be to align resources to effectively deliver our mission and serve the American people, while staying as lean as possible. Essentially, Conserving the Future is a call to action for Service employees to build on the excellent conservation done so far by working differently in the future than in the past.

Value proposition: **Implementation of Conserving the Future, embracing a landscape approach to planning and ensuring Refuges has the right employees to do the conservation work of tomorrow**

Keywords: **Vision, Planning**

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A Wilderness Meadow Restoration

5203

Poster

Decades of heavy use of the John Muir/Pacific Crest Trail as it passes through Upper Cathedral Meadow has resulted in multiple, deep parallel ruts that alter meadow hydrology and native plant communities. Yosemite National Park Trails, Wilderness and Resources Management staff rerouted the trail out of the meadow to a more sustainable area in the adjacent upland forest. Crews restored meadow function by removing parallel ruts, decompacting soils, salvaging plants from between the ruts, breaking up the trail edges, and replanting salvaged plants, seeding and mulching to facilitate plant recovery. This method is extremely effective in restoring wetland plant communities and removing ruts that will persist for years without active restoration. This collaborative approach and restoration methods provide a model for effectively managing the many trails through meadows while enhancing wilderness character.

Value proposition: **Multiple ruts characterize many wilderness trails through meadows and this project provides a model for establishing sustainable trails, ecologically restoring meadows and enhancing wilderness character.**

Keywords: **restoration, meadow, wilderness**

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Prehistoric Land-use Patterns throughout the Dunes of White Sands National Monument

5241

Poster

Prehistoric land-use patterns within the Tularosa Basin of New Mexico are poorly understood. Cultural sites known as “hearth mounds”, scattered throughout the gypsum dunes of White Sands National Monument, have the potential to provide insight into human habitation and subsistence strategies within the basin. These sites formed as heat from prehistoric fires changed the chemistry of the gypsum sand to a hardened material similar to plaster of Paris. The portion of the dune encapsulated by this hardened crust erodes slower than the surrounding gypsum sand and remains intact as the dune migrates. The temporal and spatial patterns presented by these sites support a strong association between prehistoric land-use patterns and dune movement. Through hearth reconstruction experiments, we are beginning to gain a better understanding of site formation processes and the nature of prehistoric occupation at these sites.

Value proposition: **Understanding how temporal and spatial relationships provide insight into land-use patterns and how experimental archaeology can provide an additional line of evidence to support interpretations.**

Keywords: **archaeology, prehistoric**

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Shedding light on a hot top: adaptive management of wilderness meadows in the Sierra Nevada

5545

Paper

Sequoia and Kings Canyon National Parks, protecting over 700,000 acres of designated wilderness in the southern Sierra Nevada of California, have a long tradition of pack stock use. Pack animals are used extensively for administrative use, supporting trail crews and horse-mounted rangers. Approximately a dozen commercial outfitters operate in the parks, providing services to visitors and also supporting research and management. Long a controversial topic in the Sierran parks, pack stock use was central to recent litigation and remains a contentious focal issue of current Wilderness Stewardship Planning efforts. The interdisciplinary Stock Use and Meadow Monitoring program--a collaborative effort between natural resource managers, wilderness rangers, and packers--has been in place at Sequoia and Kings Canyon for over twenty-five years. It serves as a model for the effective use of monitoring data to inform management decisions and also to facilitate communication when passions are running high.

Value proposition: **We will share lessons from one of the most controversial issues facing Sierran wilderness managers, and demonstrate how effective adaptive management can facilitate stakeholder cooperation.**

Keywords: **wilderness, adaptive management**

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Gregg Fauth is the Wilderness Coordinator at Sequoia and Kings Canyon National Parks.

"Ready, Aim … Where?" How Do We Target Conservation Goals in an Era of Rapid Environmental Change?

5249

Panel Discussion

The need for climate change adaptation encompasses management of natural and cultural resources, and also organizational structures and guidance. Vision statements or goals initiate the traditional planning and management cycle through which conservation strategies, "targets", options and decisions derive. Many protected area conservation goals look to the past as a model for future conditions, thus may be increasingly poor guides for managers as climate rapidly changes and novel ecosystems emerge. As protected area managers consider how to address the effects of climatic and socioeconomic changes, new thoughts and guidance about conservation goals, and the choices inherent in these goals, are warranted. This panel discussion will consider new ideas, and challenges for setting realistic conservation goals. The session will include open dialogue with the audience, and we encourage session participants to provide current, or on-the-horizon conservation, and climate change adaptation issues for which guidance seems to be lacking.

Value proposition: **Ideas from the speakers, and input from the audience will frame key conservation issues for task group follow-up in developing additional climate change adaptation guidance.**

Keywords: climate-change-adaptation, conservation-goals

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Bruce Stein, Director, Director, Climate Change Adaptation, National Wildlife Federation, Washington, DC
Stephanie Toothman, Associate Director, Cultural Resources, National Park Service, Washington, DC
Dan Decker, Professor and Director, Human Dimensions Research Unit, Cornell University, Ithaca, NY

Co-moderator, together with Cat Hawkins Hoffman: Dr. David Cole, Research Geographer, Aldo Leopold Wilderness Research Institute, Missoula, MT

Don't Forget the Drama!

5581

Day Capper

"Museum Theater" is a discipline that continues to grow in popularity at science centers, history museums, zoos, etc. Using excerpts from museum theater scripts, session participants will "perform," as they also get a taste of the many different ways that theater can be used to engage and educate visitors. Participants will then brainstorm possible museum theater projects for their own sites. This session will be led by Lisa Hayes who before earning a PhD in American Studies, was a professional actress and playwright. She toured her one-woman show of "Jane Eyre" to National Trust properties in England and Scotland, as well as to venues across the U.S. From oral history interviews with nurses, she created the one-woman show "Nurse!" that revolves around a nursing strike. She debuted the play off-Broadway, and has performed it at conferences in Poland, Turkey, Italy, and the U.S. She has extensive experience in museum theater.

Value proposition: Learn about museum theater and how they can incorporate it at their own site.

Keywords: theater, visitor engagement

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The Piscataway Cultural Landscape Initiative

5586

Paper

For more than 50 years, the Accokeek Foundation has stewarded 200 acres of land on the Potomac River. Though the original impetus for the organization's founding was to protect the view from George Washington's Mount Vernon, the Foundation's founders used land preservation as the gateway to a much bigger mission. They created the National Colonial Farm to demonstrate colonial agriculture, donated the Foundation's land to the National Park Service to help create Piscataway Park, and started an organic vegetable farm to train new farmers. However, the land's greatest significance- its role as the sacred homeland of the Piscataway people – went largely unaddressed. This paper explores how the Foundation came to create the Piscataway Cultural Landscape Initiative, an effort to create a national model in Piscataway Park of connecting people to the environment through interpretation of the indigenous cultural landscape of the Piscataway People.

Value proposition: **Learn about the challenges and opportunities of embarking on a journey to interpret an indigenous cultural landscape**

Keywords: **Indigenous cultural landscape**

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Spiritual Outcomes of Park Experience: A Synthesis of Social Science Research

5576

Paper

This presentation summarizes and synthesizes recent empirical research that has investigated the relationship between park experience and spirituality. This research is synthesized using the behavioural model of outdoor recreation as a framework. Antecedent conditions include personal history, current circumstances, attitude, motivation, socio-demographic characteristics, and spiritual tradition. Setting components include being in nature, being away to a different environment, and place processes such as place attachment and place meanings. Recreation components include activity, free time, solitude, group experiences, and facilitation. The presentation further explains how these conditions and components may lead to outcomes of spiritual experiences, spiritual well-being, and leisure-spiritual coping. The model presented takes into account the complexity of the park experience and spirituality relationship. Implications for park management are discussed. Park managers need to keep in mind the complexity of the relationship between park experience and spirituality, including all the components of the framework.

Value proposition: **Participants will learn about recent research studies on park experience and spirituality, a framework for synthesizing this research, and the implications for park management.**

Keywords: **spirituality, visitors, management**

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Revisiting Management of Florida Bay: Snake Bight Pole and Troll Zone Two Years Later

5305

Paper

Snake Bight Pole and Troll Zone (PTZ) has been in place for 2 years, offering a new approach for protecting park seagrass meadows, wildlife habitat, world-class fishery; while enhancing visitor experiences for this popular 9,400 acre area in Florida Bay, near the park's main destination (Flamingo). As a pilot project, requiring transit using push-poles, paddles or electric-trolling motors (no internal combustion engines), the PTZ has broad implications for elsewhere in the 400,000-acre shallow, difficult-to-navigate Bay – a resource damaged by decades of improper boating. Through focused resource monitoring and a strong public outreach commitment, the project implemented in 2011 with 95% public backing, continues to enjoy overwhelming support 2 years later as signs of improved conditions emerge. Ongoing monitoring and continued public engagement will allow for effective adaptive management within the PTZ and the rest of the park's vast shallow water marine environment in future years.

Value proposition: **Attendees learn how controversial concept gained public support through presentation of compelling scientific information. Results provide techniques for managers to improve resource and visitor conditions.**

Keywords: **marine zoning, planning**

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Communicating Climate Change with Local Business and Community Partners

5069

Poster

Recent surveys show that park visitors care deeply about climate change. Many parks educate their visitors about climate change through pamphlets, interpretive programs and displays, websites, and school outreach. If local businesses and other partners also communicate about the issues, then park visitors will be better educated and businesses may be better connected to their customers and communities. This pilot project expands climate change communication by engaging local businesses and other groups in developing science-based messages and communication products with the assistance of Research Learning Centers.

Goals include: 1) increase awareness among partners that as climate change affects the park and its resources, it also affects local communities and businesses; 2) expand and foster sustainable strategies and tools to deliver consistent science-based messages that visitors receive from parks, local businesses, and other organizations; and 3) increase collaboration between parks and partners in gateway communities around local climate change response initiatives.

Value proposition: **Presentation of the results and lessons learned from connecting parks and local communities, including businesses, to develop science-based climate change messages and communication tools.**

Keywords: **climate, communities, messaging**

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Understanding Changes in the Land Using Phenology of Local Residents in Wrangell Saint Elias Park

5630

Paper

Alaska park residents, many of whom pre-date the establishment of the Alaska park system in 1980, offer an important contribution to phenological monitoring for climate change. There are 23 resident-zone communities in Wrangell Saint Elias Park, where residents are eligible for subsistence. These subsistence users are in a unique position to offer records of phenological observations through photographs, hunting and gardening journals, daily calendar entries or oral histories. Using ethnographic methods, my research examines the opportunities and constraints that residents face in participating in phenological monitoring and the support that might best support this involvement. Because different park residents are focused on different phenological observations --ranging from ice freeze and break up to insect hatches, vegetation and migration patterns – this research offers park managers a broad perspective of the phenological events that are occurring and a framework for natural resource managers and citizen scientists to work more collaboratively.

Value proposition: I will present opportunities for monitoring climate change through the incorporation of phenological observations from park residents in Wrangell Saint Elias Park and Preserve.

Keywords: phenology, LEK, monitoring

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A Historical Assessment of Black Bear Baiting in Alaska's National Parklands: Informing Future Policy

4788

Paper

We assessed black bear harvest trends, generally, and black bear-baiting, specifically, in Alaska at three spatial scales: statewide, on lands adjacent to and including NPS units, and on NPS lands. Statewide black bear harvest has increased at an annual rate of 92.7 bears per/year and baiting harvest has increased by 20.9 bears per year over this time period. Across the duration of this study, very little bear-baiting has occurred on NPS units (37 bears; <2 bears/year). Only 3 bears have been harvested by rural Alaska residents from NPS lands over the 19 years of this study. The complexity of the issue is beyond the metrics and centers on NPS values such as natural processes and behaviors, public safety, subsistence opportunity, wilderness, and recreation. The formal field of conservation ethics and argument analysis are potential paths forward to inform policy on bear-baiting on NPS units in Alaska.

Value proposition: **Bear baiting on Alaska NPS lands resides at the convergence of ensuring natural processes and behaviors, providing subsistence opportunity, and allowing sport harvest.**

Keywords: **bear, baiting, policy**

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Exposing Dangerous Misconceptions and Innovative Solutions in Remote Site Human Waste Management

5221

Paper

Backcountry human waste management is offensive, intensive, and expensive. Nevertheless, proper management is essential. A lack of literature, standards, protocols, and erroneous perception exacerbate the mismanagement of systems and end-products resulting in hazards, disease, pollution, and wasted expense. Composting toilets failed to produce safe, stable, and mature end-product, despite frequent maintenance at all sites (17). Failure was caused by poor design, microbial inhibition by ammonia, and thermodynamic impossibilities. By optimizing for vermiculture rather than microbial composting, end-product quality and hygiene were dramatically improved. However, because hookworm ova were not destroyed, vermicompost residuals cannot be discharged into public park environments. Despite infrequent residual removal costs, vermicomposting toilets in France were operated with 10% the O&M costs and risks, as compared to composting toilets in North America. As such, vermicomposting toilets offer a huge opportunity to reduce waste management costs, hazards, and environmental impacts.

Value proposition: **Understand the processes behind composting toilet failure and become familiar with tools to evaluate system efficacy, safety, and quality. Discover how vermiculture decomposes human waste.**

Keywords: **Waste, Toilet, Compost**

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Buck Island Reef National Monument: An MPA and All the Bumps along the Way

5391

Paper

Established in 1961, expanded in 2001, Buck Island Reef NM became the first fully protected NPS MPA. A refuge for T&E birds, reptiles, and plants the park has undertaken numerous projects to restore this island ecosystem. In 2004 the park began planning for the next 20 years however along the way the park mission was lost to the visiting public and when in 2006, 5000 acres of the monument became critical habitat for the first 2 marine invertebrates protected under ESA this became a possible major game changer in how the park should protect these species, provide for recreation and ensure continued ecosystem recovery. At 50 years old Buck Island Reef NM is working to reconnect with her local population, find creative ways to ensure the protection of 2 coral species,and work toward engaging the future resource stewards through effective community outreach and education.

Value proposition: **How to make a marine protected area relevant to the local community and promote ecosystem health while the MPA recovers.**

Keywords: **MPA, outreach, restoration**

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Parks Canada Pictograph Project

5060

Paper

For the past three years, archaeologists from the Western and Northern Service Centre, Calgary have attempted to preserve Aboriginal pictographs in Canada's western national parks. The project sought to record Aboriginal Traditional Knowledge concerning rock art sites in order to preserve the cultural meaning of the pictographs. This essential component in rock art research provided Aboriginal Elders with the opportunity to speak for themselves in regards to their cultural history, rather than imposing only western scientific classifications. Personal interviews were conducted with Elders from four different Aboriginal communities: Piikani and Stoney Nakoda in southwestern Alberta, as well as Ktunaxa and Kinbasket in southeastern British Columbia. As such, it was a great privilege to have the opportunity to interview the Elders and learn more about this sacred aspect of their culture.

Value proposition: **The presentation will include discussion of the cooperative nature of the Pictograph Project between Parks Canada and local Aboriginal communities.**

Keywords: **Collaboration Aboriginal People**

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N/A

Putting Benefits Sharing to Work for Parks

5285

Panel Discussion

Learn about National Park Service benefits sharing! When research originating under NPS permits or other authorizations results in an invention with a commercial application, parks may negotiate monetary or other benefits. Such benefits sharing improves conservation of park resources and enhances public benefits from research in parks. Parks develop agreements to share or decline benefits when entities notify parks of proposed commercial uses. Although new to NPS, "access and benefits sharing" has been of interest to the international community for many years. This session addresses the legal authority for and early development of NPS benefits sharing; highlights key features of the NPS benefits-sharing policy and its significance for permitted researchers and park staff; discusses the nature of benefits and agreements to share benefits; explains the relationship between benefits sharing and federal technology transfer; and introduces tools from the benefits-sharing handbook for parks to use in initiating and managing benefits sharing.

Value proposition: **Researchers and park staff learn how commercial application of research results from authorized research on park resources leads to benefits sharing and improved resource preservation.**

Keywords: **benefits-sharing, permit, technology**

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Negotiating a Benefits-Sharing Agreement

5291

Workshop

If you do permitted research in parks or manage park resources, this workshop is for you! Develop your knowledge of National Park Service benefits sharing practices and test your skills in negotiating a mock benefits-sharing agreement. This workshop builds on information provided in the panel, "Putting Benefits Sharing to Work for Parks." After an overview of benefits sharing, participants follow steps in the benefits-sharing handbook to negotiate mock agreements. They examine agreement types, study the range of monetary and non-monetary benefits, review examples of term sheets showing desired benefits and negotiation parameters, and consider environmental compliance. They form teams and negotiate benefits sharing agreements based on a provided scenario. Upon conclusion of negotiations, the teams share their results. Specialists are available to advise teams on technicalities of developing agreements, market analyses and economic considerations, environmental compliance, and legal matters, and to provide insights from a park with benefits-sharing experience.

Value proposition: **Researchers and park staff learn the basics of benefits-sharing agreements, develop skills by negotiating a mock agreement, and build confidence to negotiate actual benefits-sharing agreements.**

Keywords: **benefits-sharing, negotiation, agreements**

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Improving Accuracy and Efficiency of Visitor Use Monitoring Efforts through Deployment of Time Lapse Photography

5187

Paper

Visitor use level on trails and at destinations is consistently selected as an indicator to assist managers in maintaining acceptable levels of visitor experience. Previous methodologies have relied on staff-intensive direct observations and photo documentation with DSLRs. In an effort to increase the number of monitoring locations without increasing staff burden, resource managers at Yosemite National Park have begun employing automated time lapse and motion-triggered cameras. This presentation outlines several ongoing monitoring and research projects that utilize automated sampling and discusses the costs and benefits between traditional approaches that require a high staffing levels to this new methodology that attempts to minimize time spent on-site through automation. With crowding at the forefront of discussions surrounding appropriate use levels pertaining to visitor experience and safety, the utilization of automated technologies can assist managers by allowing more areas to be monitored or expanding the sampling time frame with limited staffing and funding.

Value proposition: **This presentation discusses the efficacy of using automated options for collecting traditional PAOT, PPV, and other use level data by presenting a cost benefit analysis.**

Keywords: crowding, automation, visitor

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Bridging Connections: Exploratory Social Network Analysis of the Illinois & Michigan Canal National Heritage Corridor

5084

Paper

In 1984 the Illinois & Michigan Canal National Heritage Corridor was established as the first heritage corridor in the nation and in 2006, the US Congress designated the Canal Corridor Association (CCA) as the coordinating entity for IMCNHC. In 2011, CCA finalized a Master Plan detailing goals in six areas: boundaries, conservation, education, heritage, recreation and tourism. To facilitate CCA stakeholder coordination and plan implementation we used an exploratory social network analysis of stakeholders within the corridor representing dozens of organizations. Developed from sociometry and graph theory, social network analysis detects and interprets patterns of social ties among actors in complex systems. Using open source software Gephi and NetLogo for visualization, network metrics and network modeling we identified the strong and weak relationships among the actors. This data informed decision making about information diffusion, cooperation, resilience and coordination efforts for the operationalization of the IMCNHC Master Plan goals and activities.

Value proposition: **Audience will learn about network analysis applications; visualization, mapping and metrics of stakeholders; new directions in interpreting patterns in large and/or complex networks.**

Keywords: **Network analysis, visualization**

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NEPA, Conflict, and Long-Lived Controversy: Is There a Way Out?

5626

Paper

Some issues facing park administrators are so complex and controversial that they appear to be never-ending. Litigation and preparation of environmental documents seem to be unending. This paper analyzes common factors among seemingly intractable conflicts at Yellowstone and Yosemite National Parks, methods used to resolve some long standing conflicts, and the legal and other parameters limitations to conflict resolution.

Value proposition: **This presentation will analyze long standing environmental controversies and suggest commonalities between them, describe differences, and identify key tipping points in resolution of conflicts.**

Keywords: **NEPA Environment Conflict**

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Hydrological Responses of Baldcypress and Associates to Episodic Rainfall in Microtopography along the Louisiana Coast

5299

Paper

Rising sea level, subsidence and changing hydroperiod are threatening coastal forest ecosystems. Forests at the margin of permanently flooded conditions are at risk for conversion to marshes or open water by prolonged flooding or saltwater intrusion. Hummock and hollow terrain, interspersed with higher-elevation and lower-elevation topography, is common where forested wetlands transition to intermediate and saline marshes. Trees are commonly restricted to hummocks within these systems. We traced the source of subsurface water with stable isotopes measurements to learn the role of hummocky terrain in hydrologic exchange and how trees might survive periodic salinity. The study site is in the Jean Lafitte National Historical Park and Preserve – Barataria unit, near the Gulf of Mexico. Tracing isotopic water within these systems seems to suggest forested hummocks are precipitation dominated and exchange between subsurface water and other reservoirs may not be as important except on a periodic basis.

Value proposition: **Understanding the importance of microtopography in sustaining the woody vegetation in the boundary of swamps and marshes.**

Keywords: **hummock, saltwater stress**

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Differences in crowding standards among wilderness and front-country visitors at Cumberland Island National Seashore

5345

Poster

The purpose of this study was to assess the differences in perceptions and standards of social crowding between wilderness and front-country visitors at Cumberland Island National Seashore (CUIS). This investigation and results are important because coastal professionals who manage nature-based recreation areas are often mandated to provide high quality visitor experiences for diverse range of visitors. Assessing and managing for social crowding and visitor capacity can influence repeat visitation, stewardship attitudes, and support or opposition for management action. we used a mail and internet questionnaire for the wilderness users (Modified Dillman Method; n = 178) and an onsite survey for day users' (n = 303). Next, we conducted a series of mean evaluations, using an Independent Samples T-Test to evaluate differences and similarities in responses between the two visitor groups, and found substantial differences and some patterns of similarities between wilderness and front country visitors' perceptions of crowding.

Value proposition: **Assessing and managing for social crowding and visitor capacity can influence repeat visitation, stewardship attitudes, and support or opposition for management action.**

Keywords: social crowding, island

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Use, Non-Use, and Impacts of Interpretive Programs at Miquelon Lake Provincial Park, Alberta, Canada

4997

Paper

Alberta Parks is seeking scientific indicators to assess progress towards its objectives related to interpretive programs. This study sought to compare program attendees and non-attendees, evaluate impacts, and determine visitor preferences related to interpretive programs at Miquelon Lake Provincial Park (MLPP), Alberta. Of 497 respondents in 2011, 19.7% had attended an interpretive program. Attendees stayed longer at MLPP than non-attendees, but both groups were similar demographically. Attendees participated for the good of their group, entertainment, and educational potential. Non-attendees cited inconvenient timing and a lack of awareness and time. Attendees rated the quality of the interpretive programs quite high. More than 80% of attendees agreed that interpretive programs helped increase knowledge about nature, interest in future programs, and appreciation for MLPP and Alberta Parks. Most visitors agreed that interpretive programs were important to the mission of AB Parks and to the value of their park experience.

Value proposition: **Related to park interpretive programs, audience members will learn why visitors attend and don't attend, potential impacts, and methods to increase attendance.**

Keywords: **interpretation, use, impacts**

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Streamlining Data Management for Natural Resource Monitoring: The SWNC Exotic Plant Monitoring Application

5524

Paper

Data are the life blood of natural resource monitoring programs and proper data management is essential to ensure the validity and quality of scientific results. The data management team of the Southwest Network Collaborative (SWNC) developed methodologies for streamlining the data life cycle from data entry to reporting. We manage data from five programs within the National Park Service and the US Fish and Wildlife Service. Our process improves data quality and availability while reducing time and cost, and integrates national standards for spatial and non-spatial data. We build custom ArcPad applications and use versioning and replication from Esri's ArcSDE to ensure data quality and availability. The Exotic Plant Monitoring application uses a streamlined user interface, built-in validation and eliminates transcription to reduce data entry errors. Automated data processing and reporting provides parks and refuges with timely information about field crew findings critical to controlling the spread of exotic species.

Value proposition: **Attendees will learn techniques for improving field data management workflows using current technologies including ArcPad, ArcGIS and ArcSDE.**

Keywords: **Data Management, GIS**

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Heidi Sosinski, Data Manager, National Park Service - Southern Plains Network, Johnson City TX

Missy Powell, Data Manager, National Park Service - Chihuahuan Desert Network, Las Crucues NM

Meaningful Connections

5126

Poster

In the last decade Parks Canada has seen a trend of decreasing visitor numbers. The Agency is taking a corporate-wide approach to reversing this trend with a stated goal to connect Canadians, through meaningful experiences, to their national parks, national historic sites and national marine conservation areas in ways that leave them unimpaired for present and future generations. To meet this goal the Agency has develop a coherent strategy that brings together its Visitor Experience, Brand and External Relations and integrates them with its work to protect ecological and commemorative integrity. The agency has renewed and strengthened its brand. It has implemented a proactive media, social media and external relations approach and linked this to a number of key anniversaries. And it has revitalized the visitor experience at its places with new services, programs and activities. This presentation will outline these efforts and the results to date.

Value proposition: **Learn about new ways to engage the public to enhance meaningful connections.**

Keywords: **connection, visitors, experience**

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Impact of Museum Soundscapes on Visitor Outcomes

5588

Paper

Visitation to museums and other cultural settings is motivated in part by a desire to escape the stresses of everyday life. However, environmental stressors of an auditory nature may degrade the visit. The current study utilized an experimental design in which classical, nature and human voice soundtracks were piped-in to the sound system of a wildlife art exhibit and an interactive natural history exhibit. Visitors were observed in different sound conditions and intercepted upon exiting the exhibit. In general, in the art exhibit, natural sounds and classical music yielded the highest dwell times, engagement, satisfaction, and knowledge gain; human voices, especially louder voices, yielded the worst outcomes. In the natural history exhibit, there were fewer effects of the added soundtracks. Implications of unwanted sound will be discussed in the context of noise in unexpected cultural locations (e.g., protected spaces, museums). Efforts of the NPS Soundscape Program will also be discussed.

Value proposition: **The impact of noise on visitors to cultural institutions has received little attention. This presentation explores these impacts and highlights key findings.**

Keywords: **soundscapes, environment, museum**

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Horseshoe crab spawning and population characteristics in NY coastal National Parks

5038

Poster

The American horseshoe crab (Limulus polyphemus) is an important component of the marine ecosystem and a valuable socioeconomic species. Crabs are harvested commercially for bait and by the biomedical industry, which produces a critical pharmaceutical product from their blood. In 2012, spawning horseshoe crabs were monitored at Fire Island National Seashore (FIIS), Sagamore Hill National Historic Site, and Gateway National Recreation Area. Crabs were tagged in conjunction with the USFWS Cooperative Tagging Program, spawning surveys were implemented, egg densities were estimated, and subtidal movement was tracked using acoustic telemetry (at FIIS only). Over 2900 crabs were tagged with recaptured crabs reported at each park. High spawning and egg densities were observed at several beaches. Acoustic telemetry in Great South Bay (FIIS) indicated movement of crabs along the interior barrier beaches during the spawning season. Citizen-based volunteer monitoring, a component of this project, will continue the spawning surveys in the future.

Value proposition: **New information for park, state, and regional managers to protect spawning habitat and manage horseshoe crab populations. Conveys monitoring protocols applicable to other coastal parks.**

Keywords: **horseshoe, monitoring, coastal**

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Sea Semester Marine Biodiversity and Conservation: Improving Stewardship Capacities through Field-based Undergraduate Education

5242

Paper

The goal of Sea Semester: Marine Biodiversity and Conservation (MBC) is to make a significant and continuing contribution to improved ocean stewardship by developing a new generation of leaders in ocean science and public policy dedicated to understanding, preserving, and restoring our global ocean commons. Funded by NSF and the Virginia Wellington Cabot Foundation, the MBC curriculum integrates science, conservation policy, and place-based management through a field-based study of the potential of the Sargasso Sea as a high seas protected area. The new curriculum combines instruction in classical and cutting-edge techniques in marine biodiversity research, practical tools from conservation, and emergent concepts in place-based management. Initial analyses of first year results suggest a 34-point increase in conservation science and policy content knowledge, improved capacities in written and oral communication, and --most important--an increased engagement and interest among the strongest students in careers related to coastal and ocean stewardship.

Value proposition: **The paper describes the goals, methodology, and results of a new interdisciplinary field-based NSF-funded curriculum development project that centers on high-seas protected areas.**

Keywords: **Education, Ocean, Coastal**

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Ozone and Foliar Injury in the Cumberland Piedmont Network

5535

Paper

Ozone is harmful to both visitors and plants in NPS units. The Cumberland Piedmont Network (CUPN) has been monitoring ozone and its associated foliar injury since 2008. The goal is to determine if ozone concentrations are high enough to cause injury to plants and whether that injury is actually occurring. Each year, ozone monitoring and foliar injury surveys are completed at two CUPN parks. Further, foliar injury surveys are completed every year at Mammoth Cave NP (and ozone data are collected annually by the park and its partners). Summarized data from 2008 through 2012 will be presented. The relationship between ozone concentration and the severity/amount of foliar injury will be examined for all parks within the CUPN. Further, correlation and trend analysis of Mammoth Cave data will be discussed. This information is used for New Source Review, in the review of Prevention of Significant Deterioration of Air Quality permit applications.

Value proposition: **Our monitoring protocol combines two existing protocols in a unique way and can be used to improve air quality at other units within the NPS.**

Keywords: **Ozone, Ozone Injury**

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Mentoring Minority Students: Examining Communication Linkages between Partners and Students Participating in the Academy

5564

Paper

The Academy is a sponsored program established in 2010 by the Rocky Mountain Sustainability and Science Network (RMSSN). It involves a week-long workshop on sustainability issues and leadership skills for minority undergraduate students undertaking sustainability related internships. The goal of the Academy is building a network among students who are interested in sustainability and climate change and providing them with knowledge and skills. Partners/founders of RMSSN play an important role as mentors in the Academy and beyond. They provide onsite training and experience-sharing exercises, disseminate updates on sustainability and climate change issues, promote relevant internship opportunities, and offer general guidance during and after the Academy. Using survey data collected over the last three years, this paper analyzes the interactions between partners and students to see whether the Academy fosters communication and supports mentoring relationships necessary for encouraging minority students to engage in careers in public land management.

Value proposition: **This paper illustrates whether a student network fosters communication and supports mentoring relationships for encouraging minority students to engage in careers in public land management.**

Keywords: **minority; network;communication**

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Use of Early Seral Plant Species to Improve Restoration Success in the Western United States

5635

Paper

Efforts to restore degraded habitats often utilize late-seral plants, non-native species, or both. However, these restorations are often unsuccessful because such vegetation is either not appropriately matched to the site or late-seral plants are outcompeted by invasive weeds. Although native early-seral species are seldom used in ecological restoration, they have potential to help control non-native species through competition for similar resources and may facilitate important ecological processes leading towards a persistent native community. Much of our work examines the hypothesis that including native early-seral species in restoration seed mixes will help control non-native invasive species and promote native community development over time. We have applied early-seral plant species in restoration seed mixes following disturbances in the western United States. Results show that native early-seral plants can change microbial communities, and in some cases reduce abundance of non-native weeds compared to standard restoration seed mixes.

Value proposition: **This presentation will synthesize the results of several experiments looking at a relatively new approach to restoration of disturbed lands.**

Keywords: **restoration, invasive species**

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Efficacy of marine debris monitoring efforts in Alaskan National Parks

5494

Poster

In 2012, efforts to collect quantifiable and qualitative coastal marine debris information along the remote Alaskan coastlines of NPS units adjacent to the Gulf of Alaska, in preparation and response to the 2011 Japanese tsunami debris arrival, yielded mixed results. Three data collection methods were used in the Alaska Region: aerial surveys, targeted ground surveys, and opportunistic reporting. Survey limitations included inclement weather, flight availability, personnel availability, and costs. 3 parks did not collect any information, 3 parks collected aerial survey information, 5 parks collected opportunistic ground based marine debris information, and 1 park collected NOAA standardized marine debris survey information. Results of the surveys indicate little to no identifiable suspected Japanese tsunami debris impact as of September 2012 in Southwest Alaska, while the is a significant identifiable degree of suspected impact along the outer coasts of Southeast Alaska NPS units.

Value proposition: **Understand where marine debris is impacting Alaskan NPS coasts and why more marine debris work is not being accomplsihed currently.**

Keywords: **Alaska Debris Tsunami**

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Successes in Coastal Resource Management Project Coordination in the Alaska Region

5512

Paper

The Alaska region contains approximately 32% of all National Park Service coastline and includes a diverse array of managerial challenges from oil spills to climate change. Because of the remote nature of most park unit coasts and limited funding available, it is imperative that projects in Alaska be extremely targeted while providing maximum utility. Presented here are examples of three successes bringing resource studies to the Alaskan coasts: ShoreZone coastal imaging - for oil spill response planning, assessing coastal effects of climate change, and determining coastal hazards; EVOS-SWAN nearshore coastal monitoring – for assessing ecosystem recovery, provide for long term ecosystem health monitoring, and identify factors that may inhibit population recovery; and marine debris monitoring – to determine coastal impacts, identify hazardous materials, provide visitor information, and assist in the development of ocean modeling. These three examples indicate respectively, successes in interagency coordination, interagency-NGO coordination, and multi-park-multi-divisional coordination.

Value proposition: **Attendees will gain concepts of project coordination at differing levels and complexities.**

Keywords: **Coastal Management Alaska**

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Ungulate Management in the National Park Service: Internal and External Critiques

5087

Panel Discussion

The National Park Service (NPS) and The Wildlife Society (TWS) recently conducted independent reviews of ungulate management in the NPS. The resulting reports provide different and compelling assessments of the current state of affairs, progress made, and areas for improvement. Invaluable insight can be gained by comparing and contrasting these within-agency and external perspectives in an active and open dialogue. Using key authors as panelists, this session will draw upon the expertise of both NPS and TWS representatives to discuss the strengths and weaknesses of each report, future direction for ungulate management in the NPS, and how they relate to the recent "Revisiting Leopold" report issued by NPS.

Value proposition: **This session assembles key authors from two important reports. Audience members will benefit from live discussion that compares and contrasts the reports' findings.**

Keywords: **Leopold, NPS, Ungulate**

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Intra-activity Conflict Analysis: Boating on the North Umpqua Wild and Scenic River (Oregon, USA)

5055

Paper

Recreational boaters' preferences related to management issues, crowding and conflict were determined using a visual discrete choice experiment (N=204) for the North Umpqua Wild and Scenic River (Oregon, USA) during summer 2012. Setting conditions were displayed with varying boater numbers, activity types and river settings, using 128 riverscape scenarios, organized into 32 choice sets, which integrated simultaneously six attributes. Each respondent was shown four choice sets from which he/she chose which setting were perceived as best and worst and which setting they would not boat. Latent-class choice modeling was applied to account for the possible heterogeneity of respondents' choices. Results will be discussed regarding differences between kayakers and rafters, and across river user segments. Users' perceptions of preferred river and social settings will be expressed to the audience. Rivers with the "Wild and Scenic" designation are to provide a specific recreation experience, and users' perceptions of management will be addressed.

Value proposition: **Choice modeling coupled with computer manipulated images identifies boaters' trade-offs among several river site characteristics. This methodology assists in interpreting issues to resource managers.**

Keywords: **riverscape scenarios**

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Stories that stakeholders tell: Environmental Governance of the Manas National Park and Biosphere Reserve (India)

5371

Paper

Community-based conservation is an increasingly effective way to manage the earth's remaining biodiversity in protected areas through shared responsibilities held by local people and governing agencies. However, not all communities are equally positioned to benefit from community-based conservation opportunities or bear the livelihood costs of restrictions on access to natural resources furthered by governance regimes. This study explores the role of 'community identity' in the governance of the Manas National Park and Biosphere Reserve in northeastern India. A thematic analysis was conducted of 29 semi-structured interviews with stakeholders in the summer of 2012. Results illustrate how notions of 'community', 'territory', and 'resource access' are articulated by various stakeholders and used to further specific political agendas. This study contributes to an expanding body of knowledge in the human dimensions of natural resources and offers relevant insights into environmental governance and public participation in protected area management.

Value proposition: **Critique the paradigm of community-based conservation as pertains to protected area governance by examining notions of 'community', 'territory', and 'resource access'.**

Keywords: **Community, Parks, Governance**

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Moving People while Protecting Resources: The Challenges of Long-range Transportation Planning for Resource Agencies

5191

Panel Discussion

Suitable visitor access is fundamental to public awareness and management of public lands, yet visitor access also challenges resource agencies to protect natural and cultural resources. To better understand and manage this complex relationship, the National Park Service and the U.S. Fish and Wildlife Service are preparing 20-year "long range transportation plans" (LRTPs). Among other emphasis areas, LRTPs seek to better understand and minimize transportation impacts to air and water, natural habitats, diverse ecosystems, and global climate. Panelists and audience participants, including both resource specialists and transportation planners, will explore the relationship between transportation systems and the environment, and consider long-term policies and strategies that improve the balance between visitor access and resource protection. The discussion will encourage all participants to consider transportation needs and impacts in their fields of work.

Value proposition: **Resource specialists and transportation planners will collaborate to identify transportation impacts, explore information needs, and work toward long-term policies and strategies.**

Keywords: transportation impacts planning

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Alex Schwartz, Landscape Architect, Refuge Roads Program, U.S. Fish and Wildlife Service
Melissa Allen, Transportation Planner, Central Federal Lands Highway Division

FFI: An Interagency Tool for Monitoring and Data Sharing

5537

Poster

FFI (FEAT/FIREMON Integrated) is an interagency-supported application developed to assist managers with collection, storage and analysis of ecological information. FFI provides software components for: data entry, data storage (SQL Server), summary reports, analysis tools, data queries/export, geographic information system link, and personal digital assistant use. In addition to a large set of standard protocols for monitoring fuels and vegetation, the Protocol Manager lets users define their own data entry forms when custom sampling protocols are needed. The FFI application is supported by a user guide, training workshops and online demonstrations, and an online technical support discussion group. Although FFI was developed for the fire community, it can also be used to meet monitoring needs for other natural resource disciplines for a variety of purposes. FFI supports scalable monitoring, from project- to landscape-level, and encourages cooperative, interagency data management, information sharing, and regional data analysis.

Value proposition: **FFI was developed for the fire community, it can be used to meet monitoring needs for other natural resource disciplines for a variety of purposes.**

Keywords: **Fire, Monitoring**

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The National Park Idea and the Future of the National Park System

5475

Paper

This paper reviews the evolution of the national park idea and implications for the national park system. Although the Organic Act management standard—to conserve unimpaired for the benefit of future generations—has not changed since 1916, our understanding of the national park idea has changed. We have variously regarded the parks as wilderness areas, tourist destinations, recreational playgrounds, commercial commodities, ancestral lands, natural laboratories, wildlife reserves, and, more recently, the vital cores of larger ecosystems, reflecting advances in scientific knowledge and societal values. These diverse ways of viewing the national parks have generated myriad controversies, which have profound implications for the future of the national park system, including the need to view expansion opportunities in landscape terms, to consider restoration as a strategy for system expansion, to pursue more coordinated planning with neighboring agencies and landowners, and to consider more active management of park resources.

Value proposition: **How the national park idea has changed over time, controversies this has spawned, and what this means for the future of the national park system.**

Keywords: **national park idea**

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N/A

Protecting Historical Heritage: The Commemorative Integrity Evaluation Program at Parks Canada's National Historic Sites

5295

Paper

This presentation will provide a retrospective ten-year overview of Parks Canada's innovative Commemorative Integrity (CI) Evaluation Program for national historic sites — a topic that is relevant to managers of cultural heritage sites generally. It will outline the purpose, the methodology and the overall success of the program in identifying challenges and making improvements in the condition of cultural resources and the communication of their heritage value. Through ongoing monitoring, the evaluation program assisted Parks Canada in setting investment priorities for sites with the greatest need. While highlighting past successes, the presentation will also explore how the evaluation program will move forward in a current context of financial restraint. How will changing priorities impact the nature of monitoring and the continued improvement of commemorative integrity ratings of national historic sites? We will examine how Parks Canada—by building on lessons learned and established best practices—is addressing these challenges.

Value proposition: **Audience members will get an overview of monitoring and evaluation approaches and lessons learned that is applicable to the management of their cultural heritage places.**

Keywords: **Evaluation, monitoring, prioritization**

Lead author • session organizer • poster / demo / exhibit presenter:

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The Critical Role of Midwest Region National Parks in Bison Restoration in the 21st Century

5209

Paper

Bison once ranged the Great Plains in numbers beyond comprehension. From a few hundred survivors at the turn of the 20th century, the total population is now around 500,000. While public herds have remained stagnant at around 40,000 since the 1940s, tribal, non-profit and commercial herds have expanded rapidly due to interest in restoration as well as demand for bison meat. Three parks in the Midwest Region (Badlands, Wind Cave, and Theodore Roosevelt) have been key players by providing 8,500 disease-free bison to tribes and non-profits to start and supplement herds. In order for bison to once again be an ecological force on the plains, the NPS needs to look beyond boundaries to landscape scale partnerships, engaging the commercial bison industry, and multiple stakeholder management. This will require the NPS to rethink, as recommended in Leopold Revisited, the meaning of conservation and restoration for this species in the 21st century.

Value proposition: **NPS Midwest Region parks have long been key to bison restoration across the Great Plains, and will continue to be key in the 21st century.**

Keywords: **bison, restoration, conservation**

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Practical and Accessible Park Geology: The National Park Service Geologic Resources Inventory Program

5507

Poster

The Geologic Resources Inventory Program is one of 12 fundamental natural resource inventory efforts within the National Park Service. The Inventory provides accessible geologic map data and practical geologic information to support science-based resource management in more than 270 natural resource parks. The Geologic Resources Inventory undertakes three tasks for each park: (1) conduct a scoping meeting and provide a scoping summary, (2) provide digital geologic map data in a geographic information system (GIS), and (3) provide a geology report. Parks typically do not have geoscientists on staff. Therefore, products are designed for use by non-specialists and highlight practical connections between geology, resource management, and park stories. All products are accessible online. Map data is now available in ArcGIS, shapefile, and Google Earth™-compatible formats. Reports minimize technical jargon and include explanatory graphics. This poster provides updated status information and highlights examples of GIS and report products.

Value proposition: **The audience will learn about the status of GRI products, applicability to their parks, and see new map and report products, including Google Earth-compatible data.**

Keywords: **Geology, Resource Management**

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Vegetation cover change detection by satellite imagery: does it have potential for hiking trail management?

5056

Poster

The objective of this study was to detect fractional vegetation cover changes associated with off-trail hiking or trampling by using satellite imagery. Additionally, this study was established to explore whether or not remote sensing could be used effectively as a method of determining the effects of recreation impact. Three major vegetation indices were applied to measure fractional vegetation cover changes on Cadillac Mountain, Acadia National Park, Maine. The study area was divided into two zones on the basis of proximity to the trail network with the expectation of much higher impact and lower recovery in closer proximity to the trail network. The results showed no statistically significant differences between the two zones in terms of the amounts of recovery and impact (all $p > 0.05$), indicating that the magnitudes of impact and recovery were similar regardless of the proximity to the trail.

Value proposition: visitor-induced vegetation impact monitoring based on GIS/remote sensing analysis and spatial zoning method

Keywords: recreation impact, GIS/RS

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Valuing the Value of Play in Developing Countries An advocacy for quality, safe urban parks

5333

Paper

Although play, recreation and leisure are increasingly becoming part and parcel of the contemporary society, there is limited academic literature written about play, recreation and leisure. In particular, most of the developing countries are lagging behind in mainstreaming these concepts, both in cultural (theory and practice) and epistemological exploration. This paper is meant to ignite discussions about play, recreation and leisure, with the expectation that city management in developing countries will start to give play, recreation and leisure the attention that they deserve for the enhance quality of life of their fast growing urban populations. The paper recognizes safe urban parks and open spaces as avenues where meaningful and safe play takes place. The terms play, recreation and leisure may be used interchangeably and may have a variety of meanings to different people. However, play is deliberately adopted and used in this paper, albeit loosely, to encompass all three terms.

Value proposition: **Will learn about the value of play for all people and factors that constrain play in developing countries.**

Keywords: **Play, recreation, leisure**

Lead author • session organizer • poster / demo / exhibit presenter:

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Restoring Mana: Maori Influence in New Zealand National Park Management

5065

Paper

In New Zealand, biculturalism is a national aspiration that has made significant inroads in recent years. The islands' indigenous people, the Maori, constitute a sizable minority within this former British colony, and much of the Kiwi citizenry embraces its unique combination of European and Maori heritage. Yet full enactment of the inclusive ideals of the 1840 Treaty of Waitangi (New Zealand's founding document) remains a painstaking process. How has biculturalism manifested in the management of New Zealand's world-famous national parks, established for the standard Western purposes of recreation, aesthetics, and scientific research? This paper focuses on the Ngai Tahu iwi, or tribe, of Maori whose traditional territory encompasses most of South Island, where 10 of New Zealand's 14 national parks are located. I will discuss the Ngai Tahu's relationship with park lands – with emphasis on Aoraki/Mt. Cook and Arthur's Pass – and gauge the iwi's involvement in park management.

Value proposition: **This paper illustrates an admirable bicultural effort to incorporate the perspectives of indigenous people into the management of national parks, part of their former homelands.**

Keywords: **indigenous people, Maori**

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Climate Change in the Pacific Islands: Resources at Risk and the NPS Response

5219

Paper

Key cultural/natural resources fundamental to Pacific Island parks are threatened from climate change impacts to marine and terrestrial habitats. The rich heritage of coastal parks is at risk from rising sea levels while ocean warming and acidification may eliminate spectacular coral reef ecosystems. Hawaiian parks also form the best remaining terrestrial habitat in the "endangered species capital of the world" and the Pacific Island Inventory and Monitoring Network of parks is the most biologically and culturally diverse Network in the National Park Service. To meet these challenges, parks have responded individually and as a Network with carbon use reduction strategies, innovative educational outreach including one of the most active social media program in the NPS, and extensive partnership efforts that embrace the link between cultural and natural resources in identifying and funding research and management decision support needs.

Value proposition: **We will offer the example of broad partnerships, educational outreach, and a strongly linked cultural/natural resource perspective to achieve meaningful and transferable results.**

Keywords: climate change

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Public Participation in Scientific Research: A Profile of National Geographic/National Park Service Bioblitz Participants

5309

Paper

We profiled characteristics of participants attending the annual National Geographic sponsored National Park Service (NPS) Bioblitz project. The aim of the project is to engage the American public in activities that increase biodiversity awareness, resource stewardship, and an interest in science. Data were collected from participants at three BioBlitzes; Biscayne National Park in Florida in 2010, Saguaro National Park in Arizona in 2011, and Rocky Mountain National Park in 2012. Beyond profiling visitors' socio-demographic characteristics, we provide insight on their past participation in ATBI activities, motives for participating, sense of stewardship, and interest in science. Linear associations illustrate the impact of their participation on issues related to stewardship, interest and understanding of science, and their sentiment toward the parks studied. The findings provide evidence in support of the NPS effort to engage the public and demonstrate the outcomes that extend beyond the development of an extensive taxonomic inventory.

Value proposition: **Findings provide evidence demonstrating outcomes associated with the public's participation in scientific research extend beyond the development of an extensive taxonomic inventory.**

Keywords: **Bioblitz, Public Participation**

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Native Involvement in Protected Area Management: An International Spectrum of Approaches

5652

Focus Session

TBD

Value proposition: TBD

Keywords: Native involvement

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Doug Harris, THPO, Narragansett Tribe

National Archaeology Day: Creating an Archaeological Network for Public Engagement

5485

Poster

The Archaeological Institute of America (AIA) constantly looks for new ways to engage the public as it strives to fulfill its mission of promoting archaeological inquiry and public understanding of the material record. One of the Institute's newest efforts is National Archaeology Day, an annual celebration organized by the AIA that is meant to underscore that archaeology is everywhere and is accessible to all. The scope of this international event raises the profile of archaeology within modern society by engaging the public in interactive activities within their communities. This poster presents the successes of the first two National Archaeology Days, reports on the growth of the event, shares data collected from participating groups, and explores ways to continue to increase the scale and impact of this major public archaeology program.

Value proposition: **Audiences will be able to learn about what National Archaeology Day is, its purpose and benefits, and how they can get involved.**

Keywords: **archaeology, archeology, outreach**

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A Review of Regional Science Strategies and Partnership Efforts in the Pacific Northwest

5229

Paper

Development of adaptation strategies to cope with environmental change is proceeding on many fronts. The North Pacific Landscape Conservation Cooperative (NPLCC) has a new strategy for science and traditional ecological knowledge to guide activities related to landscape level conservation and sustainable resource management. The NPLCC is led by numerous partners and includes federal, state, provincial, tribal, university, and nongovernmental entities. The geographic area includes land and seascapes extending from the Kenai Peninsula in Alaska to Bodega Bay in California. The North Cascadia Adaptation Partnership (NCAP) is an effort led by a Forest Service–National Park Service team to assess resource vulnerability and incorporate climate change adaptation into current management of national parks and forests in north-central Washington. This presentation will explore elements of these two highly collaborative efforts and discuss their complementarity, as well as possible pathways and constraints of implementation.

Value proposition: **New North Pacific LCC science strategy will be compared with an applied climate change adaptation project to assess alignment and differences, and elucidate common constraints.**

Keywords: **Strategy, LCC, adaptation**

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The Evolution and Revolution of National Park Planning: Bruce Peninsula National Park, Canada (1987–2012)

4631

Paper

In 1987 the federal government of Canada established the Bruce Peninsula National Park in southern Ontario. In the twenty five years since formation, this national park has experienced a variety of park management planning initiatives that have been greatly influenced by changes in the theory and practice of planning for protected areas in Canada and worldwide. These include regional official planning revisions, changes to provincial land use policies in Ontario, the introduction of ecological integrity and updates to federal Parks Act, and the advances in protected area practices as reflected by the World Commission on Parks. The paper will provide a discussion of the implications of these changes and the key factors that have resulted in a progression of park planning in the Bruce Peninsula National Park as model for the evolution and revolution of national park planning within this recent changing era of modern protected area planning.

Value proposition: **This presentation will provide specific examples of how changes in protected area planning theory and practice are evolving the planning of recently established national parks.**

Keywords: **protected, area, planning**

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Estimating Visitor Use: An Examination of Trail Counter Calibration Factors in Sequoia National Park

5260

Poster

Currently in National Parks across the country park planners are experimenting with the use of automated counting devices as a means of estimating visitor use on trails. When looking at passive-infrared trail counters specifically, due to only recently becoming routinely used little is understood in regards to their accuracy. While calibration, the process of comparing a sample of manual counts to those taken from the trail counter, is becoming an encouraged practice to increase the accuracies of the data received, no standardization has occurred as to what extent of calibration time is necessary. The goal of this poster is to examine this issue by looking at several potential factors that may increase/decrease the amount of calibration time necessary on eight trails within Sequoia and Kings Canyon National Parks and determine if a correlation exists with these factors and the calibration coefficients seen.

Value proposition: **Park planners examining visitor movement with trail counters will learn of factors that are important to take into account when calibrating for accuracy.**

Keywords: **Trail Counter Calibration**

Lead author • session organizer • poster / demo / exhibit presenter:

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Using Qualitative Approaches to Complement Quantitative Data in Studies of Underserved Populations Surrounding Public Lands

5043

Panel Discussion

Research about the recreational behaviors of visitors to public lands has been widely published. However, underrepresented populations visitation patterns have not been studied at length. Public land managers are interested in understanding more about the reasons people choose not to visit a recreation area. Surveys are commonly used to study visitors but are not always the most useful for reaching non-visitors. Qualitative research using focus groups, interviews, and community meetings is more effective. These methods involve unique challenges and procedures. The panelists will discuss methodology and procedure to conduct such study including navigation through OMB approval process, the expectations and responsibilities of park staff and researchers. Examples of recent studies will be used to address challenges. The panelists also will demonstrate how qualitative findings can be used in conjunction with available quantitative data by managers and planners to enhance visitation.

Value proposition: **An effective methodology for studying under-represented populations that don't visit nearby public lands; and the examples of how land managers use the study results.**

Keywords: **OMB, underrepresentation, outreach**

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Tracy Swartout, Mt. Rainier National Park
Lauren Gurniewicz, Congaree Swamp National Park
Estee Rivera Murdock, Saguaro National Park

Protected Areas on Private Land: Shaping the Future of the Park System in Australia

5029

Paper

South Australia's terrestrial protected area system covers 28 million hectares, or around 29% of the State. The majority of protected areas occur on public land. However, an effective protected area system cannot be established on public land alone. Over the last four decades, South Australia has been at the forefront of private land conservation in Australia. Private protected areas now cover around 0.8% of the State and range from small conservation covenants to large former pastoral properties and Aboriginal owned land. Private protected areas provide critical support to South Australia's protected area system and contribute to wider, landscape-scale conservation efforts. This paper describes South Australia's approach to establishing private protected areas, including current work to develop an innovative legislative framework for the further establishment of private protected areas. This aims to strengthen conservation outcomes and to expand opportunities for landholders to pursue significant and meaningful conservation objectives.

Value proposition: Learn how South Australia's innovative approach to private land conservation is helping to shape development of the protected area system in Australia

Keywords: private, conservation

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Co-managing Parks with Aboriginal Communities: Improving Outcomes for Conservation and Cultural Heritage

5030

Paper

The relationship to land and sea ('country') is central to the culture, identity, spiritual beliefs and well-being of indigenous Australians. Access to country is critical to maintaining this relationship. In 2004, South Australia introduced legislation to create a framework for sharing management responsibility for national parks with Aboriginal people. Co-operative management agreements between the government and Aboriginal communities allow for a co-management board to have direct control over park management. South Australia's co-management framework provides a significant mechanism for advancing the reconciliation agenda, contributing to Aboriginal self-determination and helping to address Aboriginal disadvantage and native title issues. In addition, traditional Aboriginal knowledge and land management practices help inform and improve contemporary approaches to science and park management and enhance park visitor experiences. The values and benefits of South Australia's successful co-management arrangements will be illustrated using a case study from the Vulkathunha-Gammon Ranges National Park in the Flinders Ranges.

Value proposition: **South Australia's successful, leading-edge approach for establishing partnerships with Aboriginal communities to jointly manage parks may have potential application for other jurisdictions.**

Keywords: co-management, indigenous, parks

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South Australia's NatureLinks Program: Successfully Integrating Protected Areas Into Landscape-scale Conservation

5031

Paper

Landscape-scale conservation is now the dominant approach for responding to the challenges of conservation, sustainable livelihoods and climate change. Just as international efforts to conserve biodiversity have progressed from a species-focus to a broader systems approach, the future of protected areas relies on their integration into broader physical, social, cultural and economic landscapes. South Australia's NatureLinks program is integrating protected areas into landscape restoration. Two case studies illustrate different approaches to integration, with protected areas at their core. Operation Bounceback began as a government-driven restoration program in the Flinders Ranges National Park, originally focussing on endangered Yellow-footed Rock-wallabies. Over the last twenty years, it has extended its focus outward to encompass a range of land tenures and involve many different stakeholders. WildEyre, on the Eyre Peninsula, is driven by a consortium of non-government organisations and state agencies, with a focus on restoring private lands that surround and link protected areas.

Value proposition: **Learn how South Australia's NatureLinks program uses different approaches to successfully integrate protected areas into landscape-scale restoration and management.**

Keywords: **landscape, restoration, park**

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Names of additional authors / panelists / presenters (if any):

Public Lands/Personal Stories: Oral History and Narratives of Wilderness

5273

Panel Discussion

There are over 750 wilderness areas in the United States, and many of them are in National Parks. National Parks have been around since 1872, but the special "wilderness" designation, legislated in 1964, is much more recent. The act famously states that wildernesses are "untrammeled by man," and yet, even before the act, wildernesses were trammeled in fascinating narrative ways. What is the best way to document and preserve the human stories of these areas that are protected from human development and human impact, and then to use those stories to educate? This question is particularly relevant today, as we approach the 50th anniversary of the Wilderness Act in 2014. Using examples from Yosemite, Sequoia and Kings Canyon, and the Selway-Bitterroot, and introducing practical how-to techniques, our panel will explore how human stories and oral history are especially important to these landscapes that are, by law, "untrammeled."

Value proposition: **Audiences will learn how oral history shapes current thinking about wilderness and how to collect oral histories and use them with new media applications.**

Keywords: **wilderness, oral history**

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Brenna Lissoway (participant), Archivist, Yosemite National Park
Kass Hardy (participant), Management Assistant, Yosemite National Park
Lu Ann Jones (moderator) Staff Historian, Park History Program, NPS, Washington Support Office

The Digital Preservation of Mount Rushmore National Memorial

5393

Paper

The paper discusses the 5 year partnership between Mt Rushmore National Memorial and CyArk to digitally preserve the memorial with the latest 3D digital reality capture technologies. The project was designed to meet the preservation and interpretation needs of the park. The presentation will highlight the wide range of deliverables implemented over the course of the 5 year program, including a millimetrically accurate 3D record of the mountain sculpture and partial park grounds, conservation and rock-block monitoring tools, a web-based virtual tour, a mobile application, teacher lesson plans spanning K-12, 3D online artifact gallery, 3D prints as hands-on educational and outreach resources, new exhibit materials including a 3D hologram, a 3D interactive educational game, site management and online GIS tools, and online public dissemination of information and multimedia.

Value proposition: **Audience will learn how Mt. Rushmore has utilized digital preservation for crack monitoring on the monument, facility management, educational outreach, new exhibits, and mobile applications.**

Keywords: **3D LiDAR education**

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When and Why We Treat Wildlife as Pests: Implications for Management and Public Perceptions

5349

Workshop

Changing human and wildlife demographics are increasing negative human-animal interactions even for species traditionally managed as valued resources, such as deer and geese. Outside of parks, these situations are being handled increasingly as pest management issues by public agencies or private pest control operators. Recent studies have begun to indicate that the public may be adopting a "pest" frame for thinking about their problematic interactions with wildlife, raising the concern that a larger suite of wildlife species may become stigmatized as pests, regardless of the management context. How NPS addresses negative human-wildlife interactions in parks can facilitate or counter this process. As a conservation organization, NPS strives to encourage positive public perceptions of wildlife through our actions and words. This workshop will examine NPS historical practices and future directions for IPM and wildlife management that have implications for societal views about wildlife.

Value proposition: **Participants will examine how management actions and terminology can affect public perceptions regarding human-animal interactions and contribute to strategic thinking for IPM and wildlife management.**

Keywords: **wildlife, pest, stigmatization**

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Using Research into the Human Dimensions of Natural Resource Management to Enhance Science-Informed Decisions

5654

Focus Session

In an era of rapid environmental change and uncertain futures, context-specific information about how stakeholders relate to resources and resource management will become increasingly important in designing effective and durable natural resource management strategies. Human dimensions practitioners utilize a range of social science disciplines, which can produce different kinds of knowledge. Some approaches are better suited than others to addressing particular types of questions that might emerge with respect to various management activities. This session will introduce some of the key considerations in choosing between social science approaches to assist managers in assessing what type of information could be most helpful in a particular situation. Invited panelists will each introduce their area of expertise, the types of questions that their theory and methodology are best able to address (and at what points of the management cycle), and an example of how this insight can assist in management.

Value proposition: **Attendees will learn about various social science disciplinary approaches used by human dimensions practitioners and how they can best be leveraged to enhance management decision-making.**

Keywords: **human dimensions, science**

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Panelists:

Dan Decker, Cornell University, Department of Natural Resources: confirmed (integrated social-ecological systems)

Katherine McComas, Cornell University, Department of Communication: confirmed (risk perception and communication)

Robert Manning, University of Vermont, Park Studies Laboratory: confirmed (recreation management)

Sarah Rinkevich, USFWS: confirmed (cultural anthropology, traditional ecological knowledge)

Moderator: Grant Hilderbrand, Biologist, NPS Alaska Regional Support Office: confirmed

Developing a Wilderness Character Monitoring Program for Rocky Mountain National Park

5251

Paper

In March 2009, Rocky Mountain National Park officially received designation as wilderness. Part of the Wilderness Act mandate is to preserve “wilderness character”, an attribute often difficult for managers to quantify. To aid managers with carrying out this mandate, a wilderness character monitoring program is being developed in conjunction with Colorado State University. The goal of this project is to develop an expanded spatial based platform for evaluating wilderness character beyond previous methods proposed. The analysis and modeling capabilities of a spatial based platform will allow characteristics to be evaluated for current conditions, as well as provide a medium for testing impacts of various management options by the park to those characteristics. A secondary goal is to develop a flexible model capable of accepting a range of datasets. Such a platform will provide a basis by which various agencies can adapt the model to utilize datasets already available to them.

Value proposition: **This presentation will demonstrate methods and considerations for managing public lands, in particular designated wilderness, though utilization of spatial analysis and planning tools.**

Keywords: **Wilderness, GIS, NPS**

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Peter Newman, Ph.D. - Colorado State University, Park Studies Unit

Derrick Taft, Ph.D. - Colorado State University, Park Studies Unit

A Call to Action: Preparing for a Second Century of NPS Stewardship and Engagement

5163

Panel Discussion

The NPS will celebrate its 100th year of service in 2016. As this important anniversary approaches, the NPS is undertaking initiatives that re-emphasize the NPS commitment to the stewardship and enjoyment of public lands, while elevating new and innovative approaches. This panel will provide an overview of how the NPS and partners have committed to actions that advance the Service toward a shared vision for 2016 and the future. The Call to Action aims at connecting people to parks, advancing the NPS education mission, preserving special places, and enhancing professional excellence. The panel will focus on actions designed to meet these goals: Next Generation Stewards, Follow the Flow, Scaling Up, and Back Home on the Range. Action champions and staff will share the programs and materials the NPS has developed. Attendees will have an opportunity to engage in lively dialogue on lessons learned, provide input, and offer next steps.

Value proposition: **Participants will have the opportunity to offer input to Champions and staff on Call to Action items and help shape the success of these concepts.**

Keywords: **Call to Action**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Introduction • Elaine Leslie, Chief, Biological Resource Management Division, NPS Natural Resource Stewardship and Science Directorate
Call to Action #26, Back Home on the Range: Preserving Special Places • Dan Wenk, Superintendent Yellowstone National Park
Call to Action #22, Scaling Up: Preserving Special Places • Dan Kimball, Superintendent, Everglades National Park
Call to Action #7, Next Generation StewardsL Connecting People to Parks • Sally Plumb, Program Manager, Biodiversity Discovery, NPS Biological Resource Management Division
Call to Action #12, Follow the Flow: Connecting People to Parks • Susan McPartland, Visitor Use Management Specialist, NPS Denver Service Center

Developing a Migration Conservation Initiative for the National Park Service

5590

Panel Discussion

Migrations are one of the most spectacular of natural phenomena that demonstrate critical landscape-scale ecological connections. From whales, to warblers, to butterflies, migratory species are among our most iconic and yet most threatened of species in part because no one country or agency can conserve migratory wildlife on their own. Collaborative action is needed to preserve the wonder, grandeur, and challenges of migration. NPS has an opportunity to show leadership in identifying these key ecological connections and in working collaboratively to conserve these connections. We propose a discussion with workshop participants to further develop a suite of strategies to cooperatively gather and synthesize information to identify key habitats and threats to migration; conduct research; implement and evaluate management actions; develop programs of outreach and education; and to identify and implement proof of concept projects to gain internal and external credibility for migration conservation.

Value proposition: **Participants will have the opportunity to provide input to help develop a feasible strategy for implementing a NPS Migration Conservation Initiative.**

Keywords: **Migration, Initiative, Conservation**

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Joel Berger, Craighead Chair and Professor of Wildlife Conservation; Senior Scientist, University of Montana
Tanya Shank, Landscape Ecologist, NPS
Jodi Hilty, North American Program Director, the Wildlife Conservation Society

Backup for Joel Berger: Dr. Healy Hamilton, Senior Research Fellow, Marine Conservation Institute, Fairfax, CA

Backup for Jodi Hilty: Dr. Steve Zach, the Wildlife Conservation Society

Bioacoustical Monitoring in National Parks

5197

Poster

Acoustical monitoring of wildlife has many benefits, including the ability to detect vocal species in the absence of human observers and to gather data in remote locations for long time periods. Advances in automated detection software allow researchers to analyze large datasets very rapidly. In addition to detection, acoustical monitoring is increasingly being used to determine impacts of noise on wildlife. Noise is an increasing concern for natural resource managers in parks and other protected areas. The Natural Sounds and Night Skies Division of NPS NRSS has studied the acoustic environment in parks for over 10 years and is well-placed to help parks with inventory, monitoring, and research in this field. We are constantly refining technical systems to maximize species detections, battery life, and ease of field deployment. The latest technology, along with sample applications in parks, will be presented.

Value proposition: **We hope to share new acoustical field methods, learn what others are doing in this area, and stimulate conversation about potential applications.**

Keywords: **acoustics, wildlife, monitoring**

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Scott McFarland, CSU/NPS NSNSD

Megan McKenna, NPS NSNSD

Daniel Mennitt, CSU/NPS NSNSD

Misty Nelson, CSU/NPS NSNSD

Developing a Collaborative Learning Network for Visitor Impact Monitoring in Protected Areas: A USA–Brazil Panel

5276

Panel Discussion

Integrating visitor use with conservation objectives is a significant challenge in many national parks and similar protected areas. Visitor impact monitoring (VIM) is growing in recognition and practice as a tool for evaluating such integration. In countries with a large protected area system including the U.S. and Brazil, Indicators and initiatives have been developed to address visitor impact concerns, some of which are common in both countries. As such, international collaborative learning on VIM design, methods and implementation would generate mutual benefits for both protected area systems, leading to increased management capacity and advancements in VIM. This session aims at exploring a collaborative learning network (CLN) in which protected area professionals exchange ideas, knowledge and practices on VIM. Five panelists will offer international perspectives on VIM and collaborative learning, followed by a moderated discussion on key VIM issues and priorities for both countries.

Value proposition: **Learn about the U.S. and Brazilian perspectives on visitor impact monitoring research and practice; explore ideas for an international collaborative learning network**

Keywords: **monitoring, learning, Brazil**

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Jasmine Moreira, Ponta Grossa State University, Brazil
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Yu-Fai Leung, North Carolina State University, USA
Steve McCool, University of Montana (retired), USA

Co-organizer -- Ms. Anna Miller, North Carolina State University, USA

Natural resource impacts of technical trail features for mountain biking: An international assessment

5317

Paper

Mountain biking (MB) continues to grow in popularity in natural resource recreation areas in North America and other countries. The increase in participation is accompanied by diversified MB riding styles, including freeriding for which technical challenges are desired. One specific type of impact associated with this riding style is technical trail features (TTFs) built to enhance challenges and experiences. Many TTFs are built unofficially by mountain bikers using local or foreign materials, raising management concerns about potential ecological impacts. Research has recently begun to assess resource impacts attributable to TTFs. An assessment protocol was developed in Australia and has been adapted to the U.S., Germany and Portugal. The objectives of this presentation are to: (1) provide an overview of this emerging impact issue and (2) present an initial comparative analysis with assessment data from four countries. Research and management implications will be discussed with audience participation.

Value proposition: Learn about the growing resource management issue of technical trail features built in natural areas for mountain biking with assessment results from four countries

Keywords: biking, impacts, international

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Dr. Catherine Pickering, Griffith University-Gold Coast, Australia

Mr. Ricardo M. Nogueira Mendes, Universidade Nova de Lisboa, Portugal

Mr. Christopher Kollar, University of Montana, USA

Unpaid Protectors: Volunteerism and the Diminishing Role of Federal Responsibility in the National Park Service

5125

Paper

This presentation will explore the extraordinary importance of volunteers in the National Park Service by presenting the supply and demand forces that have fueled the Volunteers-in-Parks Program to now contribute one tenth of national park man-hours. Informed by Park Service data and interviews with superintendents, the development of two theories, hollow state and short-circuited democracy, will explain why volunteerism has prevailed over other management responses to the Park Service's need for additional resources. It will be concluded that hollow state volunteerism is inextricably tied to park health while short-circuited democracy volunteerism would subside if citizens became more aware of the important role volunteers play in the National Park Service. The possible benefits and consequences of the National Park Service's use of coproduction will be discussed and the audience will be encouraged to consider the ways in which volunteers can alter public services.

Value proposition: **They will gain a nuanced understanding of how volunteerism affects public services and be equipped with new tools to help better manage unpaid workers.**

Keywords: **NPS, Volunteerism, Coproduction**

Lead author • session organizer • poster / demo / exhibit presenter:

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Climatic precursors to wildfire in southern California chaparral landscapes

5064

Paper

Connections between fire occurrence and climate, as measured by variables such as El Nino-Southern Oscillation and drought severity, have been observed at global, regional and even local scales. For southern California, one of the most fire-prone communities in the world, research investigating such climate-fire relationships is limited. We compared multi-century fire histories created from Big-cone Douglas fir stands across three National Forests with independently derived climate proxies to examine if such links are evident in southern California. Our results indicate that drought, in the year leading up to a fire event, is a significant factor in the occurrence of both local and landscape sized fire events in southern California. These findings provide resource managers with a predictive tool that can be used to more efficiently allocate their increasingly limited assets and with a better understanding of how these complex interactions can shape fire regimes and vegetation characteristics.In 2010, the Presidio of San Francisco developed a protocol to evaluate landscape plants for use at the park level. Two factors were used to assess invasion risk: 1) whether the species was recorded as invasive elsewhere and 2) whether the species was invasive in similar regions. In addition to invasion risk, the Presidio added cross pollination risk, maintenance and historic compatibility. This process is now used to evaluate each species proposed for use in the designed landscape. Plants are placed on one of three lists: 1) approved, 2) prohibited or 3) approved with conditions. The collaborative

Value proposition: **How wildfire-climate interactions have shaped fire regimes and vegetation characteristics in southern California and how to use the information to more efficiently allocate resources.**

Keywords: **fire ecology**

Lead author • session organizer • poster / demo / exhibit presenter:

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Monitoring Terrestrial Herptiles in a Small Urban Park

5061

Paper

The use of pitfall traps and drift fencing has been an effective method for monitoring many species of herptiles. This method has been used at Cabrillo National Monument in San Diego, California since 1995 to monitor trends in reptile and amphibian species within the park as part of the National Park Service Mediterranean Coast Network Inventory and Monitoring Program. The park is located at the southern tip of the Point Loma peninsula near downtown San Diego and is surrounded by water and developed land essentially creating an island of native Coastal Sage Scrub habitat. There are twelve species of herptiles that are currently found within the 163 acre park and species diversity has declined according to historical records. Continuous inventory and monitoring efforts are important to detect any significant changes in the herptile populations within this urban "island" park and to manage our parks for future generations to enjoy.

Value proposition: **This presentation will describe methods used to monitor reptile and amphibians using pitfall traps and drift fencing.**

Keywords: **reptiles, amphibians, monitoring**

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Names of additional authors / panelists / presenters (if any):

Monitoring shorebirds within a small coastal urban park

5072

Poster

Cabrillo National Monument in San Diego, California is located on the Point Loma Peninsula and includes about 1.5 kilometers of coast line bordered by the Pacific Ocean. This rocky intertidal area is commonly used by many species of birds as foraging and roosting sites. This coastal area is also important for park visitors to experience this type of ecosystem. Monitoring efforts began in 1990 to study the rocky intertidal area of Cabrillo National Monument and the organisms that use this habitat. These efforts include monitoring shorebirds and seabirds birds as well as the number of visitors that use the rocky intertidal. There is a negative relationship between the number of people and the number of birds using the same area simultaneously. Such impacts are important for the management of the coastal areas of a small urban park in order to "leave them unimpaired for the enjoyment of future generations".

Value proposition: **This poster intends to present shorebird and visitor survey methods within the rocky intertidal area. The correlation between bird and visitor abundance will be demonstrated.**

Keywords: **Shorebirds, monitoring**

Lead author • session organizer • poster / demo / exhibit presenter:

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Understanding wildlife complaints: stakeholder perceptions regarding black bears and coyotes in upstate South Carolina.

5147

Poster

The growth of suburbs and gated communities into wildlands displaces wildlife populations from their habitat and can increase human-wildlife conflicts. This study examines an area experiencing this type of growth, upstate South Carolina, where the amount of wildlife complaint calls coming from private community residents into the SC Department of Natural Resources (SCDNR) have recently been increasing. Electronic and self-administered face-to-face questionnaires were used to survey general area residents and residents living in private communities adjacent to protected natural areas. They were asked questions regarding wildlife knowledge, their value of wildlife, and wildlife experiences. The goal was to determine if patterns for interaction are different for general residents as compared with gated community residents. Results show various stakeholders' wildlife values as well as level of wildlife knowledge. By understanding the community stakeholders, we can give meaning to wildlife complaints and also minimize negative resident reactions to wildlife control methods.

Value proposition: **This research will help managers understand wildlife complaints and how to minimize negative resident reactions to wildlife control methods by directing necessary education efforts.**

Keywords: **Wildlife, management, values**

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Dr. Jeffrey Hallo, Clemson University

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Acoustic Monitoring Workshop

5154

Workshop

In May 2012, the Natural Sounds and Night Skies Division hosted its first annual training in acoustical ambient monitoring. The course, taught over four days, covered critical topics for soundscape managers from all agencies including a quick primer on the science of sound, monitoring protocols, equipment set up, data analysis, and reporting. It also addressed how results have been incorporated into planning processes. This workshop will provide a brief introduction to each of these topics, and serve as a forum for discussing current soundscape issues in parks and protected areas. Participants will be encouraged to suggest additional topics to be added to annual training curriculum. This meeting is targeted at researchers interested in beginning acoustic monitoring programs or refining existing methods in natural areas.

Value proposition: **Participants new to the idea of acoustical monitoring will gain basic understanding. Experienced personnel will learn of latest techniques in the study of sound.**

Keywords: **acoustic, noise, sound**

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Damon Joyce, National Park Service

The Role of Small-Scale Community Conserved Areas in Larger-Scale Protected Area Conservation and Management Planning

5308

Paper

Community conserved areas (CCAs) are a globally important category of protected area with unique governance, management and foci of protection. They have often been developed in tandem with protected area development and management but they also have value as stand-alone entities independent of traditional protected areas. The smaller-scale at which CCAs frequently operate often means that their management objectives and community-based approaches are not effectively integrated into larger-scale protected area management programs and initiatives. As such, the potential of these smaller-scale, community based efforts in regional management planning is often overlooked or ignored. This presentation explores how management planning for CCAs can be more effectively integrated into regional planning initiatives and in concert with existing protected areas. Examples of integrated management planning from Belize, the United States and India are presented to illustrate practical examples of integrated management planning across scales to achieve both small and larger scale conservation objectives.

Value proposition: Presentation will explore integrating community conservation efforts with traditional protected areas management and discuss specific approaches to achieving conservation management goals across geographic

Keywords: community, conservation, management

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The New NPS Science Integrity Policy: An Introduction and Training Opportunity

5636

Workshop

The new (2012) NPS science integrity policy covers a wide range of scientific and scholarly activity, as well as decision-making that uses scientific and scholarly research results. The policy affects federal scientists and managers, contractors, university cooperators and many other GWS members--not just NPS employees. Participants will gain an understanding of the policy, how it affects them and their work, and enable them to train others in their organization. The workshop has five parts: 1) an introduction to the concept of scientific integrity, 2) a description of the new (2012) NPS science integrity policy and its requirements, 3) a series of 3 case studies that allow participants to better understand the policy in action, 4) A brief description of practical steps managers and scientists can take to ensure adherence with the policy, and 3) an open discussion of technical issues, questions, and concerns that arise from implementing this important policy.

Value proposition: **The new NPS science integrity policy affects many GWS members. Participants will understand the policy, how it affects them, and prepare to train others.**

Keywords: **science integrity, policy**

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Effects of Road Decommissioning on Carbon Stocks, Losses, and Emissions in North Coastal California

5040

Paper

Road removal is a common restoration technique on public lands in the United States to reduce erosion from abandoned or unmaintained forest roads. Although effective in decreasing sediment production from roads, such activities have a carbon (C) cost as well as a carbon savings for an ecosystem. We assessed the carbon budget implications of 30 years of road decommissioning in Redwood National and State Parks in northern California. Treatment of 425 km of logging roads from 1979 to 2009 saved 72,000 Mg C through on-site soil erosion prevention, revegetation, and soil development on formerly compacted roads. Carbon sequestration will increase in time as forests and soils develop more fully on the restored sites. The carbon cost for this road work, based on heavy equipment fuel emissions, short-term soil loss, and clearing of vegetation, was 23,000 Mg C, resulting in a net savings of 49,000 Mg C to date.

Value proposition: **The NPS is working towards being carbon neutral in their operations. Resource managers will learn how to evaluate the carbon implications of restoration work.**

Keywords: **carbon, restoration, reforestation**

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Phil van Mantgem is a Research Ecologist with the USGS,

Connecting People to Parks through Outdoor Play

5119

Café Conversation

When "A Call to Action" was released, a major theme was Connecting People to Parks. "Take a Hike, Call Me in the Morning" is one initiative focused on the restorative and healthy benefits of time spent in parks. At Clemson University, we have fostered a similar mission within the US Play Coalition, an international organization dedicated to promoting the value of play throughout life. Children and adults are spending more time "plugged-in" and less time engaging with each other and the natural world. This has had devastating effects on our physical, cognitive, and emotional well-being. As leaders in our parks and stewards of our natural resources, it is our duty to engage an increasingly distant public. The Café format will allow for an open discussion of the role of organizations like the US Play Coalition, NPS, and others on how to connect people to parks and the outdoors through play.

Value proposition: **Will learn and discuss the benefits and challenges related to increasing play for people of all ages in our work in parks and protected areas.**

Keywords: **Play, Reconnection, Health**

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The State of Park Resource Stewardship Planning: What State Are We In?

5098

Panel Discussion

Direction and momentum for park resource stewardship planning has been in flux for almost 20 years. Resource Management Plans have been out of vogue since the mid-late 1990s. The Resource Stewardship Strategy process was developed in the early 2000s, but never finalized. Now the State of the Park reports are underway, with a specific goal of completing 50 by 2016. In the absence of specific direction and guidance for resource stewardship plans, parks are either not doing them or are contemplating yet another model to meet their needs. The need for plans that identify research priorities and prioritize short- and long-term resource management activities, especially in times of budget and staffing shortages, is ever-present. This session will explore the history, evolution, and possible next steps for resource stewardship planning in the NPS through four presentations, followed by discussion with the audience and engagement on the future of Resource Stewardship Strategies.

Value proposition: **This session will describe the current state of park resource stewardship planning, allowing attendees to understand where the program is headed and options for progress.**

Keywords: **RSS, resource planning**

Lead author • session organizer • poster / demo / exhibit presenter:

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Kirstie Haertel, Pacific West Regional Office, National Park Service
Ken Stahlnecker, Black Canyon of the Gunnison National Park/Curecanti National Recreation Area, National Park Service

National Park Service Intermountain Region (IMR) Resource Managers' Meeting

5099

Affinity Meeting

Sponsored by the IMR Resource Stewardship Advisory Team (RSAT), IMR park resource managers will have the opportunity to gather and discuss issues of importance across the Region. During this meeting attendees will make important contacts that will be useful to them in their home park units. Several contemporary resource management issues will be discussed during the meeting, with the goal of sharing information and solutions. As part of the meeting RSAT will be hosting a listening session that will serve to inform park resource managers and RSAT members about current challenges and issues of importance that RSAT can assist with. These conversations and interactions will help inform the direction that RSAT and the Regional Office take with regards to supporting parks.

Value proposition: **IMR resource managers will make meaningful contacts with their peers and will learn skills and ideas that can improve resource conditions in their own parks.**

Keywords: **IMR, RSAT, resources**

Lead author • session organizer • poster / demo / exhibit presenter:

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Environmental and Natural Resource Management of Concessions in Parks and Protected Areas

5565

Panel Discussion

Leaders from the concessioner community and the NPS Commercial Services Program will share management techniques and program strategies used to effectively manage a concession operation within the NPS. Participants will learn about the challenges of operating a "sustainable" business in a park setting and the large and complex programs needed. Case studies will focus on concessions operations that are managed to promote visitor enjoyment while preserving resources for future generations. The panel will discuss techniques for minimizing impacts as well as educating the visiting public about the resource and good environmental stewardship. Panelists will address: managing concessions with minimal impact to the resource, promoting environmental sustainability with staff, promoting best management practices for natural resource management, and educating visitor's on individual impact. PRIZIM will chair the session; each panelist will present a unique perspective from different concessions service types or NPS and will speak for a maximum of 20 minutes.

Value proposition: **Learn how concessioner staff and operations are managed to protect natural and cultural resources while educating visitors and promoting environmental stewardship.**

Keywords: **Concessions, NPS, Environmental**

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Kevin Kelley, DNC, NPS Concessioner
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Nat Patridge, Exum, NPS Concessioner
Steve Hatch, Hatch River Outfitters, NPS Concessioner

Identification of Cattail Taxa in National Parks

5025

Poster

Cattails in North America consist of three species and a hybrid: broad leaf cattail (T. latifolia), narrow leaf cattail (T. angustifolia), southern cattail (T. domingensis), and hybrids of these species. Wetland managers have been dealing with identification problems of these taxa since the 1960s. Microsatellite DNA provides a method to identify these taxa based on leaf tissue analysis, although the costs are somewhat high. Another approach is to evaluate the pollen morphology. Pollen differs among the hybrids and parental species: T. latifolia has tetrad pollen, T. angustifolia has monad pollen, and the hybrids of these two species have a mixture of pollen forms. Identification methods may be based on pollen types in cattail taxa. An advantage of this method is that it is easy for volunteers and managers to use. Combining this method with molecular techniques could assist managers in cattail identification and control to restore plant biodiversity in wetlands.

Value proposition: **Understanding the role of hybridization and genetics in rapidly expanding cattail populations in wetlands is critical to applying management strategies to public lands.**

Keywords: cattails, microsatellite, pollen

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Using the National Parks in Teacher Professional Development and Classroom Activities

5089

Paper

The University of Colorado at Denver's experiential science education program utilizes numerous national parks as living classrooms. These experiences are academic in nature and generally incorporate inquiry or research components. They include on-campus courses on NPS resources and in-park field studies. This paper describes how a series of activities and experiences beginning in university classrooms and park field studies for teachers and ending with their students visiting a national park, if properly designed may impact a teachers' sense of comfort in using National Parks with students and content understanding resulting in improved classroom practice and use of park resources. The methods used in these experiences include a combination of implicit, informal and formal activities. K-12 teacher needs to prepare students for park visits will be discussed. Case study examples using Hawaii Volcano National Park, Grand Canyon and Bryce Canyon National Park will be included in the paper.

Value proposition: **Participants will learn what teachers need in bringing students to a National Park and how one program addresses them through campus coursework and field studies.**

Keywords: **Experiential learning**

Lead author • session organizer • poster / demo / exhibit presenter:

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Predicting the Effects of Sea Level Rise and Introduced Fishes on Hawaiian Anchialine Pool Ecosystems

5136

Paper

Sea levels are expected to rise up to 1.9 m by 2100 affecting coastal habitats worldwide. Anchialine pools are brackish coastal systems occurring in porous substrate where marine and groundwater mix. In Hawaii, pools support endemic species and are important cultural resources. Current efforts to model sea level rise within five Big Island parks indicate that while some coastal resources will be flooded, others will be created. Pool detection models that incorporated LiDAR derived topography as well as marine and groundwater levels were tested with known pool locations. Best models were used to predict inundation and pool creation at various sea level rise scenarios. Results were also used to predict the dispersal pathways of introduced fishes into uninfected habitats. Finally, multivariate analysis was used to examine how endemic species distribution relates to invasive fish, water quality, and land-use. These analyses will be shared with resource managers to target conservation efforts.

Value proposition: **Object based imagery analysis and cost distance modeling provide novel approaches to predicting sea level rise effects on introduced species and coastal aquatic resources .**

Keywords: **sea-level rise, introduced**

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Parks and Protected Lands Where Farms and Food Matter

5321

Sharing Circle

There is a growing network of parks and protected areas around the world that are partnering with communities to preserve historically important agricultural landscapes and encourage sustainable farming practices. In an era of climate de-stabilization and epidemic obesity, these initiatives are strengthening food education, public health and cultural heritage preservation. They also support agrobiodiversity, which is increasingly recognized as a critical component of a sustainable food supply. This network will discuss challenges and opportunities confronting parks and protected areas where farming is important, drawing from national and international examples. Topics may include new approaches to education, community gardens/ farmers markets, use of conservation strategies on agricultural lands, and a variety of new institutional relationships and partnership models. Participants are encouraged to bring their own issues and share their experiences. Examples will be gleaned to share in a future issue of the GWS Forum dedicated to the topic.

Value proposition: **Participants will contribute to a network of parks and protected lands where agricultural landscapes offer unique opportunities for community engagement, heritage preservation, and sustainable operations.**

Keywords: **cultural landscapes, agrobiodiversity**

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* to be confirmed

Park for Every Classroom: Building Partnerships that Connect Parks, Schools and Communities

5372

Paper

Public lands, partners and schools face a common challenge of relevancy to today's youth. By joining forces, we can build creative, effective, and sustainable bridges to engage students in place-based learning. This session will explore techniques to form public lands-school-community partnerships that offer youth authentic learning experiences and create new generations of engaged citizenry. These "lessons-learned" are drawn from over 12 years of experience with teacher-professional development that includes partnerships and programs with NPS Conservation Study Institute, Shelburne Farms, Appalachian Trail (Trail for Every Classroom), Iditarod Trail (i!TREC), Forest Service (Vermont, New Hampshire, Montana, Texas, and Wisconsin), eight parks in the Northeast Region (Park for Every Classroom) and Lake Champlain Basin Program (Watershed for Every Classroom). The session will also highlight the use of Communities of Learning, Inquiry and Practice (CLIPs) as an effective approach in developing and spreading innovative place-based education ideas and tools among public lands and partners.

Value proposition: **Participants will explore methods that build partnerships between schools, public lands and community partners; and gain experience designing learning communities to share innovation**

Keywords: **education, partnerships, community-engagement**

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Jen Cirillo, Director of Professional Development, Shelburne Farms

Joan Haley, Place-based Education Coordinator, Marsh-Billings-Rockefeller NHP/Shelburne Farms

Delia Clark, Consultant, Shelburne Farms

Agave Restoration Project: A Partnership in Action

5583

Poster

In 2007, the construction of the international border fence within Coronado National Memorial (CORO) resulted in the loss of an estimated 3700 Palmer's agave (Agave palmeri), the primary food source of the endangered Lesser long-nosed bat (Leptonycteris curasoae yerbabuenae). CORO initiated a collaborative effort between the National Park Service (NPS), US Fish and Wildlife Service, and the Department of Homeland Security to restore lost agaves. In 2009, CORO contracted with the Natural Resources Conservation Service to grow 4500 agave over three years, and, beginning in 2010, hosted an annual agave planting event. Each year, more than 120 volunteers and staff from CORO, other NPS units, and other land management agencies planted 1000+ agaves during the one day event. The successes of this project include: (1) the replacement of 3700 lost agaves; (2) multi-agency collaboration; and (3) the sense of community, wholesome outdoor experience, and stewardship afforded to all attendees.

Value proposition: **This poster represents a stewardship project focused on habitat restoration of a T & E species and a multi-agency and community partnership.**

Keywords: **Agave, Bats, Restoration**

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The California Phenology Project: Building a Citizen Science Phenological Monitoring Network in California

5503

Paper

Phenology is the study of seasonal biological events such as flowering, insect emergence, and animal migration. Long-term studies have documented that phenological patterns respond to environmental variation and climate change. To assess the effects of climate change on California's natural resources, the National Park Service, the University of California-Santa Barbara, and the USA National Phenology Network established The California Phenology Project (CPP; www.usanpn.org/cpp) in 2010. The CPP's goals are to develop and test protocols and to create tools and infrastructure in order to engage and educate the public in the study of phenology, detect how phenology is linked to climatic conditions, and provide data to support wildland stewardship. We will describe the CPP's accomplishments to date, which include developing a scientific framework to guide monitoring efforts; selecting focal plant species; establishing monitoring infrastructure; conducting workshops to recruit and train observers; and contributing >150,000 records to the National Phenology Database.

Value proposition: **The CPP has been designed as a potential model for replication across other NPS units, as well as other protected areas, across the nation.**

Keywords: **phenology, citizen science**

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Mendocino Woodlands: Leveraging Resources Effectively to Complete Cultural Landscape Projects for Historic Sites

5110

Paper

Mendocino Woodlands is one of many NHLs caught between the proverbial rock and a hard place, whose situation has been further exacerbated by current lean economic times. Blessed with incredible integrity, this NHL is hovering on the brink of losing distinct cultural features if rehabilitation and restoration work cannot move forward. Both California State Parks and the Mendocino Woodlands Camp Association didn't want to see that happen, and realized that a Cultural Landscape Report was necessary to provide necessary guidance for future preservation treatments. The site, located in a redwood forest in California, is incredibly remote, large and complex and a traditional approach to developing a CLR would be cost prohibitive. A creative approach was needed. In this case, the approach hinged on effective partnerships; one between a university and a consulting firm, and another between the California Department of Parks and Recreation and MWCA; consensus-building; and leveraging project dollars.

Value proposition: **Project benefits from collaboration between university and consulting firm**

Keywords: **landscape, CCC, recreation**

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Robert Z. Melnick is a professor at the University of Oregon and a nationally-recognized expert in cultural landscape evaluation and historic landscape preservation planning. A Fellow of the American Society of Landscape Architects, he has published widely on theoretical and practical issues relating to cultural and historic landscapes. Mr. Melnick's written works and professional projects have received numerous national awards. He regularly lectures at universities and professional meetings.

Landscape intactness and connectivity for management of forest-dependent wildlife in the Cumberland Piedmont region

5614

Paper

Although individual parks are important elements of the greater protected area network in the US, they alone are generally not sufficient to conserve biodiversity due to isolation from other protected areas, small size, and uncertainty in the face of threats like increasing fragmentation and climate change. Using NPScape tools, and forest pattern and land cover data, we examined forest habitat based on the home ranges and dispersal abilities of a suite of five native mammals. We explored how intact the Cumberland Piedmont region is from the perspective of these species, how functionally -connected the remaining forested protected lands are, which intervening lands are critical for maintaining this connectivity, and which forest cores and connective zones are most at risk given projected changes in population and housing density. Results are discussed in the context of management scenarios that may be useful for helping guide collaborative landscape-scale management decisions in the region.

Value proposition: **Landscape study of forest pattern and functional connectivity based on the ecological requirements of wildlife to understand and map threats and opportunities increasingly fragmented landscapes.**

Keywords: **Landscape, Forest, Connectivity**

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Shifting the Focus to Results: Ecological Restoration in Canada's National Parks

5186

Workshop

"Action on the Ground" is the largest and most aggressive ecological restoration program in Parks Canada's history. This initiative aims to improve the ecological integrity of 20 national parks by 2015. We gain focus by shifting funding towards larger projects that are integrated with outreach and visitor experience. Currently, 24 projects have stated clear measureable targets for ecological change by 2015. Achieving these targets will require close attention to these ecosystems. This workshop will give an overview of the Action on the Ground experience and will use case studies to stimulate discussion on 1)Why communicate? 2)How best to reach target audiences? 3)How to maintain a well-rounded conservation program while focussing on fewer, high profile targets? and 4)How to mount a persuasive and substantive program to report progress towards restoration targets? A short plenary will weave these strands together into advice for effective restoration on a large scale.

Value proposition: **Looking for clearer and better communicated restoration results? Come and discuss the progress and pitfalls of integrated restoration using Canadian national park case studies.**

Keywords: **restoration, monitoring, outreach**

Lead author • session organizer • poster / demo / exhibit presenter:

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Communicating One Health Messages: The Effects of Framing on Conservation Intentions

5468

Poster

Recent years have witnessed growing endorsement of the One Health concept, which emphasizes connections between human, animal, and environmental health. Little is known, however, about how the public might respond to wildlife-based One Health messages. Building on recent insights into unintended effects of message framing, we conducted an online experiment to test messages about Chronic Wasting Disease and their relationship to people's intentions to engage in conservation activities. One message described the disease as primarily due to elk behavior whereas a second emphasized a combination of human, wildlife, and environmental factors, i.e., One Health tenets. The results found no main effect for messages on conservation intentions. However, the message emphasizing elk behavior tended to increase conservation intentions among respondents having more communitarian values, whereas it decreased conservation intentions among those having more egalitarian/individualist values. The conclusions address the importance of considering potential unintended effects of messages.

Value proposition: **Audience members will learn about ways to conduct and incorporate formative audience research into message design strategies.**

Keywords: **One Health Messages**

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Enhancing Clean Air in Our National Parks: Turning Challenges into Opportunities

5501

Affinity Meeting

Over the past thirty years, the National Park Service's Air Resources Division has been a leader in understanding and protecting air quality and the clarity of scenic views in and from our national parks. New challenges are emerging from the rise of more dispersed sources of air pollution to the interaction of Climate Change on the behavior of air pollutants. It is important that park managers understand the nexus between clean air and the health of numerous park resources and values and what they can do to make a difference. Attendees will aid the division in identifying ways to best connect with park managers by fine tuning the division's communication strategy with an eye on the need to be realistic in the face of fiscal constraints.

Value proposition: **Help position the NPS to meet and communicate new challenges arising in the air resource field internally and to the public.**

Keywords: **air, communcation, pollutants**

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NPS Focus - a National Park Service Digital Asset Management System

5450

Poster

The NPS Focus Digital Library (http://npsfocus.nps.gov and http://focusmaps.nps.gov) is a National Park Service repository for digital assets. NPS Focus is used by parks and programs to manage, share, and discover information related to the protection and management of all types of park resources. The NPS Focus Digital Library has been recently redesigned as now displays assets as thumbnail images or geospatially, and improves digital asset management and discovery using current technologies. The new system features full support for embedded image metadata, metadata harvesting tools, direct upload of digital assets from mobile devices, enhanced geospatial tools for searching and tagging assets, and much more. NPS Focus is an important resource for the public and NPS users to discover digital information by and about the NPS.

Value proposition: **NPS Focus is used by the NPS to manage, share, and discover information related to the protection and management of all types of park resources.**

Keywords: **digital assets images**

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NPSearch: A NPS Search Portal

5460

Poster

NPSearch (http://npsearch.nps.gov) is a new search portal for the NPS. NPSearch allows users to index and search across information systems NPS-wide, the ultimate goal being all NPS systems. NPSearch is a "one-stop shop" for digital information for and about the National Park Service. There is a potential with NPSearch for indexing one hundred or more repositories and several million metadata records and linked digital assets. NPSearch is based upon Apache Lucene Solr, which provides a highly scalable product line with many robust search engine features. NPSearch will integrate with SharePoint services, a future target, inherently crawl and index HTTP sites, and harvest XML metadata from partnering systems. The initial NPSearch portal searches across ten systems, including NPS Focus, NRInfo GIS, NPS Voyager, InsideNPS, NPS.GOV, DOI.GOV, Landsnet and e-TIC.

Value proposition: **NPSearch is a "one-stop shop" for digital information for and about the National Park Service.**

Keywords: **search portal NPS**

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NPSearch: A NPS Search Portal

5461

Poster

NPSearch (http://npsearch.nps.gov) is a new search portal for the NPS. NPSearch allows users to index and search across information systems NPS-wide, the ultimate goal being all NPS systems. NPSearch is a "one-stop shop" for digital information for and about the National Park Service. There is a potential with NPSearch for indexing one hundred or more repositories and several million metadata records and linked digital assets. NPSearch is based upon Apache Lucene Solr, which provides a highly scalable product line with many robust search engine features. NPSearch will integrate with SharePoint services, a future target, inherently crawl and index HTTP sites, and harvest XML metadata from partnering systems. The initial NPSearch portal searches across ten systems, including NPS Focus, NRInfo GIS, NPS Voyager, InsideNPS, NPS.GOV, DOI.GOV, Landsnet and e-TIC.

Value proposition: **NPSearch is a "one-stop shop" for digital information for and about the National Park Service.**

Keywords: **search portal NPS**

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Anthropogenic Sound Occurence in Crater Lake National Park

5427

Poster

Natural soundscapes are a rapidly disappearing resource. Research of the impact and occurrence of anthropogenic sounds within the National Parks has begun under the direction of the National Park Service's Natural Sounds and Night Skies Division (NSNSD). Crater Lake National Park, in Central Oregon, is particularly known for natural quiet and serenity. However, no historic data is available with regard to the soundscape of the park. Therefore, in order to better protect and manage the soundscape of Crater Lake, research has begun to establish the presence of anthropogenic and biological sound occurrence within the park. At this time, monitoring has been completed at 23 locations throughout the park. Analysis has been completed for one of these locations. From this analysis it was found that anthropogenic noise is present 12.7 percent of the time. It is likely that anthropogenic noise will be far more prevalent in less protected locations.

Value proposition:

Learning objectives:

Keywords: sound, acoustic

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Comparison of two methods for measuring biological soil crusts in the Chihuahuan and Sonoran Deserts

5502

Poster

The Sonoran Desert Network and Chihuahuan Desert Network, as part of the National Park Service's Inventory and Monitoring (I&M) Program, measure biological soil crust abundance and composition as part of their terrestrial vegetation and soils monitoring protocol. Published research and observations during the protocol development process describe biological soil crusts as patchy at the site or plot (20 x 50 m) spatial scale. To account for the patchiness, the Networks utilize two methods to measure biological soil crust cover: line-point intercept and point-quadrats. In general, the two sampling methods resulted in similar values for two of biological soil crust morphological groups (dark cyanobacteria and lichen) but the point-quadrat method yielded significantly higher cover values of light cyanobacteria and bryophytes. We speculate that the different results stemmed from difference in observer proximity to the ground during measurement and the patchiness of biological soil crust cover relative to the plot design.

Value proposition: **People viewing the poster will understand the differences between monitoring techniques.**

Keywords: **crusts, method, monitor**

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Denizens of the Deep: Mitigating Underwater Noise Impacts on Marine Life

5194

Paper

Sound plays important roles in aquatic and terrestrial ecosystems, making the acoustic environment a key habitat characteristic that has often been ignored. All species of baleen whales use sound, and thus depend on the quality of the acoustic environment. Examples include the complex mating song of male humpback whales and the low-frequency communication calls of blue whales. Introduction of anthropogenic noise changes this environment, potentially disrupting biological activities. Anthropogenic noise includes acute and chronic sources occurring almost continuously, resulting in compromised acoustic habitats. There is a growing body of literature documenting responses to these changes and long term ecological consequences, though difficult to measure, are likely. National Parks like Glacier Bay and a few National Marine Sanctuaries are leading the way in quantifying man-made influences on underwater acoustic environments. Mitigating underwater noise is challenged by the scale of these noise sources and that protected area boundaries are permeable to sound.

Value proposition: **Will learn about the importance of natural sounds in the ocean and the challenges of protecting this resource from rising levels of underwater anthropogenic noise**

Keywords: **underwater noise, whales**

Lead author • session organizer • poster / demo / exhibit presenter:

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Chris Gabriele is a Wildlife Biologist at Glacier Bay National Park and Preserve, where she leads their long-term humpback whale population study and the underwater acoustic monitoring program, which aims to characterize natural and man-made sources of underwater sound and their potential influences on marine mammals. Since 1988, she has studied humpback whale life history and behavior in Alaska and Hawaii and has participated in field research on the vocalizations of humpback, bowhead, blue, fin and killer whales, including studies of whales' reactions to underwater sounds.

Expanding the Canadian National Park System: Lessons Learned in a Time of Changing Circumstances

5628

Paper

Since 2006, the Government of Canada has taken actions that will protect additional national parks and marine protected areas totalling almost 150,000 square kilometers. This will bring Parks Canada's network of protected areas to almost 425,000 square kilometers, representing an increase of 53 per cent. These new protected areas include the recently established Sable Island and Naatsihchoh national park reserves. An additional two new national parks may be added in northern and eastern Canada. The presentation would focus on: (1) a summary of recent additions to our system; (2) the manner in which other governments, Aboriginal people and local communities were engaged; (3) the issues and challenges that were successfully addressed; and (4) the lessons learned. The presentation will explain how Canada continues to be able to establish new national parks in a world of changing circumstances.

Value proposition: **Participants will learn about approaches taken by Parks Canada to significantly expands its national park systems by working with indigenous people and adopting policy changes.**

Keywords: **Establishment, Canada, Indigenous**

Lead author • session organizer • poster / demo / exhibit presenter:

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Landscape Alteration: Wind Energy Development surrounding Southwestern U.S. National Parks

5283

Paper

National park sites in the southwestern United States face the strong probability of renewable energy development occurring near their boundaries, making it vital to understand the potential impacts such landscape alteration may have on park visitor experience. This presentation addresses the following questions: As renewable energy development alters landscapes that are visible from and associated with national park system units, how is visitor experience potentially affected? What is the relationship between park visitor attitudes toward potential wind energy development and their levels of place attachment for national park sites? To answer the above questions, qualitative research methods were used to measure and understand place attachments assigned to potentially affected national parks in the southwestern United States, as well as attitudes toward wind energy development visible from those sites. This presentation will report on the findings and implications of this study in order to inform and expand this critical conversation topic.

Value proposition: **Audience members will gain an understanding of this new topic and how social science methods can be applied to anticipate visitor expectations and experiences.**

Keywords: **Renewable energy development**

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Improving methods of plant material selection for proactive and restoration conservation efforts

5070

Poster

As the climate changes and invasive species continue to spread, proactive management actions may be needed to conserve native plant populations. Selecting appropriate plant material that will sustain populations is an integral part of any such plan and must take into account genetic differentiation to limit maladaptation. Common gardens are used to determine the genetic basis of trait variation among populations from different geographic sources. However, maternal effects, the effects of environment on the mother tree during seed development, can also affect offspring performance, complicating interpretation of these studies. Using limber pine (Pinus flexilis) and Rocky Mountain bristlecone pine (Pinus aristata) as model species, we explored the contribution of maternal effects to trait differences among populations in a common garden study. This information will assist managers to correctly incorporate scientific data into management planning to mitigate impacts of climate change and white pine blister rust to these high elevation ecosystems.

Value proposition: **Refines methods for resource managers throughout the southern Rockies to select plant material for use in proactive conservation efforts.**

Keywords: plant conservation

Lead author • session organizer • poster / demo / exhibit presenter:

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Dr. Anna Schoettle, US Forest Service Rocky Mountain Research Station, Fort Collins, Colorado

Making Resource Stewardship Relevant

5284

Panel Discussion

Communication in the National Park Service spans a range of professions and directorates. Public affairs, interpretation, science communication, resource management, and scientists all play an important role in engaging the public in resource stewardship through communication. The fate of parks lies heavily on the public's interest in parks and their actions both within and outside parks. This session looks at the unique contributions of interpretation, public affairs, and science communication and examines the intersection of communication and resource management in preserving national parks.

Value proposition: **The audience will learn about the role of communication in resource stewardship and the unique contributions of interpretation, public affairs, and science communication.**

Keywords: **interpretation, communication**

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Giselle Mora-Bourgeois, Science Education Coordinator, Urban Ecology Research Learning Alliance

Cultural Landscapes and Climate Change: Protecting Resources that Matter in a Future of Uncertainty

4687

Paper

In light of global climate change, there is an imperative to re-think current practices regarding the protection of significant cultural landscapes. Traditional foundations of the preservation movement no longer apply to historic landscapes, and continued reliance on those precepts blocks efforts to more creatively engage landscape issues. This re-thinking should include not only a more integrative approach to the landscapes themselves but also a significant re-structuring of our codified recognition and conservation systems. This paper, building on previous research, discusses current field investigations of threatened significant cultural landscapes, observations of the direct impact of climate change, potential management responses, and implications for the current processes and methods of identification, analysis and treatments of cultural landscapes. The field investigations were primarily at NPS sites, including; Fort Jefferson, Dry Tortugas NP, Florida; Pu`uhonua o Honaunau NHP and Kaloko-Honokohau NHP, Hawai'i, and Fort Monroe NM, Virginia.

Value proposition: **This presentation addresses emerging issues for cultural landscape management and ideas to help shape future difficult decisions and resource protection alternatives.**

Keywords: **climate, cultural landscapes**

Lead author • session organizer • poster / demo / exhibit presenter:

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Protected Areas, Indigenous Lands, and Mining

5365

Paper

What progress has been made since 2001, when a report on Mining and Protected Areas, commissioned by the International Institute or Environment and Development, outlined action agendas for the mining and conservation sectors? The Sacred Site Wirikuta, the Watershed of the Rio Ameca, and the Biosphere Reserves of Sierra de la Laguna and Manantlán, are some of the Mexican protected areas threatened by mining development. These case studies are used to show some of the legal and administrative gaps that put conservation in disadvantage with mining. They are also used to discuss the repercussions that those gaps and mining development may have for migratory wildlife and transboundary conservation in North America.

Value proposition: **Participants will get enhanced understanding of how mining development in Mexico may affect conservation in North America**

Keywords: **mining, transboundary impacts**

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Veronica Chirino Baker. is a lawyer interested in environmental issues, including protected areas and indigenous People. She is Treasurer of White Eagle Sustainable Development.

Extractive Activities in Protected Areas and Indigenous Lands

5400

Sharing Circle

This sharing circle will provide an open and safe space to talk about the challenges and successes to effectively manage extractive activities in protected areas, indigenous reserves, and their area of influence. Protected lands contribute to sustainable development, so do the extractive activities. Commonly, the expected balance between the social, environmental, and economic dimensions has not been achieved. Species, ecosystems, sacred spaces and cultural landscapes continue being threatened or impacted by extractive activities. How are the standards, codes of conduct, and best practices for economic activities working? What influence does consultation with protected area managers and indigenous peoples have on decision-making for proposed developments? What is needed to advance co-management schemes with indigenous people for both protected areas and natural resources? The contributions of participants will help identify and/or refine the main factors that are preventing or facilitating the success of policy in the convergence of conservation and extractive activities.

Value proposition: **This is an opportunity to share concerns and best practices about the planning and management of extractive activities that affect protected areas and indigenous lands.**

Keywords: **sustainability, management, standards**

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Accomplishing Wilderness Character Monitoring through Partnerships with Non-governmental Organizations

5374

Sharing Circle

Wilderness character monitoring offers considerable promise to focus stewardship within the land management agencies by assessing trends that directly link to requirements in the Wilderness Act. Despite the importance of this monitoring, agencies are struggling with accomplishing this task due to staffing and funding shortfalls and are increasingly seeking new ways to engage partners. At the same time, non-governmental organizations are forming to help protect designated areas. The Society for Wilderness Stewardship (SWS) is one such organization, formed specifically to advance the profession of wilderness stewardship. In 2011, the SWS partnered with the Forest Service to accomplish baseline wilderness character monitoring assessments for selected Wildernesses. This session will share the results of this partnership and discuss lessons learned. The SWS experience will be a springboard for group discussion to explore how partnership opportunities can be expanded to accomplish wilderness character monitoring.

Value proposition: **This session will focus on sharing ideas for developing and expanding quality, long-term partnerships to accomplish wilderness character monitoring**

Keywords: **Wilderness, monitoring, partnerships**

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Responding to Change: A Network of Preservation Specialists to Address Park Resource and Staff Needs

5486

Affinity Meeting

Park-based and regional staff of the Vanishing Treasures Program (VT) and preservation specialists throughout the NPS are often the first responders to events that affect the architectural heritage in the parks. These events may result from changing climatic conditions, age, or neglect/lack of maintenance. Choosing the appropriate response can be difficult, but, at-the-same-time is important to resource survival. In an era of diminishing budgets and restricted travel, a network of multi-disciplinary preservation specialists, including park and program staff and partners, is needed to assist with decision making and implementation of response actions.

The VT Program proposes to hold an affinity meeting to: 1) discuss successes and failures in responding to resource crises; 2) identify resource and staff needs; 3) anticipate future needs that may arise as the result of changing climatic conditions and budgetary realities; and 4) begin to establish a professional collaborative that could provide assistance, when needs arise.

Value proposition: **Heritage preservation practitioners, and those in related fields will come together to share information on the care of park resources, changing needs and collaboration possibilities.**

Keywords: **Heritage, Preservation, Change**

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The role of state parks in providing recreation opportunities: Visitation trends in difficult economic times

5270

Poster

National parks in the US protect valuable natural resources and provide exceptional recreation opportunities, with nearly 280 million visits to 394 national park units in 2011 (NPS, 2012). State parks complement this role, with over 720 million visits to nearly 8,000 state park units between July 2010 and June 2011 (NASPD, 2012). Wide distribution of state park units across the country expands the accessibility of recreation opportunities in public lands. In this study we investigate trends in national and state park visitation in light of recent economic events. Using data compiled through the National Association of State Park Directors' Annual Information Exchange (NASPD AIX) survey, we explore visitation to fee vs. non-fee areas and change in visitation by state and region over the past six years. We compare change in visitation data from the NASPD AIX survey with NPS data to investigate the differences in national and state park visitation.

Value proposition: **Improved knowledge of state and national park visitation trends aid park managers in understanding and planning for potential changes in visitation to their park.**

Keywords: **State park, visitation**

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Citizen science at the Schoodic Education and Research Center in Acadia National Park

5062

Poster

National parks aim to support resource management, science, and education. However, a variety of factors frequently lead to stove-piping and limit integration and synergy among these activities. At the Schoodic Education and Research Center in Acadia National Park we have developed a program that is working to integrate these three fields and developing ways to measure the outcomes that result. We have found that a tiered approach that includes basic management, science, and education activities, and features citizen science is particularly effective. To measure the outcomes and optimize techniques, we are exploring the entire lifecycle of citizen science in both formal and non-formal education settings. We have found that successful projects must have explicit science and education goals, provide substantive training throughout a project (sometimes in skill sets not recognized during project development), and be evaluated from both the science and education perspectives throughout their duration.

Value proposition: **This poster describes the a model for using citizen science to integrate science, management, and education activities in a national park setting.**

Keywords: **citizen science, bioblitz**

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Phenology in Protected Areas: Projects and Best Practices

5123

Workshop

Changes in phenology—the timing of events such as flowering, nesting, and migration—serve as local indicators of climate change. Because phenology is critical to the function of nearly all ecological systems, and because it is easy to observe, it provides an excellent framework for place-based monitoring and interpretation. Although an increasing number of phenology-related programs are being initiated across the country, coordination among programs has been limited. This workshop will be divided into two sections: (1) an introductory session where participants who are interested may give brief "flash" presentations on their phenology projects (no slides, 3 minute max), preferably focused on each project's science, education, and management goals, as well as its challenges and successes; and (2) a discussion of best practices for phenology monitoring in parks. The goal is to facilitate communication, coordination, and collaboration to minimize duplication and maximize benefits to resource management and interpretation.

Value proposition: **Participants will learn about existing projects and best practices for achieving science, management, and education outcomes from phenology monitoring.**

Keywords: citizen science, management

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Homes in the Seashore: Fire Island as an Early Piecemeal National Park

5050

Paper

The United States Congress established Fire Island National Seashore in 1964. The story of how Fire Island became a federal park helps us to understand in what ways well-off and well-connected locals in the 1950s began a long tradition of working together with the National Park Service (NPS) to preserve their homes within protected areas. New York State's longtime planner Robert Moses had wanted to build a four-lane highway atop the island's dunes since the 1920s, but locals found an opportune ally in the federal government in order to defeat Moses' plan. The Kennedy administration and its Secretary of the Interior Stewart Udall had begun a new era in park planning by actively pushing a land conservation policy that promoted both wilderness and recreation near major urban areas, and Fire Island had both.

Value proposition: **By analyzing how the NPS allied with grassroots movements in the past, this research helps us better understand and implement conservation policies in the future.**

Keywords: conservation, suburban, history

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Global Protected Area Issues and Trends: Informing the Agenda of the World Parks Congress 2014

5322

Panel Discussion

Globally, parks and protected areas are growing in number, extent, character, and types of governance. Yet their success in conserving biodiversity, and their overall value to societies are being called into question in many quarters. Management effectiveness is beginning to be measured against new standards, and acceptance of diverse governance structures is adding resilience to national systems of protected areas. Yet management capacity does not meet needs in many systems, and public support in many countries is flagging. Each decade, protected area professionals convene to discuss these issues and set an agenda for the next 10 years. This session will identify critical issues and discuss the emerging agenda for the next World Parks Congress, in Sydney, Australia, in 2014. The panel will include Congress organizers, and we would reserve approximately half of the session time for questions and discussion, particularly on the theme of connecting people to nature.

Value proposition: **Participants will learn about global issues, trends and programs in parks and protected areas, and contribute ideas for a ten-year World Parks Congress agenda.**

Keywords: **Protected areas, global**

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Ernesto Enkerlin-Hoeflich, Chair, World Commission on Protected Areas
Sally Barnes, NSW National Parks, Australia; and/or Peter Cochrane, Director, Parks Australia

Strengthening Sister-Park Relationships through Technical Exchange

5420

Affinity Meeting

The global reach of human impact on the environment has highlighted a strong need for information and technical exchange among protected areas on an international level. The NPS Sister-Park program has been attending this need by fostering relationships between U.S. Parks and international counterparts that share similar habitats, cultural resources or similar resource issues. Twenty-seven U.S. Parks have one or more sister-park relationships, involving 35 international protected area units, and a number of additional U.S. Parks are in the process of developing sister-park relationships. This Affinity Meeting will bring together practitioners of technical exchange through the NPS Sister-Park program, and provide the beginnings of a forum for strengthening communication among NPS staff involved in working with sister-parks in other countries. Participants will learn about successful technical exchange programs carried out under the NPS Sister-Parks program, and will take home "best practices" for implementation of future exchanges.

Value proposition: **Participants will learn about successful NPS Sister-Park technical exchange programs, and will take home "best practices" for implementation of future exchanges.**

Keywords: **international, sister-parks, technical**

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Dissecting Credibility: understanding the components of credibility for science/resource management professionals

5272

Paper

The session will describe the efforts of a USNPS Work Group assigned to evaluate job-related competencies associated with scientific integrity/credibility. The work was a step in developing the first phase of training for the Career Field Academy, Natural Resources. The initial training development effort is for entry level and new (to NPS) science professionals. However, training at this level will also serve as a building block for intermediate (journey) and advanced (managerial) training to be developed in the future. The work group concluded that scientific integrity/credibility was not the only component of credibility that should be emphasized, and that if science professionals could be aware of, plan, and deliberately build those components as well, they would increase their effectiveness in early career phases, and build a foundation for credibility in subsequent, more complex assignments. A credibility model is presented and input will be solicited from those attending the session.

Value proposition: **Attendees will go away thinking about factors affecting credibility, how to build it, and what to plan for now and for later career phases.**

Keywords: credibility, career academy,

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Possibly others

The Nature Fund

5334

Business Meeting

The Nature Fund is a new Colorado non-profit devoted to supporting natural resources in parks. The Nature Fund will hold an invitation only business meeting at the George Wright Society Conference in Denver. The mission of the friends group is to support vital science, research, and stewardship projects and programs that help to ensure that natural resources in parks remain unimpaired for future generations. This group would complement existing friends groups and foundations. The board will hold a business meeting to review and discuss proposed natural resource projects, relationship with George Wright Society and entertain questions regarding the non-profit.

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Value proposition: **Participants will learn about process of developing and progress of the Nature Fund.**

Keywords: **friends**

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Exploring Opportunities for Enhancing Relevancy and Sustainability through Cultural Landscape Conservation: Learning from International Experience

5455

Panel Discussion

Recent experience with cultural landscape conservation has prompted rethinking of conservation practice in areas such as integration of natural and cultural heritage, collaboration across sectors, enhancing relevancy, local community leadership, and sustainability. A cultural landscape concept provides an interdisciplinary framework that has generated success stories and identified key challenges. Through dialogue, participants will examine lessons learned from experience with conservation of diverse landscapes and will identify opportunities to enhance their current work. This timely dialogue takes advantage of a recent international conference (co-sponsored by the NPS) as a catalyst for a national dialogue on opportunities from cultural landscape conservation. Each panelist (in ten minutes) will offer insights from their experience and reflect on findings from this international conference. These presentations will launch a dialogue with participants on two themes: (1) lessons from experience with diverse cultural landscapes and (2) ways to enhance relevancy and sustainability for conservation.

Value proposition: **Through discussion on cultural landscape conservation in the U.S. and other countries, participants can identify ways to enhance relevancy and sustainability of current conservation efforts.**

Keywords: **Landscapes, Conservation, International**

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Current status and recent trends in demographics of local communities surrounding Kings Mountain NMP

5178

Poster

Kings Mountain National Military Park was established by Congress in 1931 to commemorate the October 7th, 1780 American victory of the battle of Kings Mountain during the Revolutionary War, a victory so monumental that even Thomas Jefferson described it as “the turn of the tide of success”. Recreational visitation is an important piece of the Park’s educational mission, but changes in local demographics over space and time pose challenges for doing effective outreach in different communities. Using US Census data compiled and analyzed by NPScape, we present an analysis of how age and race (Asian American, Black, Hispanic, Native American, White) have changed from 1990 through 2010 in local communities occurring within 30, 60, 90, and 120 minutes driving time of the Park. We discuss particular outreach strategies that are informed by the results, and explain how similar analyses may be run for other protected areas in the US.

Value proposition: **Landscape-level demographic analyses help protected areas such as Kings Mountain National Military Park understand opportunities and challenges associated with promoting local recreational visitation.**

Keywords: **NPScape, Landscapes, Demographics**

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Shepard McAninch, National Park Service, Cumberland Piedmont Inventory and Monitoring Network

Kirk Sherrill, National Park Service, Inventory and Monitoring Division

Prioritizing Conservation Actions in a Fragmented Metapopulation of Desert Bighorn Sheep

5417

Paper

Desert bighorn sheep in the Mojave Desert have small, naturally fragmented populations, and connectivity among habitat patches is critical for metapopulation persistence and maintaining genetic diversity. Connectivity among bighorn populations has been greatly compromised by highways and urbanization, and proposed energy development may further fragment the landscape. Thus, there is a pressing need to clarify the relative importance of specific habitat patches and dispersal corridors. We used genetic-based models of gene flow and movement to parameterize network models that describe gene flow among patches (genetic connectivity) and recolonization of empty patches following extinctions (demographic connectivity). We applied these network models to prioritize landscape-level conservation actions for desert bighorns in and between four National Park units (Joshua Tree National Park, Mojave National Preserve, Death Valley National Park, Lake Mead National Recreation Area). Results exhibit the potential for large, disproportionate gains in connectivity via patch and corridor restoration in specific, high-priority locations.

Value proposition: **This study demonstrates our ability to evaluate pro-active, large-scale conservation efforts in a non-invasive manner.**

Keywords: **Bighorn, climate, connectivity**

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Indigenous Peoples, Intellectual and Cultural Property Rights in the International Arena

5268

Panel Discussion

This session will explore Indigenous intellectual and cultural property rights as they relate to parks, protected areas, and cultural sites. The session will discuss these issues in an international context, including discussions on the United Nations Declaration on the Rights of Indigenous Peoples and the World Intellectual Property Organization and associated meetings.

Value proposition: **This session will explore Indigenous intellectual and cultural property rights as they relate to parks, protected areas, and cultural sites.**

Keywords: **Indigenous, Property, International**

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James Anaya, Special Rapporteur on the Rights of Indigenous Peoples
Walter Echo Hawk, Native American Rights Attorney and Author

Non-Recognized Tribal Communities Protecting Cultural & Natural Resources

5265

Panel Discussion

This session will highlight some of the challenges and successes experienced by non-recognized Tribal Nations working to protect Indigenous cultural and natural resources. Members of non-recognized tribal communities often face issues such as access and gathering rights, failure of agency officials to consult with local tribal community members, and lack of access to resources and information to protect cultural sites. On the other hand, many non-recognized tribal communities have been able to form successful partnerships with state and federal agencies despite being officially un-recognized. This session will focus on challenges and successes and will provide ample time for participant questions and discussion.

Value proposition: **Session will address challenges and successes experienced by members of non-recognized tribal Nations in their efforts to protect cultural and natural resources.**

Keywords: **Indigenous, Cultural, Environmental**

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Deborah Sanchez, Co-Chair, Barbareno Chumash Council (Invited)
Rebecca Robles, Co-Director, United Coalition to Protect Panhe (Invited)

Communicating the risks of polycyclic aromatic hydrocarbon contamination with video podcasts

5315

Paper

The USGS National Water-Quality Assessment Program studies water-quality conditions and the factors that affect those conditions. As part of the program, prking-lot sealcoat is being studied as a source of polycyclic aromatic hydrocarbon (PAH) contamination. A film documenting a study to quantify the transport of PAHs from a parking-lot area coated with coal-tar sealcoat aims to make the study understandable to general audiences, such as resource managers, educational groups, public officials, and the general public.. The film, titled “Paint it Black,” documents the experimental site preparation, sealcoat application, and air and water sampling, with commentary by the principal scientists. A website address with links to additional information about PAHs and coal-tar sealcoat is provided. The website and film are an example of USGS efforts aimed at improving science communication to a general audience.

Value proposition: **Outreach efforts, including video, are used to demonstrate experimental results of coal-tar parking-lot pavement sealcoat studies to general audiences.**

Keywords: **Coal-tar sealcoat, video**

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Latin-Americans' Values on Natural and Historical National Parks in the United States

5239

Paper

Many places have been identified as valuable for humans and have been set aside to protect natural and cultural values, such as spiritual, recreational, scenic/aesthetic, and economic, etc. Integrity of these Parks and Protected Areas (PPA) depends on their management's knowledge and understanding of its surrounding communities' socio-cultural context, and ethnic and racial dimensions. Very little has been published about the rapidly growing population of Latin-Americans residing in the United States and the values they assign to PPA. This research aims to identify perceptions and values assigned to Castillo de San Marcos and Fort Matanzas National Monument and Great Smoky Mountains National Park, by members of the Hispanic community living adjacent to them. Findings from this research provide vital information that could aid PPA management in fulfilling the goal of engaging and connecting culturally diverse members of society to parks in the United States.

Value proposition: **Participants will get a better understanding of the perceptions and values related to National Parks that Latin American communities living in the United States have.**

Keywords: **hispanics, values, parks**

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The geodiversity as a touristic attraction at the Brazilian National Parks

5223

Poster

Nature is a complex structure with physical, chemical and biological aspects, which combined can form landscapes with high scenic value, especially in protected areas. Such landscapes may attract tourists that seek knowledge, contact, interaction or interpretation of nature. Considering that these tourist attractions can have a key content that motivates the visitation, this study aims to analyze 415 existing attractions in 47 Brazilian National Parks and perform a classification of content associated with 1- geodiversity, 2-biodiversity, 3-mixed of geodiversity and biodiversity, 4-historical and cultural aspects. The methodology used data from Philips National Parks Guide, visits to some Protected Areas and bibliographic research. It was found that attraction linked with geodiversity are the most common and promoted, with 50,1 %, followed by the mixed of geodiversity and biodiversity (23,1%), Cultural and historical aspects (17,6%) and biodiversity in just 9,2 % of the attractions.

Value proposition: **The audience will learn more about the Brazilian National Parks and how geodiversity is a key element in the attraction of tourists in these areas.**

Keywords: **geodiversity, Brazil, tourism**

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Thinking Beyond Bulletin 38: Reflections from the Deepwater Horizon/MC-252 Incident Response

5165

Panel Discussion

National Register of Historic Places (NRHP) Bulletin 38 was established in 1990 (with key amendments in 1992 and 1998) as clarification of federal cultural resource management mandates, particularly those of the National Historic Preservation Act (NHPA) of 1966 and the "Protection of Historic Properties" (36 CFR 800) regulations of the Advisory Council on Historic Preservation (ACHP), as they relate to Traditional Cultural Property (TCP) identification, evaluation, and nomination. As a guiding document that internally recognizes that "approaches to such properties will continue to evolve" (Parker and King 1998:3), Bulletin 38 provides opportunities to step beyond its guidance and consider alternative approaches to TCPs more directly informed by the perspectives, values, and beliefs of living communities. This panel will discuss insights and lessons learned regarding TCPs related to our work with American Indian tribes, African American communities, fishing communities, and other occupational and ethnic communities during the Deepwater Horizon/MC-252 Incident Response.

Value proposition: **Gain a better undertanding of the application and lessons learned of applying Bulletin 38 to disaster related contexts.**

Keywords: **Bulletin 38, Disasters**

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5497

Exhibit

TBD

Value proposition: TBD

Keywords: TBD

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What Will They Do? Visitor Sanctions in Response to Crowding at Coastal Parks in Oregon

5567

Paper

Studies have examined visitor encounters and crowding in parks, as well as behavioral responses such as shifting to less crowded places or times. Few studies, however, have examined sanctions that visitors apply in response to conditions, such as complaining to managers or others. This study examined these issues using surveys of 9,063 visitors at 14 coastal state parks in Oregon. Overnight visitors encountered more users (M=112 people) than day visitors (M=67) and felt more crowded (67%) than day visitors (45%). Some parks had higher encounters and crowding than others. Over 70% of visitors who were able to report an encounter tolerance limit or that encounters and crowding matter would complain to group members or friends/family, visit at different times, or alter opinions of the park. More than 25% would also write negative reviews, complain to managers or other visitors, or never visit again. Management and research implications will be discussed.

Value proposition: **This is one of the first studies examining sanctions that visitors apply in response to crowding and excessive use levels, such as complaining to managers/others.**

Keywords: **parks, crowding, use**

Lead author • session organizer • poster / demo / exhibit presenter:

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Cultural Resources, Partnerships, and Federal Bureaus: What's Here, and What's Next?

5006

Café Conversation

The future of Federal cultural resources involves outreach through partnerships to encourage civic engagement. This new reality, however, requires both new ways of thinking and new ways of acting, but also poses logistical and communication challenges to the development of new relationships. Questions addressed by the session will include: What are the big picture ideas behind cultural resource partnerships? What are the needs and the opportunities for an organization to build its capacity to work cultural resources partnerships under the new emphasis for them? Where are the connections between people, programs and resources strongest, and where do they need improvement? What are your experiences with cultural resource outreach programs with partners?

Value proposition: Gain better understanding of challenges and benefits from partnerships and share experiences in best practices with other participants

Keywords: cultural resources partnerships

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Managing Wildland Fires and Cultural Resources: A NHPA Section 106 Primer for Fire Management Activities

5044

Paper

The NPS Archeology Program has prepared guidance for coordinating cultural resources management and wildland fire management activities to ensure that cultural resources are considered when planning and implementing fire management activities. Relevant activities include planning, wildfire management, fuel reduction projects, post-fire responses, and monitoring. The guidance also addresses compliance with National Historic Preservation Act Section 106. This presentation will introduce the guidance and how Section 106 may be addressed for Fire Management Program activities, offering best management practices for achieving compliance. The streamlined compliance process outlined in the 2008 NPS nationwide programmatic agreement will be included. Wildland fire management activities that are suitable for the streamlined process will be identified, and procedures for utilizing the programmatic agreement will be discussed.

Value proposition: **It introduces new guidance for ensuring that cultural resources are considered when planning and implementing wildland fire activities and for complying with NHPA Section 106.**

Keywords: **fire, Section 106**

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It's a Small World: Geographic and Taxonomic Variation in Plethodon Salamanders' Skin Microbiome

5466

Paper

We hypothesize that terrestrial Appalachian salamanders are protected from infection by the chytrid pathogen Bd because they harbor protective bacteria, that climate change will act negatively upon the assemblage of bacteria, and that healthy salamanders (e.g. high body condition) will have high microbial diversity. We sampled three species of Plethodon along elevational and latitudinal transects to determine the distribution of bacteria in association with a) Bd b) climate, and with reductions in c) population abundance, and d) body size. Using traditional culturing methods, we found that bacterial richness was highest in northern latitudes, was lower on species with declining populations, but did not differ across elevations. We are currently testing the samples for Bd and conducting metagenomic analysis using pyrosequencing. By combining traditional culturing and new molecular methods we seek to gain new insights into amphibian-bacteria symbioses and how these interaction are affected by disease and climate change.

Value proposition: I will describe how skin microbial assemblages may be used to indicate the health of amphibians through correlations with disease status and climatic variation.

Keywords: Salamanders, Microbiome

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Using Workbooks to Engage Public Stakeholders in River Planning in Yosemite National Park

5426

Poster

Yosemite National Park is committed to engaging the public in the Merced Wild and Scenic River management planning process. To support this effort, Yosemite released a 30-page Preliminary Alternative Concepts Workbook in March 2012 that received positive reviews from those attending a series of successful spring public workshops and webinars. Within the information-packed workbook, five alternative concepts offered a range of options to manage river values, visitor-use capacity, and land use. Carefully planned, the workbook used high-quality GIS maps, icons, and summary matrices to convey an image of what the plan would look like on the ground when finalized. Due to the high quality of the workbook, more than 400 people wrote comment letters to the park. The workbook was pivotal in helping the public have confidence in the scientific integrity and planning process of the Merced River Plan, slated to be released in mid-2013.

Value proposition: **Park planners can learn of Yosemite's success using workbooks, packed with visual communication tools, to function as a centerpiece of public meetings.**

Keywords: **planning, public involvement**

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Regional Signatures of Plant Response to Climate across National Parks: Forecasts for Management and Planning

5166

Paper

Synthesis of long-term climate and plant vital signs monitoring results across national parks and adjacent land can provide important insights to contemporary climate responses and a sound basis to forecast likely future changes at species, community, and ecosystem scales. This understanding is necessary to support short-term management decisions and long-term planning for effects of projected climate changes. We present results from cross-park analyses of vital sign data from the National Park Service's Northern Colorado Plateau, Sonoran, Chihuahuan, and Mojave Desert Inventory and Monitoring Networks that illustrate how plants have responded to historical climate variability and that provide a forecast for how projected climate changes could affect future plant community composition. We demonstrate both linear and nonlinear responses of key dominant plant species and species richness to drought and elevated temperature. We also highlight climate pivot points that mark important shifts from increasing to decreasing plant abundance along climatic gradients.

Value proposition: **Regional cross-park assessments of plant species and functional types that may be most vulnerable to climate change**

Keywords: **see special instructions**

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John Gross, Andy Hubbard, Hildy Reiser, Kirsten Gallo, Nita Tallent: National Park Service - Inventory and Monitoring Program

Wilderness and Civil Rights: Freedom and Diversity of People and Places

5116

Panel Discussion

In 1964 Congress passed two ground breaking pieces of legislation which define us as a nation and set a standard for America's leadership in the world - the Civil Rights Act and the Wilderness Act. The 50th anniversary of these two pieces of legislation will be celebrated in 2014. In this session, we explore the link between people and places and the shared need for both to be free.

Value proposition: **Audience members will gain new insight linking the deeper shared value of freedom to people and wilderness.**

Keywords: **wilderness, civil rights**

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An Evaluation of the Scientific Basis for Greater Management Intervention in Protected Areas

5271

Paper

An important question currently being debated is how to manage protected areas under increasing human influence. Concerns have been expressed about how to maintain ecological function and resilience in protected areas, given the mounting impacts of human-induced climate change, introduction of invasive species, and widespread alterations of landscape vegetation and disturbances. Some have proposed that fewer restrictions may be necessary in protected areas to permit management interventions designed to maintain ecological function and resilience of natural communities. We critically evaluate the scientific basis for whether widespread management intervention is needed and likely to be successful in protected forest areas of the Northern Rockies, with specific attention to climate change and land use impacts on fire ecology and tree physiology. We argue that direct tests of the justifications for increased intervention are critically necessary and feasible and draw upon results from dendroecology, remote sensing, and tree physiology studies to demonstrate how.

Value proposition: **Discuss relationships between fire ecology, tree physiology, climate change, and landuse to evaluate future management strategies for protected area forests in Glacier and Yellowstone Ecosystems.**

Keywords: **fire, climate, naturalness**

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Elk Population Reduction in Theodore Roosevelt National Park: A Unique Case Study

5033

Paper

After a Record of Decision on an Environmental Impact Statement (EIS), Theodore Roosevelt National Park in the badlands of North Dakota undertook a major elk reduction using park staff and members of the public as volunteers. Teams of paid and volunteer employees used firearms to shoot elk within the park in 2010 and 2011. All elk were killed with non-lead ammunition. Meat was donated to American Indian Tribes, Sportsmen Against Hunger, and to the North Dakota Game and Fish Department who conveyed some of the meat back to the volunteers who assisted with the project. After two years, the population within the park had been reduced by 868 animals. The park is now transitioning to the maintenance phase of the Elk Management Plan. This was a unique program for the National Park Service and the largest project of its kind using non-lead ammunition anywhere in the country.

Value proposition: **The audience will become familiar with a highly controversial and unique program of managing an elk population and the benefits of using non-lead ammunition.**

Keywords: **elk, non-lead**

Lead author • session organizer • poster / demo / exhibit presenter:

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Estuarine Water Quality in Relation to Watershed Characteristics in Northeastern National Parks

5258

Paper

Estuaries throughout the Northeast Coastal and Barrier Network (NCBN) are severely threatened by nutrient enrichment. Water-quality monitoring was initiated in park estuaries in 2003 and now occurs biennially. We evaluated indicators of nutrient enrichment (dissolved oxygen, chlorophyll, turbidity, light attenuation) to determine the mean condition of park estuaries, the percent of estuarine area exceeding thresholds, and spatial and temporal trends. NCBN estuaries are contiguous with state waters and are influenced by external threats. Therefore, we also examined water quality in NCBN estuaries in relation to 1) regional coastal water-quality measured by U.S. EPA; 2) landscape-scale indicators (e.g. conservation status, land cover, population, percent impervious surface) collated by the NPS NPScape project, and 3) riverine nutrients measured by the USGS National Water Quality Assessment Program. Combining park water-quality data with regional coastal condition, watershed characteristics, and riverine inputs will help identify causes of estuarine degradation in parks and potential management solutions.

Value proposition: **Participants will gain insight into the extent and causes of estuarine water quality degradation in coastal parks from Massachusetts south to Virginia.**

Keywords: **estuary, water quality**

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Penelope Pooler, Northeast Coastal and Barrier Network, NPS
Dennis Skidds, Northeast Coastal and Barrier Network, NPS
Sophia Fox, Cape Cod National Seashore

Chaos on the Coast: Resident Attitudes about Protected Area Management at Kealakekua Bay, Hawaii

5569

Paper

Most studies examining public opinions of protected area management have focused on visitors because they are the main users and most often impacted by conditions and management. At Kealakekua Bay Marine Life Conservation District and State Historical Park in Hawaii, however, conditions are also impacting residents in surrounding communities. A door-to-door survey of 316 residents examined their attitudes about this protected area. Most residents (83%) agreed there were major problems needing fixing, with most concerned about alcohol/drug use (69%), vehicle congestion (67%), and illegal kayak rentals (66%) impacting both users and residents. Residents were divided in their trust of the managing agency and 81% gave a C, D, or F grade for its management. Only 15% of residents opposed a plan to dramatically change activities and conditions, but little has been done to implement this plan. Structural equation models showed relationships among current conditions, agency trust, and support for management.

Value proposition: **This is one of the first studies to demonstrate major impacts of marine protected area conditions and management on surrounding local and native communities.**

Keywords: **parks, communities, management**

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Monitoring Landscape Dynamics of U.S. National Parks with NPScape

5088

Poster

NPScape is a landscape dynamics monitoring project providing landscape-level data and evaluations for park natural resource management and planning. The project delivers a suite of products that focus on a set of landscape-scale indicators for more than 280 parks with significant natural resources. Measures are summarized in 6 major categories: population, housing, roads, land cover, landscape pattern and conservation status. Products include standard operating procedures (methods) documenting customizable processing scripts, allowing users to run analyses for local areas. Also included are seamless source and processed datasets for the continental U.S. and Alaska, Hawaii, and the Caribbean. The primary delivery mechanism is the NPS Data Store application, a web-based portal designed for search and discovery of National Park Service natural and cultural resource information, reports and data. We provide an overview of NPScape and include example products to illustrate their applicability to questions related to natural resource management.

Value proposition: **We present an NPS landscape dynamics monitoring project with applications to other US protected areas grappling with natural resource management in a landscape context.**

Keywords: **landscape dynamics**

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Exploring the Fuel Efficiency of Oversnow Vehicles in Yellowstone National Park

5207

Paper

In Yellowstone National Park (YNP) in winter, 100% of public and administrative travel is by oversnow vehicle (snowmobiles and snowcoaches, collectively OSVs). Fuel efficiency, combined with other metrics, can help determine the most environmentally appropriate vehicles for use in the park's interior during the winter, but limited studies exploring fuel efficiency of OSVs in operation during winter in Yellowstone exist. This study assessed the fuel efficiency of a representative cross-section of OSVs for both miles per gallon (mpg) and passenger-miles per gallon (pmpg). Snowcoach models' average seasonal fuel efficiency ranged from 2.6 to 4.9 mpg and 16 to 41 pmpg. Snowmobile models' average seasonal fuel efficiency ranged from 14 to 24 mpg and 16 to 28 pmpg. Fuel efficiency varied considerably between various snowcoach and snowmobile models, but neither type of OSV had consistently higher fuel efficiency on a per person basis.

Value proposition: **This study examines fuel efficiency of oversnow vehicles in Yellowstone National Park, using systematic scientific enquiry to encourage fact-based discourse on a highly contentious issue.**

Keywords: **Yellowstone, Winter, Fuel**

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Partnership Parks: Perspectives from the Field

5493

Panel Discussion

In November of 1996, three new "partnership parks" were brought into being, each with a slightly different operational model. Sixteen years out, superintendents from Boston Harbor Islands NRA, Tallgrass Prairie NP and New Bedford Whaling NHP reflect on the successes and challenges of those, and join with Theodore Roosevelt Inaugural NHS and Rosie the Riveter NHP in a conversation that explores how each of their partnership parks have approached common issues. This will include: accomplishing the NPS mission without direct authority; managing community expectations; leveraging resources; navigating funding processes built for traditional models; managing changes in partner relationships and capacities; differences in legal authorities between parks and their relative advantages; the dynamic of friends groups within the broader partnership context; and the basic elements required from the start to make a partnership park a success. Also included will be examples from Keweenaw NHP and Cedar Creek and Belle Grove NHP.

Value proposition: **Audience members will learn about the strengths of different partnership models, how these can be replicated in existing and new parks, and the accompanying challenges.**

Keywords: **partnerships**

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Wendy Lauritzen, Superintendent, Tallgrass Prairie NP
Tom Leatherman, Superintendent, Rosie the Riveter/World War II Homefront NHP

Standards Development for Long-Term Monitoring: Turning Regional Data into Effective Management Tools in Yosemite Valley

5184

Paper

Yosemite National Park has been implementing a long-term monitoring program as a component in an adaptive management framework to sustain it's natural, social and cultural resources. Proliferation of informal trails in meadows has been selected as a key indicator. Based on several years of data collection and several collaborative studies, managers have selected a fragmentation metric as the specific indicator monitoring trail impacts. In this process, scientists had little precedent in selecting numerical values for management standards. Faced with this challenge, managers utilized GIS analysis of existing trail networks and modeled results in reference to proposed management actions and restoration actions. Through comparison of informal trail networks in meadows of varying elevations and vegetative communities as well as analysis of archival air photos, managers selected draft standards for two comprehensive management plans. This presentation addresses the methods and process for standards development and its potential application at other NPS units.

Value proposition: **This has implications for parks faced with developing standards for protecting resource values. The talk focuses Yosemite, but addresses relevance for other NPS units.**

Keywords: **standards, meadows, trails**

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Practical Realities of a Large Predator Reintroduction

5623

Paper

Over the past twenty years lands in and around Big South Fork National River and Recreation Area (BISO) in the Cumberland Plateau of Tennessee and Kentucky have been the focus of species reintroductions to restore ecological integrity, conserve threatened species and, in the cases of charismatic species, provide possible economical benefits of maximizing tourism. One of the recently reintroduced species has been the American black bear (Ursus americanus). The cooperative multi-agency black bear reintroduction project resulted in established home ranges in BISO and bear sightings have become common. While there was early public acceptance of the reintroduction, the reality is some impacts to nearby homeowners, livestock and crops. There are drawbacks of having highly intelligent large predators moving on and off public lands, even if perceived threat is greater than actual danger posed. Regardless, land managers must continue to work cooperatively at reaching out to communities and managing expectations.

Value proposition: **Lessons learned include issues related working with charismatic species reintroductions and how to manage changing community expections to avoid approval changing to fear or hostility.**

Keywords: **Species Reintroduction**

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Monitoring Nekton in Salt Marshes in NPS Northeast Coastal and Barrier Network Parks

5406

Poster

Nekton respond to natural and human induced environmental changes (i.e., sea level rise, introduction of exotic species, and watershed development) and play an important role in the transfer of energy from salt marshes to adjacent estuaries, and thus are desirable for inclusion in coastal monitoring programs. The Northeast Coastal and Barrier Network (NCBN) has developed a protocol for monitoring long-term trends in nekton community structure (species composition and abundance) in its parks. In addition to descriptions of the protocol background, objectives, and sampling design, this protocol provides detailed explanations of the methods and gear used to sample nekton in salt marsh habitats such as pools, pannes, tidal creeks, and ditches. Information gained from monitoring nekton will be used to augment concurrent monitoring of other estuarine and salt marsh resources and processes, including vegetation, marsh elevation, and nutrient enrichment.

Value proposition: **The NCBN has developed a protocol for monitoring long-term trends in nekton community structure in its parks as part of the NPS's I&M Program.**

Keywords: **nekton, saltmarsh, NPS,**

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Forest communities in a changing climate: Understanding social and ecological responses to yellow-cedar decline, Alaska

4981

Poster

Extending north from British Columbia through Southeast Alaska's Alexander Archipelago, yellow-cedar (Callitropsis nootkatensis), a species of high cultural, economic, and ecologic value, has been dying off since the late 1800's, with increasing rates observed in the latter part of the 20th century. Recent studies implicate factors related to climate change as key drivers in this species mortality. This interdisciplinary research combines ecological, social, and geographic methods to address the following questions: 1) In response to yellow-cedar decline associated with climate change, what are the population level changes that occur within the forest community? 2) What are the social responses to these shifting population dynamics? By establishing sites across yellow-cedar stands that have died off at various time intervals (1900's – present) and analyzing understory and overstory dynamics, I study the process of succession by chronosequence, a "space for time" substitution, in Glacier Bay National Park and the Tongass National Forest.

Value proposition: **Interdisciplinary approach advances understanding of social and ecological responses to shifting population dynamics associated with climate change on National Park and National Forest lands.**

Keywords: **alaska forest climate**

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Assessment of Biodiversity Management Practices in the Nigeria National Park Service

5596

Paper

The study highlights biodiversity management practices in 7 (seven) National Parks under the Nigeria National Park Service. The parks are Cross River (CRNP), Okomu (ONP), Gashaka Gumti (GGNP), Kainji Lake (KLNP), Chad Basin (CBNP), Old Oyo (OONP) and Kamuku (KNP). Results showed that the parks were being managed for conservation, recreation, research and integrated rural development of local communities close to park boundaries. Several development projects were proposed by the government to support these indigenous communities. Though, a few of these projects have been executed, this has gone a long way in establishing some level of support from these communities. However Illegal grazing, poaching, logging and enclave communities were reported across the parks. The ratio of professional:technical: administrative:rangers:other staff placed serious burden on the few professional and technical staff in the performance of critical management activities. Consequently, there is a need to review management practices of the Park Service.

Value proposition: **The paper will highlight key issues that constitute as management problems in Nigeria's protected areas and profound possible solutions.**

Keywords: **Biodiversity, Management practices**

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Synthetic Satellite Imagery and Vegetation Monitoring in Dryland Ecosystems: Filling in the Gaps

5606

Paper

Protected area managers require objective quantitative information about dynamic vegetation characteristics when assessing current conditions and monitoring trends. Earth observing satellites can measure biophysical and phenological characteristics of vegetation at multiple spatiotemporal scales and extents. MODIS sensor data are often used due to a revisit cycle of 1-2 days, but lack the spatial resolution often needed to evaluate heterogeneous areas. The Landsat satellite series is popular for investigating changes in land cover and land use; however, a 16-day return interval often limits its ability to monitor dynamic conditions. Recent advances in data fusion seek to alleviate these limitations. We investigated the ability of the STARFM algorithm to predict surface reflectance and productivity estimates associated with a heterogeneous dryland region of the western United States. Reflectance and NDVI estimates were successfully predicted across the study area and should prove useful for monitoring intra- and interannual changes in plant biomass and phenology.

Value proposition: **I will present a remote sensing technique that produces plant biomass and phenology data at spatial and temporal resolutions not possible with a single sensor.**

Keywords: **remote sensing, vegetation,**

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Exploring Diversity & Relevancy in Three Urban Cultural History National Park Service Units: Fall 2012 Park Break

5444

Panel Discussion

How can National Park Service units and other organizations be more relevant and inclusive to diverse visitors? This question was the basis for the Fall 2012 George M. Wright Society Park Break in Boston. Boston National Historical Park, Boston African American National Historic Site and Lowell National Historical Park hosted eight graduate students from various cultural history fields for a week of experiential learning and application of their studies toward a real management issue. This session will explore the discoveries and discussions that occurred among students, park service personnel and community partners during the Park Break week regarding the relevancy and the diversity reflected in these three parks' management and interpretation of historic and cultural resources in an urban park setting. Via panel discussion, we will discuss our goals toward better reflecting the diversity of our shared heritage, along with the barriers, successes, and opportunities for welcoming diverse cultures and telling more inclusive stories about our history and cities within the context of park resources, collections, and exhibits.

Value proposition: **Audience will hear what three Boston-area national parks and 8 graduate students learned about attracting and becoming more relevant for diverse audiences in urban communities.**

Keywords: **diversity, cultural resources**

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Park Break Participants (up to 8 and yet to be determined)

Pesticides in amphibian habitats in five National Park Service units in the western United States

5264

Poster

Amphibian populations worldwide are in decline and pesticides, acting singly or in combination with other stressors, are receiving increased attention as a potential cause. As part of a larger study conducted in 2009 -2010, water, sediment, and frog tissue samples were collected from Great Sand Dunes, Lassen Volcanic, Sequoia and Yosemite National Parks and Point Reyes National Seashore. Samples were analyzed for over 90 current-use pesticides and degradates using gas chromatography mass spectrometry. A total of fifteen pesticides were detected. The greatest numbers of pesticides and the highest concentrations were detected in frog tissue. In tissue the most frequently detected pesticides were the degradate p,p'-DDE and the fungicides pyraclostrobin and tebuconazole. Results demonstrate that amphibians are exposed to a variety of pesticides, and fungicides represent a substantial portion of this exposure. Future work will attempt to characterize the sources of pesticides to these and other national parks in the United States.

Value proposition: **We will show that pesticides are present in amphibians and their habitats in western U.S. parks at levels of concern to resource managers.**

Keywords: **Pesticides, amphibians, contaminants**

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National Border, National Park: The History of Organ Pipe Cactus National Monument

5458

Poster

This poster unveils an innovative new website project that makes environmental history available to land managers and the general public through a digital medium that incorporates students (see organpipehistory.wordpress.com). Compiled in 2012 by the students of a senior history capstone seminar at Colorado State University, under the supervision of environmental and borderlands historian Jared Orsi, the site contains 105 subpages exploring history, ecology, park management, and international border problems at southern Arizona's Organ Pipe Cactus National Monument. It also displays photographs and national archives documents. By creating the website, students learned crucial research skills while imbibing national park values. The project is part of the CSU Public Lands History Center's larger efforts to devise new models of interactive research and education that join agency professionals, students, and academicians to pursue common goals.

Value proposition: **Pedagogical and research tool for K-12, scholars, land managers, and visitors to discover Organ Pipe's rich history; model for presenting history of any national park.**

Keywords: **environment, borderlands, parks**

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Traditional Ecological Knowledge and Natural Resource Management in the Heartland: Challenges in Michiana

5077

Paper

Traditional Ecological Knowledge (TEK) is knowledge gained over generations of interaction between people and their environment. Indigenous people throughout the world carry this knowledge and have been using it in the relatively small pockets of land left to them from colonization. In western U.S. and Alaska TEK is slowly being incorporated into federal and state land management agencies. But what of the heartlands like northern Indiana and southern Michigan where land is more scare and the presence of Native Americans less obvious? Global research reveals that western land managers, researchers and large conservation organizations have been slow to recognize the ecological value of such knowledge and the implicit role of people on the land. Political and ideological obstacles add to the challenges that indigenous people face. I utilize case study methodology including background research and interviews to investigate policy and practices that link cultures and the earth

Value proposition: **Members will become familiar with the unique set of circumstances surrounding the Native Americans and Traditional Ecological Knowledge in northern Indiana and southern Michigan.**

Keywords: **TEK Indiana Michigan**

Lead author • session organizer • poster / demo / exhibit presenter:

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A Collaborative Science Agenda on Climate Change for Southern California Coastal National Parks

5599

Poster

We report the findings of a collaborative process to develop a science agenda related to the effects of climate change on National Parks in coastal Southern California. We held a workshop in April 2011 at UCLA, as a cooperative effort between the Mediterranean Coast Inventory and Monitoring Network (MEDN), the UCLA La Kretz Center for California Conservation Science and the UCLA Center for Climate Change Solutions. Objectives of the workshop were to update national park staff regarding climate change in SoCA, familiarize UCLA faculty with ongoing monitoring programs and the research needs, identify and prioritize research and monitoring activities related to understanding and managing for climate change, and foster collaborative relationships between park managers and research scientists. The following themes emerged as the highest priorities for research and monitoring at MEDN parks: fog and microclimate, ocean acidification and warming, repeated inventories, phenology monitoring, vulnerability assessments, and fire and climate change.

Value proposition: **They will learn about thoughtful and prioritized ways to improve our understanding of climate change in national parks.**

Keywords: **climate change, monitoring,**

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Christy Brigham, Santa Monica Mountains National Recreation Area

Paul Bunge, UCLA Center for Climate Change Solutions

Species Models to Address Conservation Issues in National Parks: Relying on Peter to Find Paul

5618

Paper

Conservation biology is an imperfect science in that it nearly always requires scientists to make critical resource and conservation decisions with limited information and data. National park service (NPS) units often have long standing data sets on species occupancy and occurrence. At the same time multiyear long-term data sets are often not continuous in time and space, making trend analysis difficult to impossible. By combining data sets from a non-native invasive species, velvetgrass and an amphibian species of conservation concern, the Yosemite toad predictive species distribution models (SDM) can be used to inform and focus conservation and management efforts. I also show how SDM can be used to target survey efforts in a NPS unit that is data poor by relying on another nearby NPS unit that is relatively data rich. These case studies demonstrate the utility of amassing data sets to focus resources and ultimately meet conservation targets.

Value proposition: **See how by combining data sets, within and among National Park Service units, models can be developed to focus species conservation targets.**

Keywords: **species data, modeling**

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Creation of Waterholes for Mitigating Drought in Kainji Lake National Park, Nigeria

5323

Paper

Drought is becoming a serious problem in the Kainji Lake National Park of Nigeria. During the dry season, large mammals of the Park move towards the main water sources, Oli and Manyara Rivers. The Management of the Park has adopted the creation of waterholes in conformity with recommendations of the recent management plan to solve the problem. Dry season distribution of large mammals were observed around two of the waterholes in dry seasons of 2010 and 2011. The result shows that Kobs, Roan antelope, Reedbuck and Western hartebeest visit the waterholes during the dry season. These animals were directly sighted. Footprints of Duikers, Bushbuck, Baboon and Tantalus monkeys were also observed. The antelopes however are the commonest visitors to the site.

Value proposition: **The audience will learn about the drought-related challenges of large mammal management in a Kainji Lake National Park in Nigeria, Africa's most populous country.**

Keywords: **drought, wildlife**

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Teaching the National Parks

5235

Sharing Circle

This sharing circle will provide an opportunity for participants to discuss how they teach about the national parks, whether teaching in the parks or teaching about the parks from the outside. We will focus on talking about what techniques work for different audiences and which ones work less well, and on comparing our experiences with one another. We hope for a mix of university instructors, park interpreters, K-12 teachers, lifelong learning instructors, and others. The discussion will be open to participants from the natural sciences, social sciences, and humanities. We expect to hear from teachers who have used distance and online learning, field courses and other forms experiential learning, films, podcasts, and other instructional technologies, among others.

Value proposition: **Participants will learn the strengths and weaknesses of various strategies for teaching the parks - including distance learning, field courses, films, podcasts, and instructional technologies.**

Keywords: **education, interpretation**

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Updating Computer Simulation of Hikers in Complex Trail Networks: GPS-based Movement, Rocky Mountain National Park

5533

Paper

Management plans that involve trail networks are difficult to get right. Trails and the sites they connect vary markedly, making achievement of crowding, conflict, and resource condition standards nontrivial. However, computer simulation modeling provides detailed, reliable means of portraying the effects of proposed alternative planning and management decisions. This presentation discusses a detailed re-examination of a 30-year old key underlying set of assumptions used in simulation models—how fast do visitors hike? What speeds them up, what slows them down? We collected more than a hundred thousand visitor movement data points with GPS at Rocky Mountain National Park. We'll discuss how lakes, slope, tree cover, other visitors, distance from trailhead, and other factors influence speed. The results can improve how we simulate hikers to answer management questions and develop the right policies for trails, permits, and even shuttle bus systems.

Value proposition: **Computer simulation modeling answers the "what-if" questions facing planning teams. We'll discuss how to make hiking trail models more useful and detailed with digital data.**

Keywords: **Simulation, Modeling, Spatial**

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Just Do It! Learn the Fundamentals of Climate Change Training

5149

Panel Discussion

Enhancing workforce climate literacy is highlighted in the NPS Climate Change Action Plan as a high priority for the NPS at this point in addressing climate change. Several climate change training initiatives are underway to raise climate literacy and adaptation expertise for an internal NPS audience and key partners. This session aims to engage participants in discussions on: adaptation focusing on natural landscapes and cultural resources, effective and positive climate change communication, techniques for how to make this topic more relevant to facility managers and historians, and collaboration with multiple partners to create training that cuts across organizational boundaries. Presentations will cover such topics as: a climate change pilot course developed for Superintendents, resource management training developed with the U.S. Fish and Wildlife Service, an innovative curriculum developed for NPS interpreters titled Interpreting Climate Change, and additional training efforts underway specifically in the National Capital Region.

Value proposition: **Attendees will learn about a selection of tools and techniques developed by the Climate Change Response Program to train NPS staff/partners about climate change.**

Keywords: **Climate Change, Training**

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Angie Richman, Communication Specialist, Climate Change Response Program

Building Trust: Reflections from a Ten-year Collaboration

5621

Paper

The Beaver Hills Moraine lies within the Edmonton metropolitan region and includes federal and provincially managed protected areas, surrounded by an agricultural landscape facing increasing rural residential development pressure. The Beaverhills Initiative began in the early 2000s as a loose collaboration of three levels of government, the University of Alberta and ENGOs that recognized need for regional management of this ecologically significant area. Now a committed voluntary partnership of 30 member organizations, it was recently nominated as a UNESCO Biosphere Reserve to recognize its community engagement and sustainability initiatives. In this presentation, we will describe the strategies parks managers adopted to help build the collaboration, which led to the BHI's emergence as a trusted regional organization promoting sustainable land management. Building trust by proving innovation through demonstration and creating an open approach to problem solving were among some of the key approaches that will be outlined in our presentation.

Value proposition: **Parks managers increasingly recognize need for regional management. Collaboration is appealing, but not easily acheived. Our presentation highlights strategies to facilitate cooperation amongst diverse interests.**

Keywords: **collaboration, sustainability, regional**

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Spatial and temporal trends in snowpack dynamics in Rocky Mountain National Park

5488

Paper

Rocky Mountain National Park, like most locations in the mountains of the western U.S., receives most of its annual precipitation in the form of snow. The amount and timing of snow accumulation and melt determine the magnitude and timing of streamflow and groundwater recharge, which are critical for aquatic and riparian habitat and for downstream water supply. These measures of snowpack dynamics also describe the quality of winter habitat and cover for subnivean animals, and the suitability of snow for park visitors who enjoy snowshoeing and skiing. Recent studies suggest that spatial and temporal patterns in these measures in the central Rocky Mountains may be changing. In this study, data from automated SnoTel stations and manual snow courses are evaluated to determine spatial and temporal trends in snow accumulation and melt for Rocky Mountain National Park during the period 1936-2012.

Value proposition: **Snowpack dynamics influence subnivean, riparian, and aquatic ecological processes, water supply, recreation, and hazards related to avalanches, flood, drought, and wildfire.**

Keywords: **snow, hydrology, climate**

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Transit as a Public Lands Management Tool: Applications for Multiple Scales

5159

Panel Discussion

This session will explore the challenges and experiences of four different public lands that have studied and applied transit to their management approaches. Transit can be a valuable tool in addressing common challenges that land managers face: traffic congestion, resource impacts from vehicles, insufficient parking, and granting visitors access to protected areas of a park. While transit can be an effective management tool in many contexts and sizes of parks, it must be planned and scaled appropriately based on land management goals and target audience size. The panelists and their sites represent different parent land management agencies, visitation levels, types of visitor experiences, and transit goals. Each panelist will offer a brief background on the planning and implementation of the transit system, followed by a facilitated discussion of lessons learned, unanticipated benefits and challenges of transit, and applications for land managers. The session will also include questions from the audience.

Value proposition: **Participants will learn how to use transit in a range of settings to address challenges in park management (including congestion, visitor experience, and resource protection).**

Keywords: **Transit, visitor management**

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The Hydraulic Fracturing (HF) Process: Real Concern or Misdirected Focus

5616

Poster

This poster illustrates that the real concern for impacts to potable aquifers (DWS) of a more widespread and long term nature will likely be stray gas (methane) migration from non-targeted gas bearing zones. Managing risk, detecting the occurrence of and preventing impacts from stray gas migration should be the focus. Subsurface migration of hydraulic fracturing fluids to DWS has limited pathways and little (if any) documentation or empirical evidence exists. Methane is far more abundant, concentrated and mobile than the frack fluids. Under deeply fractured bedrock conditions that may extend below required surface casing depths, a migration pathway to potable freshwater aquifers from a borehole over pressured (above hydrostatic) by gas could circumvent cemented surface casings of good integrity via this natural fracture system. This poster visually presents this migration mechanism and illustrates this risk for discussion purposes.

Value proposition: **Concerns about Hydraulic Fracturing risk to subsurface water supply contamination are a mis-directed focus.**

Keywords: **HydraulicFracturing, Methane, Risk**

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Science, Satellites, and SWAG: Communicating through Caches

5644

Poster

In 2012, Everglades National Park piloted an experimental strategy for communicating science topics to local and international audiences through the use of strategically-placed geocaches. Working across federal, state, and local jurisdictions, the caches were used to highlight restoration projects being actively constructed during this time. As part of the effort, original publications were developed, activity web pages were developed, and an official NPS presence was established on Geocaching.com. Usage and visitor experience were tracked over time to provide a quantitative and qualitative assessment of efficacy. Preliminary results suggest that caches are a low-cost, easy-to-implement solution for engaging local audiences, and that caches placed near national park units may also garner significant international use. The pilot program served to field-test the practicality of geocaches, evaluate use, and address management concerns. The results of this trial may pave the way for an expanded network of caches throughout Everglades in the near future.

Value proposition: **Viewers will benefit from an analysis of a novel science communication strategy--focused around GPS-based recreation--piloted by Everglades National Park in 2012.**

Keywords: **Geocaching, Communication, Restoration**

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A Novel Qualitative Evaluation Tool to Assess Student Attitudes During an Overnight Environmental Education Experience

5549

Paper

Simple and economical strategies to qualitatively ascertain environmental attitudes are needed to increase evaluation accessibility. In this study, students participating in overnight environmental education were permitted to anonymously write about their experience on a large sheet of readily accessible paper. The comments recorded on this "Analog Blog" were segregated according to time recorded. We found that positive statements and feelings dominated all time series in the 24 collected blogs. Comments reflecting fear were highest in the first time series, appearing in 8.13% of responses, then dropped precipitously to 0.30% by the final time series. A quantitative pre- and post- questionnaire was also administered to the students to assess knowledge and attitudes. The results exhibited a significant increase in ecological knowledge among seven surveyed schools. This research provides a framework for implementing an economical evaluation tool for environmental and interpretive programs to examine participant impact.

Value proposition: **This work describes a low-budget, easily adaptable evaluation tool to assess attitudes of participants in interpretive or educational programs.**

Keywords: **environmental education, evaluation**

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Big river monitoring under record high flows and droughts on the Colorado Plateau

4782

Paper

Big river ecosystems represent critical natural resources for the National Park Service. Increasing human demands for water threaten these resources. Channel narrowing is an ecological response to decreases in the frequency and magnitude of streamflows and often leads to diminished riparian zones, increases in exotic plant species, reduced channel complexity and aquatic habitat; and loss of native riparian and aquatic species diversity. The focus of monitoring is on the Colorado, Green, Gunnison and Yampa rivers in Black Canyon of the Gunnison NP, Canyonlands NP, Curecanti NRA, and Dinosaur NM. Our protocol has three integrated elements: A) intensive annual monitoring at sentinel sites; B) rapid assessment of geomorphic and vegetation change on surfaces susceptible to channel narrowing; and C) a broad-scale, remotely sensed assessment of geomorphic and vegetation change. We will present the results from 2011 (largest annual flow on record) with 2012 (one of the lowest annual flow on record).

Value proposition: **This presentation will show how we have tackled monitoring large regional rivers with hundreds of river miles with a relatively small budget by using indicators.**

Keywords: **river, monitoring, geomorphology**

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Schaus Swallowtail Butterfly (Heraclides aristodemus ponceanus) Habitat Enhancement in Biscayne National Park.

5452

Paper

The Schaus swallowtail butterfly (Heraclides aristodemus ponceanus) is federally endangered and found only in Northern Key Largo and Biscayne National Park.

Despite protection afforded by the Endangered Species Act, Schaus swallowtail populations continue to decrease throughout their range. The decline of the Schaus is attributed to a reduction in habitat from development and invasion by exotic plants. In 2011, surveys found only 35 Schaus swallowtails in Biscayne National Park and 6 in Key Largo. In 2011, the National Park Service received a grant from the US Fish and Wildlife Service Coastal Program to improve Schaus Swallowtail habitat in Biscayne National Park. This habitat improvement project consists of three major components: the removal of invasive plants; the planting of over 5,000 plants of the two Schaus larval host plants – torchwood (Amyris elemifera) and wild lime (Zanthoxylum fagara); and a public education component to raise awareness and instill stewardship.

Value proposition: **Efforts to save the Federally endangered Schaus Swallowtail butterfly. The cooperative efforts include invasive plant removal, the restoration of larval host plants and public education.**

Keywords: **ENDANGERED, BUTTERFLY, INVASIVE**

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Vanessa McDonough, Biscayne National Park

GIS for Planning: Integrating GIS into National Park Service Planning

5303

Panel Discussion

Planning in the National Park Service can be aided, enhanced, and guided by geographic information systems (GIS). Four topics will be presented by regional and national NPS offices. The topics reflect the diversity of how GIS can be integrated within planning documents and processes. The first topic will showcase projects in which historic battlefield features have been dynamically mapped and used both as decision-making tools for park planning and as effective visual displays of information. The second topic will present the NPS Park Atlas—a GIS-based planning support tool that acts as a reference for park projects and facilitates planning decisions. Next, a recently developed geospatial analysis method, PaTINA (Park Transportation Investment Needs Analysis), that supports long-range transportation planning will be presented. Finally, examples of how cartography can support planning efforts by making a critical difference in the effectiveness of map products will be shared.

Value proposition: **Audience members will gain a clear understanding of the benefits and possible methods of integrating GIS into their own planning projects.**

Keywords: **GIS, Planning, Cartography**

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Utilizing GIS to Support a National Park Service Special Resource Study of the Shepherdstown Battlefield

5312

Poster

The National Park Service has begun a special resource study of the Shepherdstown Battlefield, located in West Virginia. As part of the study, a series of maps and GIS datasets were created to evaluate the national significance of the battlefield. The poster demonstrates an iterative approach to developing the maps. Starting with USGS topographic base maps, a Civil War historian hand drew battle features, such as locations of the Confederate and Union armies, direction of Union artillery, and specific troop movements. The features were digitized in a GIS environment and added to a geographic database. Map graphics were prepared using various cartographic methods to represent previous troop movements. The final product resulted in a comprehensive three-map sequence from the original series of six maps. They were used in a newsletter for public meetings to inform and educate the public about the cultural and historical importance of the battle.

Value proposition: **Audience members will learn how robust GIS cartographic skills can help them display diverse datasets to audiences both within and outside of their subject areas.**

Keywords: **Cartography, History, GIS**

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Perceptions of Protection: Coastal Residents' Awareness and Understanding of New Marine Reserves in Oregon

5447

Paper

Worldwide, marine protected areas are utilized increasingly as a means of conservation. Policies in these areas are often guided by ecosystem based management, which considers both social and ecological indicators. Comprehensive and systematic social science studies of marine protected areas, however, are rare, especially in the pre-establishment phase. This lack of baseline information is often cited as a cause for management misunderstanding and inability to track public perceptions over time. This study, therefore, examines Oregon coastal residents' attitudes, knowledge, and behaviors regarding recently approved marine reserves in this state. Data were obtained from a mail survey of over 800 residents living adjacent to these reserves and along the rest of the Oregon Coast, and results provide insight into the range of potential and actual impacts of these reserves on affected populations. This timely study informs implementation of grounded and place-specific ecosystem based management strategies, educational efforts, and socially acceptable policies.

Value proposition: **Establishing protected areas is controversial. This study examines public opinions before marine reserve establishment and is a valuable template for areas seeking advocacy for protection.**

Keywords: **marine, pre-establishment, communities**

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Shaping environmental behavior among outdoor recreationists at Channel Islands National Park

5557

Poster

Marine and coastal national parks are increasingly faced with visitor impacts. To effectively minimize environmental change within high priority settings, managers need information about the behavioral tendencies of park visitors. This study examines how outdoor recreationists at Channel Islands National Park respond to the eradication of invasive species, impacts to the marine environment, and environmental restoration in areas valued by visitors and deemed "sensitive" by management agencies. On-site survey data were collected June-August, 2012 (N = 351; response rate = 96%). Results show how environmental values, beliefs, and norms lead to engagement with behavior that benefits important resource conditions at the Channel Islands. This study aims to provide management options that target behavior change and minimize human impacts on the natural environment.

Value proposition: Examine visitor behavior that minimizes impact to high priority settings within Channel Islands National Park

Keywords: recreation, pro-environmental behavior

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Wolves Brush with Extinction at Isle Royale—Again

5182

Paper

For the second time in two decades, the wolf population in Isle Royale National Park (MI) reached a low level where extinction probability is very high – nine wolves in 2012, including just two females. In the early 1990s, with 12 wolves left, inbreeding and introduced disease (canine parvovirus) were emergent issues, but the population flourished as disease died out and an immigrant wolf brought new genetic diversity. Inbreeding is now a paramount issue and demographic stochasticity a serious extinction risk factor. While popularly viewed as an ecosystem without important human impacts, indirect impacts include 80% reduction in ice bridges allowing wolf access to the island, long-term legacy of parvovirus, and a single event in 2011 in which 25% of the wolves died in a historic mine shaft. Responding to these circumstances requires careful attention to a complex set of competing values, including non-intervention, wilderness, ecosystem health, science, and education.

Value proposition: **Wolves at Isle Royale have symbolic and ecological importance; as they brush with extinction ecologists and managers must confront basic values associated with protected areas.**

Keywords: **wolves, Isle Royale**

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Developing Quantitative Relationships between Visitor Use Levels and Park Management Objectives to Address User Capacity

5179

Paper

User capacity is a challenging and controversial concept with regard to visitor use in parks and protected areas. Researchers and land managers must clearly identify management goals and objectives and determine if management goals are related to overall visitor use levels in order to ascertain if visitor use management techniques, including use limits, will achieve land use goals and objectives. This paper describes recent research in Yosemite NP, Sequoia/King's Canyon NP, and Devils Postpile NM that uses automated visitor counters, direct observation, and visitor surveys to address this question and develop quantitative relationships between use levels and management objectives such as crowding and visitor safety. Results from this approach offer land managers clear and direct information to consider relationships between visitor use levels and management objectives. Additionally, this information provides parks with documentation of use levels that can serve as baseline conditions in which to compare changes over time.

Value proposition: **Audience will gain insights into practical research methods to examine and consider visitor use capacity.**

Keywords: **User Capacity**

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Twenty-year Decline in the Size Distribution of Limpets at Cabrillo National Monument

5519

Paper

Limpets (Lottia gigantea) have been counted and measured twice each year on 18 permanent plots in the rocky intertidal zone of Cabrillo National Monument. These plots were established where limpets were largest and most abundant in 1990, presumably the highest quality limpet habitat. While the average number of individuals in these plots has remained constant, the size distributions have shrunk by approximately 5mm each decade. Either reduced growth rates or increased mortality could drive the decreasing sizes, but either process should also decrease the number of limpets. We suspect that overall limpet abundances are decreasing, but that movement of individuals from mediocre and marginal habitat to the higher-quality habitat masks that decrease in the census plots. Academic research permittees are valuable for understanding these results.

Value proposition: **Need for both statistical and ecological knowledge to interpret monitoring data; One example of dealing with issues from monitoring non-random sites.**

Keywords: **rocky intertidal, monitoring**

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Rocky Intertidal Visitor Count at Cabrillo National Monument: Data Summary 2011

5127

Paper

Visitor count data were collected near the rocky intertidal habitat at Cabrillo National Monument for most of 2011. Due to the sensitive nature of the rocky intertidal marine habitat, it is essential to have an accurate assessment of the number of visitors to this area in order to make informed management decisions. Protection efforts to prevent the removal of marine life and habitat by visitors are in effect, however, negative human impacts go beyond the obvious threats. Damage can be done simply by people being present and walking on the algal turf and other organisms. These data are necessary to assess visitor capacity in the preservation of the rocky intertidal and also to ensure a positive visitor experience. The park was surprised by some of the results from 2011, which will be presented. The methods and challenges of data collection as well as calibration methods will also be briefly presented.

Value proposition: **The audience will learn how a baseline visitor count was established for the rocky intertidal and the importance of using these data for resource management.**

Keywords: **Visitors Counts Intertidal**

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Dr. Benjamin Pister is the Director of the Ocean Alaska Science and Learning Center since October and formerly the Chief of Cultural and Natural Resources Management and Science at Cabrillo National Monument.

Dr. Tom Philippi is a Quantitative Ecologist for the National Park Service's Inventory and Monitoring Program.

Avian Predator Prey Dynamics in Kenai Fjords National Park: Integrating Seabird and Raptor Population Monitoring

5431

Poster

We initiated a study to examine the food-web dynamics that determine upper trophic level bioaccumulation of contaminants in the marine environment. Concurrent with monitoring surveys for peregrine falcons, bald eagles and seabirds, we collected biological samples to evaluate contaminant levels and diet of falcons and eagles nesting in the Kenai Fjords area. In May, we located raptor nests to determine territory status. We accessed nest areas of raptors from the ground to collect egg and feather samples for contaminant analyses and prey remains to assess diet. We revisited sites in July to determine productivity of raptor nests and collect additional prey and feather samples. Initial results suggest fork-tailed storm petrels and common murres may be important prey for peregrine falcons and bald eagles respectively. Examining the predator-prey dynamics and contaminant burdens of these species will allow us to better understand changes observed in long-term monitoring programs and develop conservation strategies.

Value proposition: **This poster presents new information about coastal bald eagle and peregrine falcon populations and a novel approach to integrating monitoring studies to understand predator-prey dynamics.**

Keywords: **contaminants, raptors, seabirds**

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Trends in Acid Neutralizing Capacity of stream sites within National Capital Region Network

5430

Poster

In 2005, the National Capital Region Network Inventory and Monitoring Program began a monitoring effort to conduct monthly water quality analysis at 39 sites throughout the District of Columbia, Maryland, Virginia and West Virginia. After more than 7 years of data collection, trends have started to emerge from the snapshots in time. Within one of these parameters, two discrete trends are visible. The Acid Neutralizing Capacity (ANC) at some of our sites display a significant seasonal pattern. Yet many of these same sites are showing a correlated trend of increasing values on an annual basis. This poster will out tease out which sites have these trends and what the trends are, as well as, show those sites that do not. We will also discuss management implications.

Value proposition: **To begin to understand the long term trends and management implications that can be derived from Inventory & Monitoring programs' data.**

Keywords: **Inventory, Monitoring, ANC**

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High Tech Wilderness: An Oxymoron?

5360

Paper

As technology evolves and devices like GPS units, smart phones, and personal locater beacons continue to become cheaper and more widely available to the public, the issue of the use of technology in wilderness areas is emerging. The historic Wilderness Act of 1964 specifies that wilderness areas should offer "outstanding opportunities for solitude" and a "primitive and unconfined type of recreation." How does the use of technology comport with these objectives? Is the use of high technology in wilderness appropriate or acceptable? To help answer these and related questions, a survey of visitors to the wilderness portion of Olympic National Park was conducted. Findings from the survey will help inform development of a wilderness stewardship plan for the park.

Value proposition: **This presentation will introduce the emerging issue of managing the use of technology in wilderness settings. Visitor preferences towards various management practices will be discussed.**

Keywords: **Wilderness, Technology,**

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Interpretive Themes and Foundation Documents: How to Reveal the Importance of Your Park's Fundamental Values

5634

Paper

A foundation document serves as the underlying guidance for all management and planning decisions for a national park unit. It describes the core mission of the park by identifying the purpose, significance, fundamental and other important resources and values, interpretive themes, and more. This session will provide guidance for developing interpretive themes and revealing the importance of your park's fundamental resources and values. Interpretive themes are often described as the key stories and concepts that visitors should understand after visiting a park—they define the most important ideas and concepts communicated to visitors about a park unit. Themes are derived from—and should reflect—park purpose, significance, resources, and values. The set of interpretive themes is complete when it provides the structure necessary for park staff to develop opportunities for visitors to explore and relate to all of the park significance and fundamental resources and values.

Value proposition: **Because all national park units aim to have completed foundation documents by 2016, parks, regions, and the DSC are eager to communicate best practice tips.**

Keywords: **foundation documents, values**

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Grazing Conflicts and the National Park Service: Range Management Histories for Two Arizona National Monuments

5473

Paper

Grazing has been a continuing challenge for NPS in its ongoing quest to balance use vs. preservation. National monuments at their establishment were required to permit continuance of pre-existing land uses, including grazing. This was true for almost every western national monument containing natural resources. NPS, unlike USFS and BLM, had no personnel or expertise to manage this kind of grandfathered use. Saguaro and Organ Pipe Cactus National Monuments were established in the 1930s on lands grazed by cattle. Their range management histories provide two examples of how NPS employees and administrators struggled for 40 years to maintain the mandate of landscape preservation and recreation use while permitting cattle grazing, dealing with hostile ranching communities, and appeasing unsupportive congressional representatives. Termination of grazing was ultimately dependent upon a legal opinion recognizing the primacy of the landscape – grazing was only permissible when compatible with the preservation of park resources.

Value proposition: **Terminating grazing challenged many western parks. Legal and resource support finally became available for park managers during the 1970s and 1990s.**

Keywords: **Grazing Termination Southwest**

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External Management Review and Opinions of a Research Learning Center Performance

5134

Paper

The Ocean Alaska Science and Learning Center (OASLC) is one of nineteen Research Learning Centers (RLCs) throughout the National Park Service. In May of 2012 a management review of the OASLC was completed, including surveys and interviews of 30 partners both inside and outside the federal government, to evaluate the effectiveness of the OASLC. This review highlighted the internal and external perceptions of an RLC mission, performance, successes and short comings. To our knowledge, no other RLC has received this kind of evaluation. Several recommendations were made, including shifting the focus of the OASLC away from research and towards education and outreach. The review and the future direction of the OASLC, has implications for other RLCs, how they interact with parks and Inventory and Monitoring networks, and their relationships with external partners such as universities and NGOs. In this paper we present the insights gained from the review process.

Value proposition: **Gain a better understanding of the perception of NPS research learning centers, what they have done well and where they need improvement.**

Keywords: **RLC partnerships outreach**

Lead author • session organizer • poster / demo / exhibit presenter:

Benjamin Pister Director, Ocean Alaska Science Learning Center

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Names of additional authors / panelists / presenters (if any):

Jeff Mow, Kenai Fjords National Park, National Park Service

Contemporary Challenges and Issues of Invasive Species in National Parks and Protected Areas

5078

Workshop

Invasive species present an unprecedented challenge to protected areas. Managers and biologists are often presented with the problem(s) and no forum for discussing strategies towards potential solutions. This workshop will provide an opportunity for focused discussion about contemporary issues and challenges relating to invasive species. To set the stage for discussion, the workshop will begin with a brief summary of current invasive species management progress in the National Park Service. Facilitated discussion will then focus on four topics: 1) What are the different ways we should be framing questions of species invasions? 2) What are the information gaps, science needs, and management needs? 3) What is needed for effective planning, partnerships, and priorities to be developed? 4) What does all this mean to the Park Service and other protected areas; what is their role in addressing the invasive species problem both within a site-specific and broader ecosystem context?

Value proposition: **This workshop presents an opportunity for managers and scientists to discuss the extent of the invasive species problem and, most importantly, focus on developing solutions.**

Keywords: **Exotic, invasive, species**

Lead author • session organizer • poster / demo / exhibit presenter:

Glenn Plumb Chief Wildlife Biologist

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Scott Abella, National Park Service
Panel Discussion • Panelists:
Pete Budde, National Park Service
Tom Stohlgren, U.S. Geological Survey

NPS Bison Conservation

5421

Business Meeting

National Park Service (NPS) Call to Action Item #26 – Back Home on the Range focuses on restoration of bison as wildlife on NPS lands, through innovative partnerships and the Department of Interior Bison Conservation Initiative. This meeting will provide a setting for focused discussions amongst multiple park, regional, and Washington office participants concerning current conditions of NPS bison management, near-term challenges and opportunities, and long-term strategic planning.

Value proposition: **This meeting is to discuss lessons learned, and identification and coordination of stewardship and science needs to advance bison conservation into the 21st century.**

Keywords: **Bison**

Lead author • session organizer • poster / demo / exhibit presenter:

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Bert Frost, Associate Director, Natural Resource Stewardship and Science, National Park Service
Elaine Leslie, Chief, Biological Resource Management Division, National Park Service

National Park Service/National Geographic Society BioBlitz Review and Discussion

5021

Business Meeting

National Park Service (NPS) has partnered with the National Geographic Society (NGS) to host one annual high profile BioBlitz in an NPS unit for the ten years leading up the 2016 NPS Centennial. The BioBlitz is a two day event centering around a 24-hour inventory effort that engages local communities, schools, park visitors, and scientists in joint species discovery and documentation. To date, these BioBlitzes have taken place at Rock Creek Park (2007), Santa Monica Mountains NRA (2008), Indiana Dunes NL (2009), Biscayne NP (2010), Saguaro NP (2011) and Rocky Mountain NP (2012). Participants in this invitation-only meeting will review past efforts, advise on lessons learned, identify coordination needs and opportunities, and allow parks that may potentially host the 2013-2016 BioBlitzes to engage in in-depth discussion with past hosts.

Value proposition: **This meeting offers advice on lessons learned, identification of coordination and planning needs, and discussion between past and future host parks to improve future events.**

Keywords: **BioBlitz**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Sociological Analysis for Human Use Management: An Issue-driven Case study in Prince William Sound, Alaska

5511

Paper

Adaptive human use planning and management at the landscape scale is impossible without deliberate investment in rigorous sociological inquiry framed around specific management issues. Too often resource managers fail to characterize the human uses of landscapes with the same rigor applied to describe species distribution or habitat type. In 2006 the Chugach National Forest initiated a detailed analysis of the human systems of Alaska's Prince William Sound. This recovering ecosystem, most known for the disastrous 1989 Exxon Valdez Oil Spill, is relied on by numerous and diverse recreationists, thriving commercial fishing and tourism industries, and four rural communities with households still practicing a traditional "subsistence" (fishing, hunting and gathering) lifestyle. This case study describes an issue-driven approach to quantify landscape use patterns of these four groups in a spatially explicit way, which will benefit multiple land and resource managers in the region.

Value proposition: **The audience will see a technique for issue-based land management planning at multiple spatial scales and novel spatial analytical procedures to describe dispersed human use.**

Keywords: **Landscape, Sociology, Planning**

Lead author • session organizer • poster / demo / exhibit presenter:

Aaron Poe Science Coordinator

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Names of additional authors / panelists / presenters (if any):

Dr. Randy Gimblett, Professor, School of Natural Resources and Environment, University of Arizona, Tucson, Arizona.

Dr. Dale J Blahna, Research Social Scientist, US Forest Service, Pacific Northwest Research Station, Seattle Washington.

Dr. Clare M. Ryan, Professor, School of Environmental and Forest Sciences, University of Washington, Seattle Washington.

Aldo and Leonardo: Wilderness Art and Science Collaboration

5424

Panel Discussion

What happens when artists and scientists work together? How is the art affected? How is the science affected? Colorado Art Ranch and the Aldo Leopold Wilderness Research Institute are hosting one-month residencies in six different wilderness biomes throughout the United States. Artists will be collecting data with researchers and creating their own work in response. The panelists have all had experience with art/science collaborations and will talk about best practices in that endeavor. Colorado Art Ranch and the Aldo Leopold Wilderness Research Institute are engaged in a three-year project that combines international artists with wilderness researchers in six different biomes from Alaska to Puerto Rico. The project includes the National Park Service, Bureau of Land Management, National Fish and Wildlife Service, U.S. National Forest Service and the USGS.

Value proposition: **Audience will learn about how the arts can help scientists and managers solve park and wilderness issues.**

Keywords: **art, science, collaboration**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Cindy Swanson, Director, Aldo Leopold Wilderness Research Institute
Grant Pound, Executive Director, Colorado Art Ranch
John Calderazzo, Poet, Instructor, Colorado State University

Challenges to Landscape Scale Management: How Do We Move Forward to Protect Park Resources?

5585

Panel Discussion

Threats to park resources such as biodiversity occur at local, regional, and landscape level scales. As a result, responses to these threats require landscape scale planning and integrated transboundary ecosystem management. Despite agreement regarding the best approaches to address these transboundary issues, biodiversity and their habitats continue to degrade. Some of the major barriers to implementing these landscape scale plans appear to be poor institutional coordination and cooperation across regional scales, the building of trust, and perceived policy barriers such as NEPA. This session describes some of the common barriers that park managers face when seeking to effectively coordinate landscape scale efforts, and then gives examples and proposes specific steps and conditions to overcome them. As complex and transboundary threats such as climate change, pollution, and land conversion increase, it is thought that without landscape scale planning and management, park and protected area resources will decline.

Value proposition: **Understand and discuss the challenges to landscape scale planning and management and the potential ways to overcome them.**

Keywords: **Planning, Ecosystem management**

Lead author • session organizer • poster / demo / exhibit presenter:
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Names of additional authors / panelists / presenters (if any):

Gary Machlis, Science Advisor, NPS
Dan Wenk, NPS, Superintendent, Yellowstone NP
Marc Stern, Associate Professor, Department of Forest Resources and Environmental Conservation, Virginia Tech
Jennifer Thomsen, Department of Parks, Recreation, and Tourism Management, Clemson University

Norbert P. Psuty

5169

Poster

As part of the program to produce geological maps of 270 units within the National Park System, nine coastal units in the Northeast Coastal and Barrier Network were selected for geomorphological, rather than geological, mapping. Using the conceptual basis of stages in the evolution of the surface configuration driven by processes and dimensional analysis of products, as per the modern approach in geomorphology, a classification of the topographical expression of each of the nine areas was developed. Recent LiDAR data and orthophotography established the time frame for the characterization of the often-dynamic coastal systems, augmented by georeferenced soils and vegetation maps. Spatial filtering of the LiDAR data was a key to developing improved bare earth views and the application of hillshade to the final product provided a viewable accent to the relief encompassed in the geomorphological features.

Value proposition: Learn the conceptual basis for constructing the categories of a geomorphological map, learn the filtering techniques to improve bare earth representation from LiDAR data sets

Keywords: Coastal Geomorphology

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Monica Patel, Gulf Islands National Seashore

William Hudacek, Columbia University

Jacob McDermott, Rutgers University

Joelle Freeman, Rutgers University

John Gagnon, University of North Carolina, Wilmington

Sean McLoughlin, Rutgers University

William Schmelz, Rutgers University

Coastal Geomorphological Monitoring in Gateway National Recreation Area

5174

Paper

An intensive program of monitoring 1-D, 2-D, and 3-D changes has been established along much of the sandy coast of Gateway NRA. Based on the geomorphological protocols created as part of the Northeast Coastal and Barrier Network initiative, a web of geo-referenced control points has been installed and periodic surveys have been conducted. The combination of shoreline position (1D), dune-beach profiles (2D), and digital terrain model development (3D) are tracking the vectors of change within the Gateway units and generating information on sediment transport, sediment budget, and geomorphological evolution. These data are the foundation for the sediment recycling project initiated at Gateway. The consistency of survey technique and temporal sequence throughout Gateway provides for comparability and improved evaluation of the impacts on natural and cultural resources. The data sets have recently been published as a series of annual reports and a 5-year trend report that incorporates analyses.

Value proposition: an application of coastal geomorphology protocols developed through the Northeast Coastal and Barrier Network. It is both methodology and utilization in resource management

Keywords: coastal monitoring, geomorphology

Lead author • session organizer • poster / demo / exhibit presenter:

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Andrea Spahn, Rutgers University, Highlands, NJ

Tanya Silveira, Rutgers University, Highlands, NJ

Mark Christiano, Gateway National Recreation Area, Fort Wadsworth, NY

Contributions and Benefits of the GeoCorps Program to the NPS Northeast Coastal and Barrier Network

5297

Poster

The NPS Northeast Coastal and Barrier Network, the NPS Geologic Resources Division, and Rutgers University provide opportunity for GeoCorps America interns to participate in hands-on science in the parks. Through this partnership, nine interns have been placed in Gateway National Recreation Area and have gained experience in applying the monitoring protocols and data collection for tracking shoreline position and coastal beach topography. Together with the Rutgers University team, the interns have also contributed to the production of reports, publications, and presentations at local and professional meetings. This unique program allows interns to participate in the resource management environment in National Parks and provides the opportunity to problem solve and see their products put to use by the park resource managers.

Value proposition: **This effort provides valuable scientific experience in problem solving and professional development, and contributes to the park database.**

Keywords: **coastal monitoring, geomorphology**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

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NPS Transboundary Protected Areas Initiatives: Lessons Learned from around the Service

5306

Panel Discussion

The National Park Service (NPS) has numerous units on or near international borders with Canada, Mexico, Russia and the Caribbean. Many of these NPS units have active programs of cooperation with their counterparts in our neighboring countries. Park resources and threats pay no heed to international borders, but they do pose unique challenges to management. In this session, we will get an overview of several transboundary park initiatives from around the NPS, seeking to identify common themes, solutions to the challenges of working across international borders, and stimulate new ideas to make these partnerships more effective.

Value proposition: **An opportunity to share ideas and lessons learned from a variety of transboundary park initiatives; park managers will gain renewed energy and new ideas.**

Keywords: **Transboundary protected areas**

Lead author • session organizer • poster / demo / exhibit presenter:

Jonathan Putnam International Cooperation Specialist

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Names of additional authors / panelists / presenters (if any):

Jeff Bennett, Big Bend National Park
Jack Oelfke, North Cascades National Park
Janis Kozlowski, Beringia Shared Heritage Program
Russell Galipeau, Channel Islands NP
Mike Tranel, Klondike Gold Rush NHP

U.S. World Heritage Program Update

5314

Business Meeting

The last two years have been momentous ones concerning World Heritage in the U.S. The U.S., through the NPS and DOI, has been busy developing new World Heritage nominations, initiating the "Periodic Report" on all sites, developing products and events commemorating the 40th anniversary of the Convention, and doing all this under the cloud of the cut-off of U.S. funding to UNESCO in late 2011. This business meeting will bring together those working on World Heritage matters to provide an update on all these activities and answer questions regarding the above issues and others. IUCN will also present an update on the challenges facing World Heritage from a more global perspective.

Value proposition: **Will be of significant benefit to any site managers responsible for World Heritage matters, as there is much going on with the program currently**

Keywords: **World Heritage, international**

Lead author • session organizer • poster / demo / exhibit presenter:

Jonathan Putnam International Cooperation Specialist

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Names of additional authors / panelists / presenters (if any):

Steve Morris, Chief of International Affairs, National Park Service
Phyllis Ellin, Office of International Affairs, National Park Service
Tim Badman, World Heritage Program Director, IUCN

Renewable Energy Development 2.0: The Collaborative Process for Creating a New Energy Frontier

5653

Focus Session

Issue

The development of renewable energy projects on public lands and in federal waters, and related transmission infrastructure, has reached a watershed moment in our Nation's history. The Department of the Interior and its federal partners, including the U.S. Forest Service and the Department of Energy, are

working to create a "New Energy Frontier" that decreases our dependence on foreign oil and reduces greenhouse gas emissions by providing clean energy opportunities for the public. This development has been enhanced by tax incentives and grants created through the American Recovery and Reinvestment Act of 2009. Utility-scale energy development projects, however, have the potential to cause landscape level impacts to natural and cultural resources. Numerous agencies have been working together with state, non-governmental, and public stakeholders to plan for and create development that is "Smart from the Start" and which limits adverse impacts while maximizing public benefit. The scientific community is being asked to rapidly identify and respond to these impact concerns, and to help create tools for better planning, design, mitigation, and monitoring.

Value proposition: **The audience will receive an overview of the major initiatives to date and related resource, policy, and legal implications from a cross-agency perspective.**

Keywords: **renewable energy, planning**

Lead author • session organizer • poster / demo / exhibit presenter:

Sarah Quinn External Renewable Energy Program Coordinator

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Names of additional authors / panelists / presenters (if any):

National Park Service – Bert Frost, Ph.D., Associate Director (participation confirmed)

The NPS will discuss its role in working as a cooperating agency on renewable energy projects and related planning initiatives with other federal lead agencies to identify potential cross-boundary impacts to units of the National Park System, such as night skies, natural soundscapes, wildlife corridors, watersheds, and scenic vistas. Through a pilot project involving geospatial analysis of existing data, the NPS has taken a science based approach to identifying key resources outside its boundaries that are critical for the protection of in-park resources.

U.S. Fish and Wildlife Service – David Cottingham, Senior Advisor to the Director (participation confirmed)

In 2012 the FWS finalized its Wind Energy Guidelines for developers to enhance the consideration and protection of avian and bat species in the vicinity of land-based wind development. The FWS will discuss this achievement and the need for broader collaboration across the scientific community to model and to

Evaluation of a Feeder Beach for the Restoration of Bayside Sediment Transport Processes

5243

Paper

A feeder beach was constructed at Fire Island National Seashore to restore bayside sediment transport processes within Great South Bay, thereby providing protection for the Sunken Forest, a globally rare maritime holly forest and fundamental park resource. The beach was constructed in November 2011 using sediment from dredging of a park marina. Rates and pathways of sediment transport were evaluated in a 30-day instrumented study of beach processes. Ongoing measurements of topographic changes are being made to determine how the beach evolves. In addition, ecological effects have been assessed by pre- and post-construction monitoring of nekton, invertebrates and water quality. Preliminary results reveal that the new beach protected the Sunken Forest where it was initially placed and also at locations along the shore outside the placement area. This demonstration project will determine if this is an appropriate restoration technique at this site and potentially other segments along the bay shore.

Value proposition: **This presentation will provide an evaluation of a novel approach for the restoration of sediment transport processes along estuarine shorelines.**

Keywords: **sediment, natural processes,**

Lead author • session organizer • poster / demo / exhibit presenter:

Patricia Rafferty Coastal Ecologist

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Names of additional authors / panelists / presenters (if any):

Karl F. Nordstrom, Institute of Marine and Coastal Sciences, Rutgers University, NJ
Nancy L. Jackson, Department of Chemistry and Environmental Science, New Jersey Institute of Technology, NJ
Eugene J. Farrel, Institute of Marine and Coastal Sciences, Rutgers University, NJ
Taylor Cayes, Department of Chemistry and Environmental Science, New Jersey Institute of Technology, NJ

Evaluating the Role of Nitrogen as a Cause of Marsh Loss in Jamaica Bay, Gateway NRA

5520

Paper

Jamaica Bay is New York City's largest tidal wetland complex. Excluding dredging and fill activity, more than 66% of the vegetated salt marsh islands in Jamaica Bay have converted to subtidal and intertidal mudflats since 1951. On average, 15,785 kgd-1 of nitrogen enter the bay via wastewater discharge, subway dewatering, landfill leachate, submarine groundwater discharge and atmospheric deposition. The efficiency of nitrogen retranslocation in Spartina alterniflora has been measured to evaluate if high nitrogen loading has altered salt marsh vegetation function within the Bay. In addition, low root:shoot ratios (less than 1) that have been measured in Jamaica Bay may also be a response to high nitrogen levels. Reallocation of energy from roots to shoots in S. alterniflora may contribute to marsh loss by reducing sediment organic matter accumulation and the ability of these marshes to maintain elevation relative to sea level.

Value proposition: **Techniques to evaluate impacts of eutrophication on coastal marshes will be presented in the context of a controversial management issue for GATE and NY City.**

Keywords: **eutrophication, salt-marsh, urban**

Lead author • session organizer • poster / demo / exhibit presenter:

Patricia Rafferty Coastal Ecologist

National Park Service, Northeast Region patricia_rafferty@nps.gov

Names of additional authors / panelists / presenters (if any):

Forecasting to Support Management of Overabundant Ungulates

5510

Poster

In many areas of the world, the elimination of large carnivores has allowed populations of mammalian herbivores to increase dramatically, causing harm to ecosystems. A case example is seen in white-tailed deer populations in North America that threaten the biological diversity of eastern deciduous forests. Managers of National Parks in the eastern United States need a forecasting model of to allow them to choose among alternative controlling of the abundance of white-tailed deer. Alternatives broadly include culling and fertility control. A forecasting model will support an informed dialog between park managers and citizens about ungulate management. We are using a Bayesian state-space framework to forecast the effects of these management strategies. Parameters and states in the model are estimated using a ten year time series of white-tailed deer group count and composition from ten different National Parks.

Value proposition: **Our poster will show estimated effects of various fertility control regimes (culling, sterilization, and birth control) on ungulate populations.**

Keywords: **ungulates, fertility control**

Lead author • session organizer • poster / demo / exhibit presenter:

Ann Raiho Graduate Student

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Names of additional authors / panelists / presenters (if any):

My advisor is Dr. Tom Hobbs at Colorado State University. This project is supported by the National Parks Service specifically working with Glenn Plumb and Ryan Monello.

Ecological Assessment of the Sunken Forest and Other Maritime Forests on Fire Island National Seashore

5442

Paper

Fire Island National Seashore (FIIS) contains the Sunken Forest, a critically imperiled habitat. When the park was establishment 1964, white-tailed deer (Odocoileus virginianus) were rarely seen on the island. Since then the park has seen increases in the deer population and the natural regeneration processes have been interrupted by herbivory. In 1967, a number of vegetation plots were established in the forest and have been resurveyed for more than forty years. While the canopy of the forest has remained the same, the sapling densities are very low and do not meet the recruitment necessary to maintain the density of current canopy constituents. This presentation will examine trends from 1967 to the present time in the Sunken Forest, show 2012 survey results of other maritime forests throughout FIIS, and discuss the vegetation survey protocols that will be used to assess the efficacy of the upcoming White-tailed Deer and Vegetation Management Plan.

Value proposition: **The presentation discusses how a park will utilize vegetation survey data and protocols to assess the efficacy of a White-tailed Deer and Vegetation Management Plan/EIS.**

Keywords: **deer, maritime forests**

Lead author • session organizer • poster / demo / exhibit presenter:
Jordan Raphael Park Biologist

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Names of additional authors / panelists / presenters (if any):

Unraveling the Mystery of the Mazama Newt

5410

Paper

The Mazama newt (Taricha granulose mazamae), a putative subspecies of the rough skinned newt (Taricha granulosa), has been described as occurring only within the caldera of the former Mt. Mazama and what is now Crater Lake. This potentially endemic subspecies was reportedly common along the Crater Lake shoreline and Wizard Island. The current hypothesis is that isolation of a newt population within the caldera served as a driver for the evolutionary divergence of closely related newts and led to the diversification of amphibians in Crater Lake National Park. Differences between the rough skinned newt and Mazama newt have been described and are characterized as both morphological (variation in orange pigmentation on the ventral surface) and behavioral (more terrestrial habits and aggregating behaviors). Here we present findings from both genetic and morphological analyses that support claims that the shoreline habitats of Crater Lake support a morphologically and genetically distinct salamander.

Value proposition: **Audience will learn how multiple lines of evidence were used to characterize genotypic and phenotypic diversity of newts within Crater Lake and in surrounding habitats.**

Keywords: **Crater Lake, newts**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

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4Southern Oregon University, Ashland, Oregon 97520

Implications of Wildfire on Stream Ecology: West Fork Gila River, New Mexico

5351

Poster

The frequency, size and intensity of wildfires in the American Southwest have had a major impact on the ecosystems and management of National Park Service (NPS) units. In 2011 and 2012, two major wildfires burnt through the park and watershed of Gila Cliff Dwellings National Monument in New Mexico. The NPS Inventory and Monitoring Program (I&M) is examining the impact of the fire on the stream water quality, benthic macroinvertebrates community, stream channel morphology and streambed particle size. We present monitoring data including real-time ash flow water quality data, flow timing and intensity; and the subsequent impact of these flows on the benthic macroinvertebrate abundance and community structure; and on channel morphology and streambed particle size. This data will allow for park managers to better understand and interpret the impact of the fires and allow I&M project managers to understand the impact of fire on long-term monitoring data sets.

Value proposition: **This poster will provide useful data and information about monitoring techniques for streams after large fires.**

Keywords: **Wildfire; Stream Monitoring**

Lead author • session organizer • poster / demo / exhibit presenter:

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Eavn Gwilliam, National Park Service, Sonoran Desert Network, Tucson, AZ; Shannon McCloskey, National Park Service, Sonoran Desert Network, Tucson, AZ

Planning for Climate Change: NPS Guidance and Best Practices

5300

Sharing Circle

This session will introduce participants to NPS climate change policy and guidance, facilitate discussion on translating this information into unit-level planning processes and documents, and provide case studies to illustrate ongoing efforts to integrate climate change into planning efforts. This session is intended for park planners and those responsible for carrying out NEPA, section 106, and other planning processes, as well as resource and facility managers facing challenges adapting to climate-change related concerns now and in the future. Other topics will include talking to the public about climate change; appropriate sections and strategies for integrating climate change into planning documents; and consulting with American Indian tribes, SHPOs, USFWS, and others on climate change. Though the session will build on NPS guidance, planners and resource managers from other agencies are most welcome and are encouraged to attend and to share their agencies' best practices and ideas.

Value proposition: **Participants will exchange ideas and gain tools and resources necessary to incorporate climate change guidance into unit-level planning processes and documents.**

Keywords: **Climate change, Planning**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Brenda K. Todd, Cultural Resource Specialist, Denver Service Center, National Park Service
Don P. Weeks, Climate Change Resource Planner, National Park Service

How Disturbances Affect Natural Resources in Big Cypress National Preserve and Everglades National Park

5472

Paper

Big Cypress National Preserve (BICY) and Everglades National Park (EVER) cover approximately 2.3 million acres of the southern Florida peninsula. Humans have inhabited these areas for many centuries. Shell middens dot the coastline of Florida, and interior tree islands exhibit many types of evidence of pre-industrial human use. Canal and levee building began in the 1880's and ever since, the range and connectivity of the regional hydrologic system has been incrementally reduced. Recent improvements in hydrologic information provide the opportunity to visualize temporal patterns of human induced impacts across the terrestrial, estuarine, and marine landscapes. When these summaries are coupled with similar summaries of other types of human impacts, we have the opportunity to perceive and communicate some of the less intuitive causes of natural resource management challenges in these areas.

Value proposition: **The presentation will disclose the progress of a Natural Resource Condition Assessment that combines many categories of reporting into a general condition assessment using maps.**

Keywords: **hydrology, disturbances, reporting**

Lead author • session organizer • poster / demo / exhibit presenter:

Jed Redwine Natural Resource Condition Assessment Ecologist

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Names of additional authors / panelists / presenters (if any):

Darrell Herbert - Ecologist with Florida International University

David Rudnick – Science Coordinator for Everglades National Park

Freddie James - Hydrologist at Everglades National Park

Understanding subsistence use and identity in communities surrounding Denali National Park and Preserve

5041

Poster

Effective management of subsistence use in Alaska includes sustaining wildlife species and preserving the cultural activities that link communities to their environments. However, managing subsistence use is complex and requires a comprehensive understanding of subsistence users' identities, cultural traditions, and motivations. The presenter will display and describe a research program funded by the NPS Subsistence Advisory Council that is intended to improve management of subsistence activities on federally managed lands. Specifically, the research team uses in-depth semi-structured interviews, through a phenomenological approach, to explore the identity formation of subsistence users in designated subsistence communities surrounding Denali National Park and Preserve. The results increase our understanding of subsistence use and identity formation in a NPS setting and aim to improve the quality of communication between managers and subsistence users. Recommendations for continued research are described.

Value proposition: **Increase understanding of subsistence use and identity formation in a NPS setting.**

Keywords: **subsistence, Denali, communities**

Lead author • session organizer • poster / demo / exhibit presenter:

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Amy Craver, Denali National Park

Kelly Bricker, University of Utah

Matthew Brownlee, University of Utah

Assessing and Communicating the Response of Glacier Bay, Alaska, to Ocean Acidification

5346

Paper

Climate change, largely driven by anthropogenic carbon dioxide (CO2) emissions, is a global problem with far-reaching consequences. The most dramatic impacts can often be observed in pristine enclaves, where direct human activities are minimal. Ocean acidification (OA), a byproduct of fossil fuel combustion, is a chemical process by which the oceans take up atmospheric CO2, increasing seawater's acidity and reducing the availability of carbonate minerals, the building blocks for shells and skeletons of many marine organisms. This process can be exacerbated by other mechanisms such as the rapid deglaciation that has occurred in Glacier Bay, AK over the past 250 years. To understand the impacts of OA, we have conducted an extensive study in the region to quantify the changes that are occurring in the biogeochemistry of this important ecosystem. Simultaneously, we've launched an extensive outreach program to educate residents as well as visitors to the region on these impacts.

Value proposition: **They will learn about ocean acidification, how it's affecting the ecosystem of Glacier Bay, AK, and how these results are comparable to similar glacier systems.**

Keywords: **Glacier Bay, acidification**

Lead author • session organizer • poster / demo / exhibit presenter:

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Dr. Jeremy T. Mathis - NOAA

Lewis Sharman - Glacier Bay National Park and Preserve

Dr. Seth Danielson - University of Alaska-Fairbanks

Natalie Monacci - University of Alaska-Fairbanks

Monitoring Global Change Impacts in Mountain Forests: Twenty Years of Vegetation Change

5160

Paper

Forest ecosystems in many protected areas are threatened by both climate change and an increase in climate-driven disturbances. The ecotones between different forest types, which represent the margin of each species' climatic and competitive tolerance, can be particularly sensitive to environmental change. In 1992, 14 ecotone transects were established in Rocky Mountain National Park to monitor the effects of climate change on forest composition and structure. In recent years, many of these transects have also been affected by a particularly severe mountain pine beetle outbreak. This disturbance is altering forest composition and structure along many of the ecotone transects, and may interact with climate change and the abiotic environment to accelerate vegetation shifts. Data from these monitoring sites can provide an early indication of how forest communities may change in the future.

Value proposition: **This presentation will describe a widely-applicable method of monitoring climate change impacts, and will discuss several changes already occurring in forest ecosystems.**

Keywords: **forests, mountains, disturbance**

Lead author • session organizer • poster / demo / exhibit presenter:

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Gravel Mining: A Sustainable Practice in Denali National Park and Preserve?

5142

Poster

To preserve its wilderness character and historical value, Denali National Park has maintained 79 miles of gravel access road. To meet high maintenance needs and acquire the material sustainably, the Park instituted a strategy for extracting gravel from a glacially-fed braided river floodplain in a non-wilderness area. This method requires mimicking the natural channel dimensions across the 2,000-foot-wide expanse of minimally vegetated floodplain. Though this bi-annual extraction comes with impacts to the floodplain morphology and appearance, importing gravel from outside sources is far more detrimental to the health of the park. The Park's persistence on maintaining the integrity of this naturally braided river has evolved recently into comprehensive ground surveying, monitoring through air and space borne imagery, and contracted geomorphologic analyses. The improvement in monitoring and understanding this complex system combined with the collaboration between divisions for refinement of this practice creates a unique example of active adaptive management.

Value proposition: **This addresses a critical need for resources and the use of sustainable, innovative methods approved by management, monitored by resource staff and implemented by maintenance.**

Keywords: **geomorphology, gravel, floodplain**

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North American Grasslands: A continental partnership

5326

Exhibit

Ranchers and conservationists are working together across North America's grasslands to implement beneficial management practices that conserve native grasslands and sustainably manage working landscapes while maintaining—or enhancing—ranch profitability. Case studies of ranches and initiatives underway in or near Grassland Priority Conservation Areas across the continent demonstrate how a partnership of different interest groups can reach out to a broad audience to promote improved habitat for the full lifecycle of grassland birds including both wintering and summering grounds, retention of native grassland, and awareness of the green economic and low-carbon benefits of ranching on grasslands.

Value proposition:

Keywords: North America, grasslands

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Cutting Edge Communication: Facilitated Dialogue on Climate Change

5086

Workshop

Climate change is effecting major change in societies, environments, and economies worldwide. In addition to needed discussion on science, research, and policy, it's essential that we develop effective communication skills such as deep listening and meaningful dialogue with our staffs, parks, and communities. How do we process this rapidly changing world and our own feelings about it? How do we respond to reactions such as fear, disbelief, apathy, or refusal of science? How can we provide a safe atmosphere in which to discuss the realities of this distressing subject while not losing our optimism? Using facilitated dialogue in a supportive atmosphere, this workshop will enable participants to delve into these questions, share experiences, inquire as to their own beliefs and feelings, and possibly challenge some perceptions. Participants will come away with communication tools they can bring into their organizations --- and a network of practitioners to continue this work.

Value proposition: **Through a unique approach, the participants in this facilitated dialogue workshop will explore the challenging aspects of internal and external communication about climate change.**

Keywords: **climate, facilitated dialogue**

Lead author • session organizer • poster / demo / exhibit presenter:

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Becky Lacome, Training Specialist, Stephen T. Mather Training Center, National Park Service

Accidents and accountability: Perceptions of unintentional injury in national parks

4785

Paper

Each year, thousands of national park visitors suffer serious unintentional injuries and fatalities that affect the victims, as well as the staff who respond to them. From a hiker's unpreparedness to a sudden thunderstorm, causal explanations for these events range from attributing responsibility to the individual, to the (mis)deeds of an organization, or even to "acts of God." Given the expectation that staff and visitors both participate in risk management, one might expect their perceptions of responsibility to align; in practice, however, they may vary. Using attribution theory, we present survey data collected at three national parks to examine differences in interpretations of a hypothetical visitor accident. Specifically, we explore how experience, such as the salience of the accident, helps explain attribution of responsibility. From a theoretical and applied perspective, we argue that risk management approaches are not universal, and that the strategies used in national parks require science-based targeting.

Value proposition: **We discuss perceptions of responsibility for visitor safety, which will be relevant to park managers in choosing the most effective risk management strategies to employ.**

Keywords: **public health; risk**

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Go Green through Sustainable Investments in the National Park Service

5254

Panel Discussion

Supporting the planning, construction and maintenance of facilities in natural environments is often perceived to be at odds with protection of natural and cultural resources. In this panel, NPS facility manager representatives from Headquarters, a region, and a park will discuss the importance of investing wisely in facilities to protect cultural and natural resources. They will share how their work aligns with the NPS mission and how others can adopt decision-making strategies to have sustainable built environments that protect natural and cultural resources over the assets lifetime. Lauren Riley will chair the session; each panelist will speak for 20 minutes, leaving time for discussion with the audience. Frank Priznar from PRIZIM, who serves on the George Wright Society Board, supports submittal of this abstract. He believes that as a "discipline" this aspect of park management is often overlooked as a source of positive influence in wise park resource stewardship.

Value proposition: **Learn how protection of cultural and natural resources are dependent upon sustainable investments in the built environment (i.e., facilities).**

Keywords: **investments, sustainability, facilities**

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Ray Todd, Associate Regional Director, Facilities and Lands, National Park Service
William Thompson, Chief of Facility Management, Rocky Mountain National Park

Biocontrol with the Tamarisk Beetle (Diorhabda carinulata): impacts on tamarisk in Grand County, Utah, 2004–2012

5335

Paper

In 2004 Grand County (UT) began using the tamarisk beetle Diorhabda carinulata to control tamarisks throughout the county. The Grand County Weed Department began systematically monitoring beetle abundance and tamarisk responses in 2007. The tamarisk-D. carinulata interactions had been studied in labs and field cages, but these studies did not provide data on the dynamics of interactions at the landscape level. Beetle populations move back and forth along riparian corridors, defoliating tamarisk, dispersing to new territories, before subsequent generations re-colonize stands previously defoliated. Timing of defoliation, re-foliation, and re-colonization over time determines how quickly D. carinulata kill tamarisks. To enhance our understanding of the beetle–tamarisk interactions we use mortality studies to determine the effectiveness of the beetles in controlling tamarisk and survey vegetation naturally colonizing the land beneath once dense tamarisk thickets where browning and die-off from beetle attacks allows light penetration to reach the surface of the ground.

Value proposition: **Understanding these dynamic processes is essential for managers trying to balance tamarisk control with other resources as natural beetle-tamarisk interactions spread across the Southwest.**

Keywords: **Tamarisk, Diorhabda carinulata**

Lead author • session organizer • poster / demo / exhibit presenter:

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Tim Graham - Grand County Weed Department

Can We Protect Whitebark Pine (Pinus albicaulis) in North Cascades and Mount Rainier National Parks?

5112

Paper

Whitebark pine (Pinus albicaulis Engelm.) is patchily distributed across approximately 5,100 ha on east side of the Cascades in North Cascades and Mountain Rainier National Parks. Warming climates, an introduced fungal pathogen (white pine blister rust (Cronartium ribicola J. C. Fisch), epidemic populations of native mountain pine beetles (Dendroctonus ponderosae Hopkins), and altered fire regimes are contributing to the decline of many populations. In July, 2011 the U.S. Fish and Wildlife Service added the species to the Federal Candidate list. In 2004, a long-term monitoring program was established to track status and trends of whitebark pine in the two national parks to inform park protection and restoration of existing populations. We established and monitored permanent plots, in thirteen whitebark pine stands, across the two parks in 2004 and monitored the plots in 2009. Five year trends in conditions of whitebark pines stands indicate continuing declines.

Value proposition: **They will learn about the status of whitebark pine in the PNW, how it differs from the Rockies, and application to management.**

Keywords: **whitebark pine**

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Mignonne Bivin, Plant Ecologist, North Cascades National Park
Lou Whitteaker, Plant Ecologist, Mount Rainier National Park

Monitoring Butterflies in the northern Cascades – Community Science in Action!

5231

Poster

Butterflies are sensitive indicators of climate change because temperature influences the timing of an individual's life cycle and the geographic distribution of species. In 2011, North Cascades and Mount Rainier National Parks partnered with North Cascades Institute, Butterflies and Moths of North America (BAMONA), Western Washington University, and Mount Baker-Snoqualmie National Forest to establish a butterfly monitoring program. We are using two approaches to study butterflies: photo-inventories and field surveys. Photos are uploaded to BAMONA (www.butterfliesand moths.org) and by visitors to Mount Rainier and North Cascades NPs, Mount Baker-Snoqualmie and Okanagan-Wenatchee NFs, and two areas in British Columbia: Skagit and Manning Provincial Parks. Field surveys are conducted at 9 sites in the two national parks and Mt Baker-Snoqualmie NF. This part of the program was modeled after the successful Rocky Mountain NP butterfly program. This year we partnered with National Socio-Environmental Synthesis Center for data sharing and database development.

Value proposition: **Learn about the challenges & successes in establishing a citizen science project inremote, mountain parks.**

Keywords: **butterflies, citizen science**

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I&M Network and Cultural Resources: Success Stories and Challenges for Improved Articulation

5368

Affinity Meeting

Climate change is presenting new challenges in identifying and responding to environmental change. Call to Action #28 Park Pulse further sets the goal for National Park Service (NPS) to "assess the overall status of park resources and use this information to improve park priority setting." The NPS Inventory and Monitoring (I&M) network was established to track key natural resource and ecosystem indicators at park unit and regional levels. Cultural resource programs are responsible for regularly assessing condition of archaeological sites, structures, and landscapes. This session brings together I&M and cultural resources staffs to discuss in detail data needs and current protocols with the objective of identifying new points for collaboration between programs. This 2-hour session will initiate with three case examples ranging from park-based projects, to the Vanishing Treasures program, to NPS-wide databases, then set out major themes for discussion. Note takers will capture data, ideas, and contact information.

Value proposition: **Meeting will be forum for detailed discussion between I&M network and cultural resources to identify means of improved collaboration in condition assessment data and protocols.**

Keywords: climate, I&M, archaeology

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Lauren Meyer, Conservator, Vanishing Treasures Program, National Park Service
David Gadsby, Archeologist/Archaeological Site Management Information System, National Park Service

Re-introducing the Endangered Black-footed Ferret to Wind Cave NP: Did the Five-year Experiment Work?

5053

Paper

The Black-footed ferret (Bff), once thought to be extinct, remains one of the most endangered mammal species in North America. For restoring populations of Bff, a viable population of 5-10,000 acres of black-tailed prairie dog (main food source) habitat was once thought necessary. Prairie dog complexes of this size are now rare across the western US. The U.S. Fish and Wildlife Service (USFWS), wanting to get the endangered Bff back onto the landscape, was willing to experiment at Wind Cave National Park (WICA) in South Dakota by reintroducing the Bff onto 2600 acres of prairie dog habitat. After a 30 year absence, the first Bff's were released at WICA on July 4, 2007. A total of 49 animals were released in 2007 and 12 in November 2010. In the fall of 2011 the minimum estimate was 46 ferrets. The animals were located in 10 different colonies. Did the experiment work?

Value proposition: **Gain an appreciation for the complexity of re-introducing an endangered species into a NP and the value to the public, wildlife and the ecological process.**

Keywords: **Ferret, re-introduction, Wind**

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Dan Licht
Travis Livieri

Mapping Indicators of Ecological Resilience across Vulnerable Landscapes

5048

Paper

Ecological resilience is increasingly used to guide management of natural resources in parks and protected areas. However, in order to "operationalize" the concept, maps are needed that show where resilience is most likely across the landscape. Maps are intuitive tools that facilitate communication among a wide range of stakeholders about complex ecological information. To motivate this idea, we demonstrate how landscape-scale monitoring data has been used to generate maps of potential resilience across the steppe landscapes of John Day Fossil Beds National Monument. These maps have been instrumental to the structured decision-making process for vegetation management and restoration in the park. Our maps enabled us to articulate spatially-explicit hypotheses about how disturbance, weather and climate, and topography influence resilience in the uplands of the park. Our approach highlights successful integration of monitoring and management decision-making and provides a framework that has broad applicability for protected area managers.

Value proposition: **Demonstration of how ecological resilience can be "operationalized" to guide protected area management and restoration with maps of predictive statistical models developed from monitoring data.**

Keywords: **decision-making, monitoring, resilience**

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Shirley Hoh, NPS John Day Fossil Beds National Monument
Roger Sheley, USDA Agricultural Research Service

Conservation in a Cultural Landscape: Fire, Weeds, and Tough Decisions in Big Hole National Battlefield

5076

Paper

The ecological significance of cultural parks and protected areas such as battlefields has frequently been overlooked. Yet small cultural parks with rare populations provide refugia and colonists for re-establishment elsewhere. However, managing for both cultural and natural resource objectives presents unique challenges. To motivate this discussion we explore fire management decision-making at Big Hole National Battlefield. A recent study established that the Battlefield is home to the largest population of the endemic Lemhi penstemon, a plant species that appears to benefit from fire. The Battlefield landscape itself is fire-maintained, creating an opportunity to align cultural and natural resource management objectives. But the increasing spotted knapweed infestation in the Battlefield may also benefit from fire, complicating plans to use prescribed fire as a management tool. The successful, albeit complicated, integration of cultural and natural resource monitoring and management in the Battlefield provides a model for science-based conservation in cultural parks.

Value proposition: **We describe the successful integration of monitoring data with cultural and natural resources decision-making. We emphasize transferability of our case study to other cultural parks.**

Keywords: **monitoring, fire, cultural**

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Dennis Divoky, Glacier National Park

Climate as Driver of Current and Future Vegetation Biome Distribution

5522

Paper

There is a spatial coincidence of broad scale climate patterns and the distribution of vegetation assemblages in a region. Using a water balance approach (Stephenson, 1998) we calculate the "climate space" of different vegetation biomes using actual evapotranspiration (AET) and water deficit (D). Weather station data, passed through a water balance model, can define the climate space of the biome where the stations reside. Graphing the annual AET and D over time can show that the climate space of an area is changing, affecting vegetation condition, and eventually its distribution. We extend this concept in a spatially explicit manner to an entire region (park or larger area) using downscaled gridded climate layers as estimates of AET and D. We demonstrate the management relevance of this approach by mapping the climate space that vegetation in familiar park locations must adapt to in the future under alternative climate change scenarios.

Value proposition: **Anyone can use the techniques described in this talk to discover how their climate may be changing and affecting the distribution of their vegetation.**

Keywords: **vegetation, climate change**

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David Thoma is a hydrologist with the Northern Colorado Plateau Network.

Native bee biodiversity in national parks, more than just honeybees

5536

Paper

How many species of native bees depend on NPS protected habitats service-wide? Fifty? Two hundred and fifty? The number is probably closer to a thousand. Insect biodiversity is often overlooked when NPS managers think about the resources they protect even though these communities provide critical ecosystem services. A three year study of native bees in climate sensitive habitats in 50 different national parks has already identified more than 650 species and we are still counting. High elevation, coastal, and arid areas are particularly vulnerable to climate change and these areas are often hot spots for bee and plant endemism. This talk will highlight results from the study and amaze you with very cool, high resolution photos that show off the incredible, hidden diversity that surrounds us.

Value proposition: **The audience will learn more about the hidden biodiversity that occurs in NPS units across the country and why they should pay attention to it**

Keywords: **bees, biodiversity, climate**

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Ralph Grundel,

Jessica Rykken,

Atlas of Yellowstone

5538

Poster

The recently published Atlas of Yellowstone was 10 years in the making and is the first comprehensive atlas of a U.S. national park. It provides a data rich, state-of-the art, authoritative reference volume for the area and has an overarching goal of giving readers an enriched understanding of and appreciation for Yellowstone's natural and cultural landscapes. The Atlas serves to educate the public, inform park staff, and help build a constituency for the park through its persuasive blend of science and art. The atlas team, which comprised of professional staff and students, worked closely with over 100 topic experts from Yellowstone and Grand Teton National Parks, universities, and resource management agencies to develop story lines and page layouts that highlight the remarkable diversity, complexity, richness, and global importance of the Yellowstone region.

Value proposition: **Many beautiful examples of telling important resource stories through a creative and visually appealing mix of of maps, graphs and charts that can be used.**

Keywords: **geography, atlas, GIS**

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The USA National Phenology Network

5102

Exhibit

The USA National Phenology Network (USA-NPN; www.usanpn.org), established in 2007, is a national science and monitoring initiative focused on phenology as a tool to understand how plants, animals and landscapes respond to climatic variability and change. Core functions of the National Coordinating Office (NCO) of USA-NPN are to provide a national information management system including databases, develop and implement internationally standardized phenology monitoring protocols, create partnerships with a variety of organizations for implementation, facilitate research and the development of decision support tools, and promote education and outreach activities related to phenology and climate change. This exhibit will describe programs, tools and materials developed by USA-NPN to facilitate science and management related to phenology of plants, animals and landscapes within managed and protected areas at local, regional and national scales.

Value proposition: **Learn how you can participate in a national science and monitoring network for science, education and decision-making in a changing world**

Keywords: **monitoring, education, science**

Lead author • session organizer • poster / demo / exhibit presenter:
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Understanding Audiences To Improve Agency Decision Making: The Issue of Lead Ammunition and Fishing Tackle

5521

Paper

Significant attention has been directed in recent years toward examining and addressing the impacts of lead in the environment from ammunition and fishing tackle. Strong and conflicting public opinions make decision-making about this issue particularly challenging for agencies. Human dimensions research can inform this process by providing a more adequate representation of diverse viewpoints and enhancing the ability to identify likely sources of controversy related to potential management activities, communicate more effectively with the public, and develop more successful management solutions. Qualitative research design – consisting of interviews, observation, and document analysis – was used to obtain information about target audiences, including their beliefs, attitudes, and likely responses to various management strategies. Particular attention was paid to debates among individuals with opposing viewpoints and key attitudes and beliefs that form a foundation for contemporary discussions about the topic. Findings offer insight for future research and communication initiatives.

Value proposition: **Lead ammunition and fishing tackle is highly controversial; the audience will gain a better understanding of key attitudes, beliefs, and intergroup conflict characterizing the issue.**

Keywords: **Lead, hunting, fishing**

Lead author • session organizer • poster / demo / exhibit presenter:

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Kirsten Leong, Biological Resource Management Division, National Park Service

Collaborative Landscape Conservation: Benefits for Protected Area Management

5657

Focus Session

This focal session will highlight how landscape-scale collaboration and data can and should improve management of protected areas. While landscape-scale collaboration and data has multi-faceted utility, this session will focus on application to the management of existing protected areas. Protected areas are geographically-defined and often have limited authorized uses, and as a result, landscape-scale data must be uniquely analyzed and applied. Specifically, the focus session will: 1) examine the existing organizational network for collaborative landscape conservation; 2) take stock of the emerging landscape-scale data sets; and 3) examine a few case studies where landscape-scale collaboration and data have been used to improve protected area management.

Value proposition: TBD

Keywords: landscapes, collaboration

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Session Outline:

1) [10 minutes] Existing organizational network for collaborative landscape conservation

2) [15 minutes] Taking stock of emerging data sets for landscape-scale conservation

3) [65 minutes] Case Studies

a. Using landscape data to answer two questions:

Short-term Coral Growth Rates in a Coral Reef with High Environmental Variability

5331

Paper

In certain coral reef ecosystems there is a high degree of environmental variability, often spanning pH and temperature regimes that are predicted for the future. Understanding how natural environmental variability influences coral calcification will help inform us about the impacts of future pH changes on coral growth. In the back-reef of the National Park on Ofu Island, American Samoa, there are daily swings in pH of up to 0.56 units and temperatures reaching 34°C. Because environmental variability is highest when the tidal cycle is strong, we measured growth of the coral Acropora surculosa during one week with reduced environmental variability and the following week with increased environmental variability due to strong low tides in September 2012. Stained coral branches were thin-sectioned and examined with fluorescence microscopy for growth analysis. These experiments will provide the first reports of the role of natural pH variability on short-term coral growth.

Value proposition: **We are interested in the link between coral growth and environmental variability. To measure growth we have designed an experiment using a fluorescent dye.**

Keywords: **coral, calcification, pH**

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The Cultural Resource Learning Commons: An Uncommon Twist on Social Networking in Training

5320

Exhibit

The National Park Service's Cultural Resources Learning & Development Program is creating the NPS Career Academy for Cultural Resources. This digital learning environment offer employees access to myriad professional development resources and opportunities. While the reach of digital learning provides several benefits, it also presents unique challenges to the creation and sustainment of professional contacts in an already geographically dispersed agency. However, to harness technology's reach, we are building a professional network component based on the City University of New York's revolutionary model, the Academic Commons. It will provide employees a virtual space in which they can connect and interact, thus encouraging creativity and innovation. Drop by our exhibit to check out the Learning Commons, as well as offer your comments, suggestions, and, of course, sign up for the Commons and join in on the fun!

Value proposition: **Our exhibit will be beneficial because it will present new, easily accessible training website that the audience can improve upon with their feedback.**

Keywords: **CulturalResources, online-learning, social-networking**

Lead author • session organizer • poster / demo / exhibit presenter:

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The Botany of Shell Mounds in Southwestern Everglades National Park, Florida

5409

Paper

Everglades National Park is a 1.5 million acre subtropical wetland located at the southern end of the Florida peninsula. Small isolated upland plant communities are found throughout these wetlands, many of which have been occupied and modified by humans over long periods of time. Extraordinary examples of the human influence on the landscape can be found in a series of massive shell mounds constructed by Calusa Indians beginning about 3000 years ago. Following the decline of the Calusa, these mounds were then briefly used by Seminole Indians and finally European settlers. The purpose of this paper is to present results of floristic inventories of 9 shell mounds in southern Everglades National Park. Emphasis will be given to the contribution of the flora of these human landscapes to the plant diversity in Everglades National Park. Potential links of the current flora to past occupational history will also be described.

Value proposition: **This work will help reduce the gap between cultural and ecological concepts of landscape by providing information that recognizes both ideas.**

Keywords: **botany floristics ethnobotany**

Lead author • session organizer • poster / demo / exhibit presenter:

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Resource Stewardship Strategies

5130

Poster

A resource stewardship strategy identifies desired conditions for select natural and cultural resources and develops strategies to attain those conditions. At the heart of developing a resource stewardship strategy is identifying and selecting indicators of resource conditions and developing target values that represent desired conditions. Together, these two components allow park managers to measure the status of resources relative to desired conditions and develop comprehensive strategies designed to achieve or maintain the desired conditions. Although this process was developed by the National Park Service, it is applicable to any national forest, area of critical environmental concern, national refuge, or other national or state protected area.

Value proposition: **This poster is valuable to readers because it describes a process to identify and manage important resources for a park or other protected area.**

Keywords: **Resources, comprehensive management**

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A Basin Restored: Restoration in Lost Man Creek Basin, Redwood National and State Parks

5484

Paper

Forest roads are a significant sediment source for many watersheds in the northwestern United States. Road removal has been shown to be effective in reducing this sediment delivery and is an economically viable alternative to the continual high cost of road maintenance. Over the past 13 years restoration efforts have focused on approximately 58 miles of abandoned roads in the Lost Man Creek basin, a tributary of Redwood Creek. Restoration goals including restoring natural hydrologic function, the reduction of road-related sediment input into streams, preservation of salmonid spawning and rearing habitat, and protection of terrestrial and aquatic ecosystems. Restoration techniques included moving unstable road fill to more stable locations and reestablishing natural drainage patterns. The project -- a monumental milestone for the park -- substantially reduced erosion from these forest roads resulting in improved water quality and fish habitat for listed salmonids and eliminated future maintenance costs of these roads.

Value proposition: **Lost Man Creek basin provides a case study as the first basin in Redwood National Park where nearly all the abandoned roads have been decommissioned.**

Keywords: **Erosion, restoration, preservation**

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Protecting park resources through visitor education: Exploring site-based communication strategies to reduce non-compliant behavior

5578

Poster

Resource damage is a significant issue along the shorelines of Lake Powell at Glen Canyon National Recreation Area (NRA) – a unit of the National Park Service (NPS) stretching across southern Utah, into northern Arizona. With an estimated 1,900 miles of shoreline, the lake provides boater access to numerous culturally significant areas managed by the park, such as archeological and paleontological sites. In recent years, Glen Canyon NRA has experienced a variety of resource degradation issues ranging from looting and theft of artifacts to excessive graffiti and overall site vandalism caused by non-compliant behavior. This study explores recreationist values and motivations and the use of site-based communication strategies to educate and inform visitors and reduce non-compliant behavior.

Value proposition: **This poster will highlight the benefits of understanding visitor motivations/values and share effective communication strategies aimed at reducing non-compliant visitor behavior in protected areas.**

Keywords: **communication, resource protection**

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Rosemary Sucec - Chief, Cultural Resource Branch, Glen Canyon National Recreation Area

Research Learning Centers

5387

Exhibit

Research Learning Centers (RLCs)have been developed to facilitate research efforts and provide educational opportunities. They are places where science and education come together to preserve and protect areas of national significance. They have been designed as public-private partnerships that involve a wide range of people and organizations including researchers, universities, educators, and community groups. In this joint exhibit, the nation's 21 RLCs will come join to communicate their work to GWS members. The exhibit will consist of two Skyline exhibits summarizing the mission of RLCs, two flat screen TVs presenting short videos and slides on each RLC and two tables with take away information. The exhibit will be the center piece of the RLC experience for the GWS conference and will be a focal point for RLC members to share ideas and best practices with one another and with the society at large.

Value proposition: **GWS members who interact with exhibit will have the opportunity to learn about the activities of the 21 Research Learning Centers across the National Park.**

Keywords: **research learning center**

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Cave development in relation to structure and regional groundwater patterns in a pre-Grand Canyon setting

5641

Poster

Grand Canyon National Park is not known as a “cave park”, but holds extensive cave and karst resources. The park likely contains more caves than any other National Park unit. Some caves represent the current hydrology of the canyon region, acting as large drains to the surrounding plateaus. Many other caves, however, represent a past environment, prior to Grand Canyon incision, when regional groundwater flow patterns were potentially different than the current flow regime. This project is investigating the processes of cave development prior to Grand Canyon’s existence and the roles of regional and local geologic structures on the location, orientation, and density of cave systems. The results will inform the multitude of conflicting theories on state of the Colorado Plateau pre-Grand Canyon as well as the timing and mechanisms of canyon incision.

Value proposition: **The paper illustrates how cave systems can inform the roles of regional and local-scale geologic structure on past and current groundwater basins.**

Keywords: **caves, karst, groundwater**

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Changing Permafrost Landscapes in Denali National Park: Carbon Balance Observations and Degrading Permafrost

5373

Paper

Permafrost, which underlies 43% of Denali National Park and Preserve (DENA), is particularly vulnerable to degradation because the annual average temperature hovers just below freezing. Beginning in 2004, a permafrost carbon observatory was initiated at a site near DENA that exhibited permafrost in various states ranging from minimally to extensively thawed. Atmospheric and aquatic carbon flux was measured from sites with differing levels of thaw and aquatic carbon was attributed to either recently sequestered carbon or ancient carbon. Sites with extensive thaw lost more carbon (including ancient), than sites with minimal or moderate thaw. Degrading permforst is also causing rapid changes in wetland structure, the extent and juxtaposition of plant communities, and wildlife habitat. Management implications include changes in water-bird and ungulate habitat and potential changes in fire effects as permafrost in DENA occurs in a fire-prone ecosystem. This study demonstrates the positive feedback between climate and permafrost carbon.

Value proposition: **Attendees will learn about the dynamic structure and function of permafrost in an era of rapid climate change. Carbon balance observations of will be highlighted.**

Keywords: **permafrost, carbon-flux, climate-change**

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Projected Impacts of Emerald Ash Borer on National Capital Region Parks

5073

Paper

Ash trees (Fraxinus spp.) are a common component of the forest canopy in the mid-Atlantic, including in the NPS National Capital Region (NCR) parks. Ash is threatened by an exotic insect pest, the Emerald Ash Borer (EAB). This pest has recently been found in NCR parks. As EAB spreads it is expected to cause widespread mortality of ash trees, over the next ten to fifteen years. Additionally, white ash trees (Fraxinus americana) in Catoctin Mountain Park are currently undergoing decline. White ash trees in this park often exhibit many large dead branches, a sparse canopy and a high mortality rate. This decline does not appear to be related to EAB. This talk examines the potential effects of the loss of ash trees in NCR forests. In particular we examine the interaction between loss of ash trees, lack of forest regeneration due to deer browse and the spread of exotic plants.

Value proposition: **This talk will highlight the potential impacts of interaction between a serious forest pest with other stressors such as exotic plants and over-abundant deer.**

Keywords: **forest ecology**

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Proactive Strategy: Gaining the Science to Sustain High-elevation Pine Forests Threatened by Novel Stresses

5516

Paper

In a changing climate in western North America, continued invasion of Cronartium ribicola, the non-native fungus that causes white pine blister rust (WPBR) and the concurrent mountain pine beetle epidemic threaten five-needle pine populations which dominate healthy mountain-top ecosystems. Recognizing the dire consequences of inaction, a Proactive Strategy was developed to conserve the genetic diversity of threatened pines and provide managers with scientific information necessary to manage pine populations for resilience. In situ and ex situ genetic conservation are both underway before the populations and ecosystems are compromised. On-site research of disturbance ecology, regeneration potential, and frequency of WPBR resistance allows prioritization of mitigation interventions and the timing of their deployment for greater efficiency and efficacy. The Strategy and its application in Rocky Mountain NP, Great Sand Dunes NP&P, Crater Lake NP and Great Basin NP as well as on other federal lands will be discussed.

Value proposition: **Learn a new proactive approach to gain a science foundation to sustain functioning ecosystems threatened by invasive diseases and unnatural levels of bark beetles**

Keywords: **Disease, Insects, Pines**

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Jen Beck, USDI Park Service, Crater Lake National Park

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Richard Sniezko, USDA Forest Service, Region 6 Dorena Genetic Resource Center

Human Dimensions of Climate Change (HDCC): An Interagency Collaborative

5196

Workshop

The HDCC intends to provide guidance relevant to operational challenges of resource management associated with climate change. Working in concert with natural resource managers, HDCC will focus on human dimensions issues associated with on-the-ground operational management of natural resources. Objectives include: 1) Sustain a community of practice on the HDCC that facilitates sharing of information; 2) Provide an interagency forum to apply and evaluate practices, data sets, and indicators; 3) Develop a common framework across agencies for assessing and responding to the human effects of climate change relevant to resource management. The HDCC seeks participation by social scientists, staff in environmental and natural resource agencies, climate change researchers in academia, nongovernmental organizations, and industry. Current collaborative members include: BLM, USGS, Forest Service, NPS, and NOAA. Workshop activities will address the objectives above and foster participation in the Collaborative. Participants will provide feedback on, and guide, development of tangible HDCC products.

Value proposition: **Participants will help identify information needs, data sets, indicators, principles, and guidelines to encourage a consistent approach to applying HDCC information in natural resource management.**

Keywords: **Climate Change**

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Tom Fish, National Park Service
Daniel R. Williams, U.S. Forest Service
Karen Blakney, Bureau of Land Management

U.S. Fish and Wildlife Service Employees' Constraints to Connecting Children with Nature

5445

Paper

The US Fish and Wildlife Service Division of Education and Outreach, National Conservation Training Center and the USGS Policy Analysis and Science Assistance Branch conducted a survey of FWS employees to identify constraints that potentially impede FWS progress in connecting children with nature. The survey was conducted on-line. Responses were received from 320 employees (55% response rate) representing diverse regions, tenure, wage/grade level, job series, supervisory status, and involvement with education and outreach activities. Quantitative analyses were conducted. Results found that FWS employees believe they as individuals and the FWS are successful now and will be more successful in the future in connecting children with nature. Multiple constraints to connecting children with nature were found. A 3-level hierarchy based upon the perceived severity of the constraints was identified. Details concerning individual constraints, the hierarchy, and using this information to understand constraints and progress toward overcoming them will be discussed.

Value proposition: **Learn about constraints in accomplishing the FWS mission to connect children with nature including the top 10 issues and a 3-level hierarchy of constraints.**

Keywords: children, constraings, nature

Lead author • session organizer • poster / demo / exhibit presenter:

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Joan Ratz, United States Geological Survey

Parks on Fire: Building Effective Relationships between Fire Management and Other Disciplines within the NPS

5655

Focus Session

Revisiting Leopold: Resource Stewardship in the National Parks states that "the extraordinary natural and cultural resources of the National Park System are the environmental, cultural, legal, and political, and moral basis of the commitment of the American people to their national parks". The presence or absence of wildland fire has a significant influence on this commitment within the NPS, as well as in its wilderness areas. This focus session examines how effective the contract we have for the stewardship of NPS resources using the integration of wildfire in its management has been, and how it might be improved.

Fire is a vital ingredient in the management of resources. Resources managers need to work with fire managers to stir this ingredient. Without shared involvement between fire and resource managers, NPS resources will either be at the table or on the menu. This is because fire can be used in many ways to accomplish many objectives but total fire exclusion, even if desired, is not possible.

Value proposition: TBD

Keywords: fire, program coordination

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TBD

We are looking for a lively debate from all sides of the spectrum. Invited panelists will be fire managers, natural resource managers, scientists, and NPS leadership.

Development, Application and Comparisons of Wetland Bioassessment Models in Two National Parks

5478

Paper

Key challenges for the NPS Vital Signs program are creation and interpretation of monitoring data to permit evaluation of ecosystem condition and to provide translation to current and longer term management needs. We present results from an ongoing research project to develop, interpret and apply multimetric models of wetland condition in two National Parks. The diverse and challenging management goals of these parks require unique application of tools for creating models. For example, at the Great Sand Dunes NP the primary need is to integrate long term Vital Signs monitoring of wetlands with a developing Ungulate Management Plan – this requires models that focus more on 'natural' disturbance gradients. At Rocky Mountain NP, the goal is to assist decisions about hydrologic restoration and to provide interpretation of wetland condition as a general index of park integrity – this requires models that are structured more around classic measures of anthropogenic disturbance.

Value proposition: **Attendees will learn about cutting edge methods in bioassessment via two real world examples with explicit management application. Models are sharable as R functions.**

Keywords: **Bioassessment, Wetland Integrity**

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What is driving patterns of spruce beetle outbreak in the San Juans Mountains, CO?

5500

Poster

Since 2003, over 200,000 acres of mature, high-elevation spruce (Picea engelmannii) in the San Juan Mountains (CO) have been killed by spruce beetles (Dendroctonus rufipennis). Though outbreaks initially emerged across the entire range, epidemic levels have occurred only in the eastern San Juans. What is driving this spatial pattern? Host vigor, size and density are thought to be important controls of outbreak development which vary across landscapes due to weather patterns, topography, land-use and disturbance history—to name a few. How do such factors vary across the San Juans and relate to patterns of outbreak? My research uses tree density, size and annual growth data collected in 19 valleys across the San Juans to test and model relationships among these drivers and outbreak patterns. Results are presented and interpreted in the context of challenges specific to managing a matrix of wilderness/non-wilderness land during a period of changing climate.

Value proposition: **Attendees will learn about the scope, scale, spatial patterns and drivers of spruce beetle outbreaks currently affecting public lands in the San Juan Mountains, CO.**

Keywords: **disturbance, wilderness, climate**

Lead author • session organizer • poster / demo / exhibit presenter:

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Conservation-reliant species: New Challenges for Future Managemnt of National Parks

5232

Paper

The anthropogenic alteration of most ecosystems means that many species will require conservation management actions for the foreseeable future to maintain targeted population levels because they face threats that cannot be eliminated, only managed. Such species are “conservation reliant”. E9ighty four pervccent o of endangered species with recovery plans are conservation reliantThere are two, overlapping forms of conservation reliance: population-management reliance and habitat-management reliance. Ultimately the ability of a species to persist is related to the characteristics and condition of both populations and their habitats, but conservation actions for different species often focus primarily on either managing populations or on managing habitat. This paper provides an overview and introduction to a series of papers that examine the concept of conservation reliance in the context of a range of taxa and habitats.

Value proposition: **Attendees will learn managemnt aand policy implications of conservation reliant species and extent of their occurence as endangered species.**

Keywords: **conservation reliant, endangered**

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Water Quality Monitoring Helps Define the Dynamic Nature of Southeast Alaska Rivers

5214

Paper

The Southeast Alaska Network has been monitoring water quality in three national park rivers since 2010. Flowing water is a fundamental component of soggy Southeast Alaska, where total freshwater input to marine waters nearly equals the discharge of the massive Yukon or Columbia River basins. Our network collects hourly temperature, dissolved oxygen, pH, conductivity, and turbidity data from May through October. These data are helping define the unique physical characteristics of regional stream types. For example, temperature data demonstrate distinct thermal regimes across glacial, ground-, and surface-water systems. Biology is also driving physical patterns; diel and seasonal dissolved oxygen variation responds to influxes of spawning adult salmon. Water quality trends such as these undoubtedly affect ecosystems across multiple spatial scales, especially if present trends shift due to climate change. I hope to present a unique ecological perspective that is applicable to any water quality monitoring program.

Value proposition: **Instead of dryly comparing water quality monitoring to regulatory standards, I will link results to broadly applicable ecological and park management questions.**

Keywords: **water, quality, Alaska**

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Names of additional authors / panelists / presenters (if any):

A Framework for a Changing World: The National Fish, Wildlife and Plants Climate Adaptation Strategy

5183

Panel Discussion

The National Fish, Wildlife and Plants Climate Adaptation Strategy provides a unified approach—reflecting shared principles and science-based practices—for reducing negative impacts of climate change on America's species and the natural systems they depend on. This unprecedented collaborative effort has involved dozens of federal, state, and tribal agencies as well as input and support from conservation organizations, industry groups, and private landowners. The report recommends seven primary goals, including the need to conserve habitat and provide linkages and corridors. Sustaining a diversity of healthy populations over time requires conserving a sufficient variety and amount of habitat and building a well-connected network of conservation areas to allow the movement of species in response to climate change. Future management challenges will not be to keep current conservation areas as they are, but rather ensure there is a network of habitat so that the majority of species will have sufficient habitat somewhere.

Value proposition: **Participants will learn about opportunities to participate in implementing the Strategy, and the role of parks and protected areas in supporting adaptation.**

Keywords: **climate change, adaptation**

Lead author • session organizer • poster / demo / exhibit presenter:

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Jack Sullivan, WI Department of Natural Resources

Monitoring Trends in Health and Status of Whitebark Pine in the Greater Yellowstone Ecosystem (GYE)

5405

Paper

The vital signs monitoring program of the National Park Service was initiated to monitor ecological changes overtime for select indicators. This program provides managers with scientifically sound data to be used in management decisions. Because of the significant role of whitebark pine in the Greater Yellowstone Ecosystem (GYE) monitoring trends in the health and status of whitebark pine populations is necessary to effectively manage this species. Since 2004, the Interagency Whitebark Pine Monitoring Program, facilitated by the Greater Yellowstone Network, has been monitoring whitebark pine health across the GYE. We have completed the first statistical analysis to examine whether there is evidence of a change in infection and severity of white pine blister rust. We have also investigated mortality of whitebark pine as a result of other environmental causes including the recent mountain pine beetle epidemic as well as developed methods to monitor whitebark pine recruitment.

Value proposition: **Determining status and trends allows managers to make informed decisions and work more effectively with agencies for the benefit of park, federal and private resources.**

Keywords: **whitebark pine**

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6 National Park Service, Yellowstone National Park

Variability Indeed: The Meaning of Multiple Consecutive Anomalous Years Reflected by Glacier Bay Oceanography

6667

Paper

Continuous long-term monitoring of oceanographic conditions of Glacier Bay, Alaska is entering its 21st year. Standard oceanographic parameters (temperature, conductivity, density, light penetration, turbidity, fluorescence [proxy for primary productivity], and dissolved oxygen concentration) have been characterized by vertical cast data year-round during nearly-monthly sampling cruises that include a set of 22 permanent stations. In general, parameters consistently reflect typical ranges and spatial (both horizontal and vertical) and temporal patterns expected for a high-latitude tidewater glacial fjord, with strong seasonal signals and strong length-of-fjord gradients along glacier-to-baymouth transects. The water column is well-mixed in winter and strongly stratified in summer. However, 2009-2012 data from a representative station in mid-summer have shown consecutive anomalies (compared to the 20-year mean) in temperature, salinity, and density. Anomalies variously match patterns observed in other northern Gulf of Alaska coastal waters - or not - suggesting response to large-scale regional physical forcing, or a reflection of more local processes.

Value proposition: **The audience will learn about continuous long-term monitoring of oceanographic conditions of Glacier Bay, Alaska.**

Keywords: **oceanography**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Preparing the Next Generation of Protected Area Employees: Opportunities for Students, Agencies, and Universities

5275

Panel Discussion

Protected area managers are becoming more reliant on the services of students in these times of economic hardship. Student employees offer managers a cost-effective means to complete meaningful projects that may otherwise be postponed or never completed. Students can also conduct research in protected areas that helps inform adaptive management of ever-changing resources. From these experiences, students gain essential skills and knowledge that prepare them for future employment opportunities in public land management. This panel discussion will provide an open dialogue with current students working for the National Park Service, as well as their manager and a university professor mentoring the students. Topics will include how the students perceive their working experience, how they came to work for the agency, and the perspectives of supervisors and mentors of student employees. This session will highlight the importance of involving the next generation of protected area managers early in their careers.

Value proposition: **Inspires and encourages students, promotes the value to managers, and demonstrates the importance of career mentorship beginning at the university level.**

Keywords: **Students, employment opportunties**

Lead author • session organizer • poster / demo / exhibit presenter:

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Jennifer Stein - Visitor Use Management Specialist - Denver Service Center

Angel Lopez - Youth Development Program - Denver Service Center

E. coli Contamination of the North Fork Virgin River Upstream of the Zion Narrows

5213

Paper

Contamination of the North Fork of the Virgin River with E. coli bacteria has been documented for three years and the state has included the reach, including the Wild and Scenic designated reach in Zion National Park, on the 303d list of non-compliant waters. Monitoring by the park and the state has identified the source as irrigation return flows from pastures at the Narrows Trailhead. The case is of special interest to the UDWQ because of the number of recreational users, the National Park link, and the pervasiveness of livestock grazing along streams in Utah. The state has begun a TMDL process and the park, state and BLM are pursuing remedial actions, but this is complicated by complex land ownership patterns, and reluctant landowners and BLM permitees. The solution appears to lie in improved irrigation practices.

Value proposition: **Will hear of a water contamination problem that is widespread, where the science is very straight-forward, but the solution is complex even with state support.**

Keywords: **quality, E.coli, water**

Lead author • session organizer • poster / demo / exhibit presenter:

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Water education at Congaree National Park: programs and proposals for NPS – Project WET partnerships

5157

Paper

Hydrology education is a core focus of the Old-Growth Bottomland Forest Research and Education Center at Congaree National Park (CONG). Examples include Linking Ecology and Art of Floodplains (LEAF) programs, which were recently supported by a 2012 National Park Foundation "Ticket to Ride" grant; Junior Ranger Ecology Camp "water day" programs; and technical undergraduate fieldtrips. Several of these programs are part of a pilot proposal for the NPS – Project WET "Discover the Waters of Our National Parks" educational partnership. For this partnership, CONG is proposing a suite of adaptable materials to help K12 teachers and park staff across the country to develop and supplement local hydrology education opportunities. Materials, which will include over twenty-five programs covering climate change, data collection, visual art, history, and stewardship, will be correlated with the New National Science Standards. The Project WET partnership will also support the latest Call to Action item, "Crystal Clear."

Value proposition: **Audience members will learn about several ongoing approaches hydrology education at Congaree National Park as well as an emerging NPS – Project WET partnership.**

Keywords: **Hydrology, education, floodplain**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Climate Change Communication and the Interpretive Equation: A Graphic Organizer Approach

5158

Poster

Climate change communication is critically important to the sustainability of parks and public lands, but it can be an intimidating and overwhelmingly complex topic. There is an enormous volume of data, perspectives, models, frames, visual aids, math literacy, science literacy, counter-arguments, caveats, and directives relevant towards sharing the science in a variety of settings. The interpretive equation [IO = AT* (KA + KR)], however, offers a simple and valuable conceptual tool for helping communicators efficiently frame well-rounded presentations about climate change. This poster presents a graphic organizer that emphasizes selected climate change resources, concepts, quotes, references, and best practices relevant to each term in the equation. This graphic organizer also experiments with adding a new term for "sa" ("self awareness") as an exponent to "Appropriate Techniques." This "sa" term helps to emphasize the importance of understanding how an agency's position and policy on climate change influences communication.

Value proposition: **Viewers will find a graphic organizer that links selected climate change communication resources, concepts, quotes, references, and best practices to the interpretive equation.**

Keywords: climate change, communication

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Names of additional authors / panelists / presenters (if any):

Resource Conflict Analysis: A Geospatial Approach to Assessing Energy Development Threats to Landscapes

5035

Poster

Responding to cumulative impacts with consistency across park and regional boundaries at landscape-scales is a difficult task and establishing an agency-wide NPS methodological precedence is needed. Utilization of available geospatial data and analytic tools to assess potential risks of proposed external land use actions presents a viable approach to creating a critical dialog with NPS managers and groups proposing land use actions. An effort to respond to the Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States highlighted the benefit of adopting this approach for addressing potential resource conflicts across broad geographic extents. The developed geospatial resource conflict analysis approach engaged multiple levels in the NPS organization and incorporated authoritative resource data sources in the assessment. Moreover, the experience highlighted the potential to successfully respond to situations where the NPS response minimizes park-by-park variability in assessments of risk and consistently reflects bureau-wide policy and program decisions.

Value proposition: **A pilot effort to develop a National Park Service methodology to assess external development actions and their potential impacts on NPS resources is introduced.**

Keywords: **GIS, Energy, Solar**

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Detection of Early Season Invasive Plant Species Across the Northern Colorado Plateau

5170

Poster

To study landscape level dynamics of Early Season Invasive (ESI) plant species, including cheatgrass, a Detection of Early Season Invasives (DESI) software program was used in conjunction with Landsat remote sensing imagery and NPS Vegetation Inventory field data to create decadal time series ESI estimates at three Northern Colorado Plateau (NCP) NPS units. DESI measures ESI presence by detection of early season greenup of ESI species relative to other species using a normalized difference vegetation index. Plot-based monitoring of species presence/absence and cover were used to optimize and assess the accuracy of ESI estimates. ESI time series products will subsequently be used in a geospatial model to assess the degree to which climatic, biogeophysical, and land use factors explain ESI species across the NCP.

Value proposition: **A methodology for estimating early season invasive plant species using remote sensing and detection software will be introduced and demonstrated across three NPS units.**

Keywords: **Cheatgrass, Remote Sensing**

Lead author • session organizer • poster / demo / exhibit presenter:

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The Role of Relationships in the Implementation of Canada's Heritage Lighthouse Protection Act

5118

Paper

Owing to dramatic advances in technology, reliance on traditional lighthouses to deliver modern aids to marine navigation programs is on the wane. But this state of affairs has not signalled the end for historic lighthouses. On the contrary, governments, heritage organizations and communities around the world are working to identify new or complementary uses for lighthouse properties in order to secure their long-term survival. In Canada, this initiative is being advanced through the Heritage Lighthouse Protection Act. Parks Canada is responsible for implementing the Act and a significant part of this task consists of forging and nurturing relationships with those eager to help conserve Canada's lighthouse heritage. This presentation outlines how Parks Canada has fostered relationships with other government departments, heritage stakeholders and citizens across the country to effectively implement the Heritage Lighthouse Protection Act.

Value proposition: **Conference-goers will gain a better understanding of the Heritage Lighthouse Protection Act, Canada's federal legislation that ensures the protection and conservation of heritage lighthouses.**

Keywords: **lighthouse, Parks Canada**

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N/A

Identifying Climate Change Refuge for At-risk, Native Brook Trout (Salvenlinus fontinalis) of the Namekagon River

5572

Paper

The goal of our research is to identify brook trout (Salvelinus fontinalis) habitat that could serve as thermal refuge under climate change in the wild and scenic Namekagon River of the St. Croix National Scenic Riverway. Our research includes two components to inform agency plans for protecting and restoring cold-water habitat and brook trout populations in the face of changing climate. First, we assessed available habitat in the headwaters of the Namekagon River and its tributaries by reviewing historical records, completing stream habitat surveys, and deploying 95 temperature loggers to monitor summer temperatures in 2012. Second, we surveyed fish communities in seven Namekagon River tributaries to identify productive brook trout populations. Results will guide NPS resource managers in 1) protecting habitat that is thermally suitable for brook trout and 2) implementing future restoration projects for habitat that is thermally suitable but not of sufficient quality to sustain brook trout populations.

Value proposition: **Audience members will learn about the importance of using an interdisciplinary approach to identify resource management needs, including using techniques for researching river habitat history.**

Keywords: river ecology

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Park Planning Framework

5496

Panel Discussion

The new planning framework introduces the concept of a park planning portfolio, which is the assemblage of the individual plans, studies and inventories needed to guide park decision-making. The new portfolio structure encourages the use of targeted, small-scale planning products to meet a broader range of park planning needs more efficiently. A foundation document is the underlying guidance for management and planning decisions in a national park unit. It describes the core mission and underpinnings of the park unit; providing basic guidance for all the decisions to be made about the park. The park atlas is a GIS product currently being developed as part of the foundation document process that includes a large-format map atlas and a web-mapping site. The park atlas acts as a reference for park projects and daily operations as well as to facilitate planning decisions as a GIS-based planning support tool.

Value proposition: **The audience will learn fundamental concepts about the new park planning framework for the National Park Service.**

Keywords: **planning, foundations, parks**

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B.J. Johnson, Chief, Denver Service Center Planning Division, National Park Service
Nell Conti, GIS Chief, Denver Service Center Planning Division, National Park Service

(all panelists have confirmed attendance)

Use of the AGWA GIS-based Hydrologic Modeling Tool to Aid Park Fire Management Decisions

5218

Poster

In effort to help parks better manage the effects of fire on their landscapes, AGWA (Automated Geospatial Watershed Assessment), a GIS-embedded hydrologic tool, is used to model change in erosion and runoff parameters before and after burns. In four park watersheds (Bandelier National Monument, Bryce Canyon National Park, Chickasaw National Recreational Area, and Zion National Park), "existing conditions" publicly-accessible data was gathered for AGWA inputs. Hydrological outputs were analyzed to determine which areas are at high risk for post-fire runoff and erosion to aid park management decisions. Park staff use this data to provide a set of "alternate conditions," that portray a range of potential future conditions, including potential fires of various severities and pre-fire suppression techniques to limit fire severity. Hydrological modeling of these alternate scenarios would then further help park staff in determining where and how pre-fire management could be done to mitigate post-fire runoff and erosion.

Value proposition: **Audience will learn how the geospatial hydrological model AGWA can be used in a wide range of protected areas to aid in fire-related management decisions.**

Keywords: **fire, watershed, hydrology**

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Using Next Generation Sequencing of Environmental DNA to Assess Fish Assemblages in Alaska

5051

Paper

In Alaska, because comprehensive fish sampling over large areas is cost-prohibitive, data on fish species richness and distribution in small lakes and rivers in remote national parks and wildlife refuges are scant. We are developing methods for the simultaneous identification of multiple fish species using environmental DNA (eDNA) extracted from water samples. Recent developments in classical genetic technologies (e.g., DNA barcoding) for the identification of species using eDNA offer powerful new methods for generating data regarding fish species richness or distribution. However, these approaches generally target a single species, and multiple-species detection is difficult and not cost-effective. Amplicon-based next-generation (NG) sequencing can overcome a number of these obstacles. Here we present the experimental approach and preliminary results from the application of NG-eDNA methods for detecting multiple fish species in water samples collected from streams and lakes in Wrangell-St. Elias National Park, Denali National Park and Bering Land Bridge National Preserve.

Value proposition: **This talk will introduce powerful new genetic techniques for the sight-unseen detection of multiple species using DNA extracted from environmental samples.**

Keywords: **DNA, fish, Alaska**

Lead author • session organizer • poster / demo / exhibit presenter:

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Greta Burkart, Arctic National Wildlife Refuge, U.S. Fish and Wildlife Service, 101 12th Avenue, Room 236, Fairbanks, Alaska 99701

Demolition for Preservation: The Memory of Marginalized Community at a Civil War Battlefield

5370

Poster

In the 1920s and 1930s, federal policies regarding both housing and preservation favored the picturesque and nostalgic over racial equality and quality of life. The Cemetery Community, once located on what is now Stones River National Battlefield, was formed during Reconstruction by veterans of the United States Colored Troops, their families, and local formerly enslaved people. In the 1920s, the United States War Department purchased large sections of the community's lands to commemorate the Battle of Stones River. For many years, community members and descendants resented the loss of their land and community. Today, Stones River National Battlefield administrators, through community outreach efforts, are working to preserve the memory of Cemetery and include it in the broader story of the Civil War and its cultural and economic impact on American history. "Demolition for Preservation" tells the story of dynamic interpretation through maps, photographs, primary documents, and interpretive text.

Value proposition: **Visitors will learn about one park's civic engagement efforts to broaden Civil War interpretation through local memory of a community demolished to enable battlefield preservation.**

Keywords: **Outreach, African-American, Battlefield**

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Reconciling Competing Visions in New Deal Parks: Balancing Natural Conservation, Historic Preservation, and Recreational Development

5090

Paper

The central question to my dissertation research is how park planners reconcile competing values of natural conservation, historic preservation, and recreational development. The balance of these assets—sometimes contentious, sometimes parallel--shapes how parks look, feel, and function. Their thought processes are reflective of American culture, and reveal how parks were believed to function in American society. The New Deal period is especially revealing as the National Park Service solidifies its role as a national agency, and institutionalizes the park "master plan." I have explored this issue on the park level through several case studies, including C&O Canal National Historical Park, Fort Frederick State Park, Stones River National Battlefield, and Catoctin Mountain Park, which contribute to my thesis that New Deal park planners struggled to reconcile these assets, thus greatly transforming the federal landscape. Parks continue to deal with these legacies today, especially as they move towards integrated resources management.

Value proposition: **Park managers moving towards integrated resource management will better understand past efforts to balance nature, history, and recreation in state and national parks.**

Keywords: **landscapes, history, planning**

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Names of additional authors / panelists / presenters (if any):

Monitoring the Effects of Climate Change using GIS in a Network of Northeastern Coastal Parks

5296

Poster

The Northeast Coastal and Barrier (NCBN) Inventory and Monitoring Network is charged with monitoring a core number of ecological "vital signs" at eight coastal parks from Virginia to Cape Cod. The collection and analysis of spatial data - be it for mapping the species composition and extent of salt marsh plant communities or performing complex 3D analyses of barrier island topography – is integral to this monitoring. Such coastal natural resources stand to be particularly impacted by the effects of climate change. For example, it is predicted that beach-dune ecosystems will be impacted by accelerated sea level rise and increased storm frequency and intensity, as will the extensive salt marsh and estuarine resources at these parks. The NCBN, in collaboration with other agencies, hopes to capture such climate change effects both at the park and regional scales, enabling it to provide sound scientific information and data to park resource managers.

Value proposition: **Viewers will learn how climate change impacts several ecosystems in northeastern coastal, as well as the use of geospatial technologies to better monitor these impacts.**

Keywords: **GIS,climate change,monitoring**

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Norbert Psuty, Rutgers University Institute of Marine and Coastal Sciences

Ecological Consequences of Increased Nitrogen Deposition in Three Northern Great Plains Grasslands

5266

Poster

Although there has been a substantial amount of research on the effects of increased N on communities and ecosystems, most studies add large and, relative to natural inputs, unrealistic amounts of N. This "two-point" approach, comparing control to high-N plots, provides little information about the levels of N inputs at which responses first occur. The overarching goal of this study was to identify response thresholds to N addition in Northern Great Plains grasslands that differed markedly in soil fertility. Over two years we assessed responses to increased N inputs (from 2.5 to 100 kg N/ha) in soils, leaf tissue, plant community composition, and aboveground net primary production (ANPP) in northern mixed prairie grasslands. These three sites encompassed the range of productivity found across the northern Great Plains and thus my results will enable us to better forecast both ecosystem and community responses to increased fertilization in this understudied region.

Value proposition: **Audience will learn about ecological effects on ecosystem components at three grassland sites which differ in soil fertility at Wind Cave and Badlands NP.**

Keywords: **nitrogen, deposition, effects**

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NPS Employee-Centered Organizations: Where to from Here?

5263

Day Capper

As 2016 approaches NPS needs strong voices and robust support to be successful in its second century. You are invited to join a "focus group" to help brainstorm the future directions for several organizations that are centered on National Park Service employees, including the Employees & Alumni Association (E&AA), Coalition of NPS Retirees, and Association of National Park Rangers (ANPR). This fast-paced, engaging session will ask for feedback about what is working in these organizations, test some new ideas on attendees, and ask for their ideas as to what people see and desire as the future for the organizations they belong to or might join. There will be an introduction overview on where things are and the coming opportunity to be an important element in the 2016 centennial celebration and thereafter.

Value proposition: **Attendees will have the chance to help chart the future of several organizations whose memberships are centered on NPS employees (active and/or retired).**

Keywords: **NPS employees**

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Doug Morris

Protecting Marine Spaces: global targets and changing approaches

5643

Paper

This paper provides a broad overview of the development of international commitments to marine biodiversity conservation, in particular, the Aichi Targets of the Convention on Biological Diversity. It begins with a summary of the international policy and legal frameworks which have encouraged the protection and management of living marine resources. Part 2 then provides a review of global MPAs, considering political and biogeographic patterns in coverage. Part 3 takes a detailed look at the Aichi Targets for protected areas coverage and considers how current coverage statistics are counted towards that target. Finally, Part 4 draws together these observations to consider future trends and needs for marine protection and the achievement of international targets. We highlight the need for wider debate on the uptake of international standards on protected areas so that all conservation areas are accurately categorised as MPAs before being counted in international analyses and global trends.

Value proposition: **The audience will gain a better understanding of global trends in marine protection: patterns in coverage, policy and the controversial considerations for achieving international targets.**

Keywords: **marine protected areas**

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Claire Fitzgerald

Identifying and Conserving Ecological Corridors for Gatineau Park (QC, Canada)

4993

Paper

This presentation will focus on the innovative model used to identify, characterize and prioritize twelve ecological corridors that connect the federal Gatineau Park to surrounding ecosystems. This regional project is nested within the Algonquin to Adirondacks landscape connectivity initiative in eastern North America, and has the potential to be exported to similar contexts. The project takes place in a complex jurisdictional environment, situated among six municipalities and two large cities, and across a provincial border. The implementation plan to conserve the corridors takes place over several years, and involves multiple strategies with private and public sector interests. The presentation will discuss the opportunities and challenges of the initiative, highlight lessons learned, and look to next steps. It will be relevant for academics interested in the methodology applied, as well as for land managers interested in pursuing a similar approach.

Value proposition: **Hear about an innovative regional model to identify ecological corridors for a federal park and lessons learned from the ongoing work to conserve them.**

Keywords: **ecological corridors, park**

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Preserving our Shared History: National Register of Historic Places Documentation in National Parks

5039

Poster

This poster will present a 5-year National Park Service project to identify and protect the nation's significant cultural resources by improving park units' National Register and National Historic Landmark documentation. It will explain the project's goals and provide examples of recently completed park documentation. National Register nominations are foundational documents important to park planning and management, central to interpretive and educational programs for visitors in person and online, and essential for compliance with provisions of the National Historic Preservation Act that protect historic and prehistoric properties. Many parks lack National Register documentation altogether or have documentation that does not reflect resources captured by boundary expansions, recent research, discoveries, or themes. This initiative is projected to add over 300 new or updated nominations and produce historical and cultural content for park websites, extending the NPS mission to audiences who cannot visit in person and inspiring resource stewardship beyond park boundaries.

Value proposition: **The audience will learn how the National Park System's significant cultural resources are being identified and protected by the updating of National Register documentation.**

Keywords: **NRHP, NPS**

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Communication and Yellowstone Winter Use: Designing and Implementing Strategic Communication Initiatives for Winter Use Planning

5411

Paper

This presentation will focus on the implementation of a strategic communication initiative to accompany the release of Yellowstone National Park's Draft Supplemental Environmental Impact Statement/Winter Use Plan. This targeted communication effort was undertaken to achieve several strategic goals, chief among which was to reframe the discourse surrounding oversnow vehicle management. During the process, the Park conducted detailed stakeholder analysis, developed a comprehensive messaging strategy including messages tailored to individual stakeholder groups, and employed a response strategy designed to address and neutralize values-based criticism. Through media content analysis, the Park was able to determine whether it was meeting its communication goals. This presentation will provide tangible suggestions for developing and employing a strategic communication initiative for controversial issues surrounding park management and for designing useful measures to evaluate the effectiveness of those initiatives.

Value proposition: **This presentation will provide tangible suggestions for developing and employing strategic communication initiatives for controversial management issues and evaluating the effectiveness of those initiatives.**

Keywords: **Yellowstone, WinterUse, Communication**

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Dr. Rebecca Weintraub, Director, Master of Communication Management, University of Southern California

Dan Wenk, Superintendent, Yellowstone National Park

The Interagency Visitor Use Management Council: Improving Visitor Use Management on Public Lands

5437

Poster

Five federal land management agencies— National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service, and U.S. Army Corps of Engineers—have recently charted an Interagency Visitor Use Management Council (IVUMC). The council's mission is to provide guidance on long-term visitor use management policies and to develop legally defensible and effective interagency implementation tools for visitor use management. Visitor use management is defined as the dynamic process of planning for and managing the characteristics of visitor use and the setting in which that use takes place. Interagency collaboration through the council is designed to increase awareness of and commitment to proactive, professional, and scientific visitor use management on public lands. Providing a consistent approach to visitor use management will better serve the public by creating seamless connections between federal lands.

Value proposition: **Learn about a newly formed collaborative interagency council working to help shape the future of visitor use management on public lands.**

Keywords: **visitor, interagency, use**

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Uncovering Best Practices in Interpretation in the U.S. National Park Service

5148

Panel Discussion

The session will review the results of three years of research supported by the National Education Council and the Center for Park Management on the role and practice of interpretation within the U.S. National Park Service (NPS). We'll present the results of surveys of NPS superintendents and interpretation and education supervisors regarding perceptions of the roles of interpretation and education, data needs, and best practices. We'll then share the results of research designed to isolate best practices in NPS interpretation. The results are based on literature review and an empirical study conducted at 24 NPS units with over 3,500 attendees of 376 live interpretive programs in the summer of 2011. The findings reveal the program characteristics that most consistently influence positive visitor outcomes, including satisfaction, visitor enjoyment and appreciation, and behavioral intentions. Implications for programming and training will be discussed.

Value proposition: **We'll discuss results of research isolating the characteristics of interpretative programs that most strongly influence visitor outcomes and associated implications for NPS programs and training.**

Keywords: **interpretation, education, evaluation**

Lead author • session organizer • poster / demo / exhibit presenter:

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Robert B. Powell, Clemson University
Michele Simmons, National Park Service
Becky Lacome, National Park Service

The Critical Determinants of Planning Process Outcomes

5245

Paper

Drawing upon the results of surveys with a representative sample of National Environmental Policy Act (NEPA) processes in the U.S. Forest Service (n = 489), this presentation discusses the primary drivers of planning process outcomes, including achievement of agency goals and NEPA mandates, process efficiency, public relations, team morale, and appeals and litigation. The surveys examined the role of science, leadership, interdisciplinary collaboration, public involvement techniques, and a number of other factors in predicting process outcomes. The most consistent predictors of more positive outcomes across contexts involved the empowerment of team leaders and the nature of intra-team collaboration. The findings also suggest the importance of genuine interaction with external stakeholders and of empowering team leaders and team members through enhancing elements of discretion, responsibility, clear role definition, collaborative interdisciplinary deliberation, and perceived self-efficacy. The results will be discussed in terms of their potential application to National Park Service planning processes.

Value proposition: **The study provides empirically-derived insights into the critical factors driving different outcomes of planning processes associated with the National Environmental Policy Act (NEPA).**

Keywords: **Planning, teams, policy**

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Assessing current and future effects of climate change on groundwater in Kaloko-Honokohau National Historical Park

5504

Poster

Kaloko-Honokohau National Historical Park was established in 1978 to preserve, interpret, and perpetuate traditional Native Hawaiian activities and culture. The Park's groundwater dependent resources such as anchialine pools and fishponds are vulnerable to the effects of decreased precipitation and increased temperature due to a changing climate. Changes in precipitation and temperature affect groundwater recharge and ultimately affect freshwater discharge to surface resources and submarine groundwater discharge to the near shore environment. We analyzed climate observation records within the Keauhou Aquifer System for evidence of statistically significant change. The results of the statistical analysis along with IPCC projections are being used in an analytical model to assess the current and future effect of climate change on recharge and groundwater salinity within the Keauhou Aquifer System.

Value proposition: Understand how climate is changing near Kaloko-Honokohau NHP and how observed or predicted climate changes can be used to assess the vulnerability of groundwater resources

Keywords: Climate change, groundwater

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Examining evidence for climate-mediated range contraction at multiple spatial resolutions

5601

Paper

The American pika (Ochotona princeps) has become a symbol of climate change impacts on alpine species diversity and is currently being evaluated for protection under the California Endangered Species Act. Because of an exceptionally high abundance of pika habitat at low elevations, Yosemite is a perfect laboratory for decoupling effects of habitat abundance and elevation on pika range limitations. I will present data on pika surveys conducted on multiple spatial scales in and around Yosemite National Park. Historic records and carbon dating of relict pika feces will be used to compare past and current occupancy patterns. Though all historic pika record locations in Yosemite are currently occupied by pikas, multiple low-elevation extirpations have been documented with the aide of relict pika feces.

Value proposition: I will discuss the current state of knowledge about climate-mediated decline in the American pika and report on surveys conducted in and around Yosemite.

Keywords: Climate, Pika, Yosemite

Lead author • session organizer • poster / demo / exhibit presenter:

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Ecological responses to an altered hydrologic regime downstream of Hetch Hetchy Reservoir, Yosemite National Park

5544

Paper

In Yosemite National Park, damming of the Tuolumne River behind Hetch Hetchy Reservoir has altered the natural river hydrograph, presumably impacting the downstream ecosystem. The objectives of this study were to (1) quantify the degree of hydrological alteration; (2) characterize current vegetation conditions and bird and bat assemblages downstream of the dam; (3) determine possible impacts from the altered flow regime; and (4) inform the timing, duration, and magnitude of water releases to maximize benefits to downstream ecosystems. We found that, although ecosystems downstream of the dam are surprisingly diverse, dam operations have reduced spring flooding, caused some wetlands to transition to upland-type plant communities, threatened the nests of some birds, and potentially reduced foraging opportunities for bats. Aligning water releases more closely with the natural hydrograph will improve wetland conditions; deter birds from nesting in the flood zone; and provide bats with increased foraging opportunities.

Value proposition: **Audience members will learn about an interdisciplinary study designed to provide specific management recommendations to improve the ecology downstream of a major reservoir in Yosemite.**

Keywords: **Birds, Riparian, Hydrology**

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Monica Buhler, Yosemite National Park

Jim Roche, Yosemite National Park

A Comparison of Four National Land Cover Data Sets for National Park Service Use

5453

Poster

Parks and protected areas may often hold detailed information about the land cover/vegetation within their boundaries but this information is seldom available in the same detail for areas surrounding these units. There are several national (in scope) data sets available representing land cover/land use that might be used by professionals for landscape scale applications that include these parks. Some (National Land Cover Data, NLCD) have been available for intervals since 1996. Others are a reflection of a particular timeframe. These data sets are built upon different classification systems that represent different levels of detail for describing land cover/land use. This poster will show examples and discuss the differences and the appropriate uses of each of these data sets.

Value proposition: **This poster will discuss the differences between NLCD, GAP, LandFire and LandScope data and the implications of using any of these for NPS applications.**

Keywords: **Land cover, vegetation**

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Vegetation Classification Tree of the Appalachian National Scenic Trail's Lower New England Ecoregion

5638

Poster

The Appalachian National Scenic Trail (APPA) traverses more than 2,175-miles, stretching through 14 eastern states and covering an amazing range for habitats and ecoregions, including the Lower New England (LNE) Ecoregion. To assist in the National Park Service Vegetation Inventory Program (NPSVIP) mapping of APPA, the Resource Mapping and Spatial Analysis Team (RMSAT) at the US Geological Survey (USGS) Upper Midwest Environmental Sciences Center (UMESC) has created a vegetation classification tree to provide a route to each of the 76 map classes along with key characteristics to help distinguish each map class from related map classes. The information used to create this tree were derived from the National Vegetation Classification System (NVCS) and natural community reports, existing field data, and six-weeks of field surveys conducted by UMESC and supporting ecological teams within the LNE ecoregion.

Value proposition: **Viewers will learn the system mappers use to discern 76 vegetation types in the LNE and how this can be applied to any mapping process.**

Keywords: **Mapping, Signature, Vegetation**

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Jennifer Dieck, Biologist, USGS,

Mapping and Classifying Vegetation Communities Concurrently: Can it be Done?

5162

Paper

This study evaluates the merits of mapping and classifying vegetation concurrently, by contrasting the results of a census-style, field-based mapping and classification process to the traditional approach where a randomized, sample-based classification phase precedes a separate field mapping and attribution effort. Clustering and ordination were used to develop National Vegetation Classification Alliance classes, from data collected at two U.S. national parks in Arizona, using two spatial scales of observation (0.1ha vs. >0.5 ha) and the same sampling methods. Results indicate that Alliances from field mapped units have high compositional similarity to and are supported by the plot data groupings. Plot data tended to over-classify samples due to higher variability in cover values and localized variance. Correlation between methods was greater in wooded types than in shrub dominated areas. Intuitively mapped communities provided a comparable classification at a mappable scale, while also providing great savings in effort over the traditional ap
proach.

Value proposition: **Hear how well this non-traditional method worked for us so others can apply it in their parks. Will give practical information on methods and results.**

Keywords: **Vegetation mapping; classification;**

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From data collection to management action in the blink of an eye: exotics go electronic.

5357

Poster

In an effort to dramatically decrease the time, costs and problems associated with data entry and data management of field collected data, the Southwest Network Collaboration (SWNC) data managers (From Southern Plains, Sonoran Desert and Chihuahuan Desert Networks) have implemented electronic data collection. Through an existing enterprise agreement with ESRI the move to electronic field data collection required only minimal expenditure beyond the necessary handheld GPS units. For the tri-network exotic plant early detection protocol, an ArcSDE geodatabase was built to house the data along with ArcPad applications and forms that mimic the field data entry work flow and ease the data entry process. By tailoring the applications and pick lists, transcription errors are eliminated and data completeness and accuracy are increased. Furthermore reporting the time-sensitive exotic plant data to park managers or EPMT's for rapid response is greatly automated allowing rapid data delivery of ~1-2 weeks from field work.

Value proposition: **Learn about electronic field data collection solution/applications using ArcPad and ArcSDE geodatabases: increased efficiency, decreased error, and automated reporting process.**

Keywords: **Electronic data entry**

Lead author • session organizer • poster / demo / exhibit presenter:

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Student Conservation Association

6666

Exhibit

Value proposition:

Keywords:

Lead author • session organizer • poster / demo / exhibit presenter:

Student Conservation

Names of additional authors / panelists / presenters (if any):

Interagency Wilderness Fellows: Post-Graduate Students Assess Wilderness Character

5114

Sharing Circle

Wilderness Fellows is a program that recruits highly talented recent graduates and graduate students to complete wilderness character assessments for wilderness units. The idea began in 2010 in NPS, was improved in FWS, and has expanded to USFS. This session will be led by agency leads of the 2012 program, wilderness fellows, project leaders from the refuges, parks, or forests involved, and the youth conservation partner. The sharing circle format provides an opportunity for informal and candid discussion about how the program works, what the benefits and challenges are for the site managers, first-hand experiences of wilderness fellows and how this program fits with their professional growth, hurdles and successes for interagency coordination, and future possibilities for this program. Participants can offer suggestions for future improvements, and take away information that may enable them to engage wilderness fellows or adapt the idea to other resource stewardship projects.

Value proposition: **Wilderness fellows have proven to be a highly cost-effective way to complete wilderness character assessments, provide fresh perspectives to managers, and cross agency lines.**

Keywords: **Wilderness, student, interagency**

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Who Will Care about Wilderness Tomorrow? Engaging Youth in Wilderness

5115

Day Capper

Who will care about wilderness tomorrow? See new videos produced by film students from American University presenting wilderness from their perspectives. Learn about teaching teachers to teach about wilderness. Experience the poetry, videos, and artwork inspired by the wilderness experiences of high school "Wilderness Ambassadors" at Great Sand Dunes National Park. Learn the results of pairing college student leaders with Big Brothers and Sisters in the Outdoor Explores Mentoring Program. Become deputized as a Wilderness Explorer Jr. Ranger with a new interagency activity book. Participate in an interactive activity led by a wilderness fellow. In this multi-media and participatory session, you will experience a variety of ways to engage youth in wilderness experiences and stewardship. The future of wilderness stewardship, and more broadly, resource stewardship and protected area management, is in the hands of future generations. We all must make an effort to forge connections between resources and today's youth.

Value proposition: **Relevance of wilderness to future generations is essential for the viability of the National Wilderness Preservation System. Be inspired by innovative approaches and outcomes.**

Keywords: **Wilderness, relevance, youth**

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Steve Archibald, Education and Outreach Specialist, Arthur Carhart National Wilderness Training Center
Kelly Pippins, Wilderness Fellow, U.S. Fish & Wildlife Service

Commemoration and Contestation: Archaeological Heritage Interpretation at the W.E.B. Du Bois Homesite

5108

Paper

Today, the former homeplace of William Edward Burghardt (W.E.B.) Du Bois is a National Historic Landmark administered by the University of Massachusetts Amherst, which assumed stewardship of the property in 1987 after more than seventy years of relative abandonment. Nondescript and overgrown, the space appears to be little more than a vacant parking lot and accompanying sign alongside Route 23 in Great Barrington, Massachusetts. Indeed, ongoing efforts to commemorate Du Bois and to interpret the archaeological heritage associated with his maternal family and longtime occupants of the Homesite, the Burghardts have been met with varying hostility, apathy, and acceptance. In this paper, I emphasize the centrality of issues of race, identity, and power to understanding the decades of attempts by various individuals, institutions, and communities to establish the Homesite as a space of collective remembrance and commemoration within Great Barrington's contested landscape.

Value proposition: I describe the ongoing efforts to interpret the archaeological heritage of a historic African American site and propose alternative methodologies for understanding contested spaces.

Keywords: DIASPORA, HERITAGE, COMMUNITY

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The Volunteer Experience: Total Immersion

5248

Sharing Circle

Volunteers have become a critical source of energy and manpower both nationally and globally. Participants in this sharing circle will have the opportunity to elaborate on personal experiences as a volunteer or volunteer coordinator while we address the question: "how can your experience inform park professionals?" We will discuss the opportunities, challenges, and best practices to growing volunteer networks and maintaining participation. I bring an unusual perspective to the traditional volunteer discussion through my participation in an immersive six-week program in South Africa volunteering as a seabird rehabilitator. I completed this program in coordination with my master's degree program and found it to be a time of great personal growth. The growth originated from my direct experience at the rehabilitation facility, from time spent with other volunteers outside of working hours, and from the completion of my research project. Park professionals can benefit from a similar immersive model.

Value proposition: **Will understand broad possibilities of the volunteer experience and discuss barriers, opportunities, and best practices to increasing volunteer engagement.**

Keywords: volunteer, immersion, growth

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The 50th Anniversary of the Wilderness Act: Inspiration for Celebration

5001

Sharing Circle

2014 marks the 50th anniversary of the Wilderness Act and the wilderness system it created. During this anniversary year, communities across America will celebrate through educational projects and events that raise awareness of wilderness benefits. Most of these efforts will be grassroots, formed through leadership by local coalitions. During this session, attendees will be introduced to national events, projects, and resources that support community events. Discussion will be facilitated by a wilderness advocate who has been integral in orchestrating local events for past anniversaries, and will focus on sharing stories and ideas about how different communities are planning to celebrate the 50th. Attend this session to share what's going on in your community or to learn become involved in planning your community's celebration.

Value proposition: **Through sharing and discussion, attendees will acquire ideas, contacts and resources for planning and participating in local 50th anniversary event planning in their communities.**

Keywords: **wilderness**

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Lisa Eidson, 50th Anniversary National Planning Team member

New applications for camera traps in U.S. national parks

5637

Paper

One of the challenges of natural resource management in national parks, especially in an era of limited resources, is setting priorities for wildlife conservation and management. Of all the species in a park, how do we know (in an economically efficient and unbiased way) which are most threatened and deserve our attention? Many parks are using camera traps (also called wildlife or trail cameras) to study wildlife, but there has been little attention to develop park-wide, regional, and national monitoring programs based on camera trap networks. However, new and emerging technologies, including development of standard procedures for international monitoring of rainforest mammals and birds, are making it possible for the first time to efficiently assess wildlife communities and populations. This talk will focus on new opportunities for parks to utilize camera traps, using data from a recent effort at Saguaro National Park and southern Arizona parks as an example.

Value proposition: **Attendees will learn about new applications for camera traps, with a special emphasis on how national parks can use this technology for effective long-term monitoring.**

Keywords: **wildlife, camera, monitoring**

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Using Internet Search Behavior to Measure Media Effects on National Parks

5287

Paper

We demonstrate how to use newly available search-engine tools to

quantify the effects of a television documentary on Internet search behavior for the national parks. We measure search behavior before, during, and after the broadcast dates. Metrics for one website with technical information about national parks indicate the documentary had a more enduring impact than search volumes alone suggest. Our study is also of practical importance for park managers in their mission to monitor and protect the public lands comprising "America's best idea." Our research suggests that park managers and administrators may: (1) profitably use internet search engines to assess news impacts on the general public; (2) wish to increase electronic links to related sites to activate more park program interest; and (3) increase park interest by increasing news items about the parks.

Value proposition: use search engines to assess park news impacts; increase electronic links to related sites to activate more park interest; increase interest by increasing news items.

Keywords: parks, Google, public

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Wilderness Act Compliance and Commercial Services: Extent Necessary Determinations and the Parks

5419

Panel Discussion

The Wilderness Act of 1964 includes a series of prohibitions related to particular activities:..."Commercial services may be performed within the wilderness areas designated by this Act to the extent necessary for activities which are proper for realizing the recreational or other wilderness purposes of the areas." Panel discussion will utilize a case study from SEKI to illustrate the policy, legal, and political issues surrounding the required assessment of whether any commercial services are necessary in the Wilderness area. And, if such services are deemed appropriate to the purposes of the Wilderness Act, how a further determination of the specific amount of such commercial services can be accomplished.

Value proposition: **Learn new techniques for large wilderness park planning and accomplishing the required extent necessary determination without an established agency policy or template.**

Keywords: **wilderness, commercial, legal**

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ClimateAnalyzer.org: A Portal for Accessing and Summarizing Climate Data

5337

Paper

Climate Data can be time consuming to obtain and it comes in a variety of formats that are often difficult to work with. Units of measure vary from one data source to another. Missing values are represented differently in different situations. Data quality flags, re-arranged columns and other idiosyncrasies make analysis with standard tools like excel or R problematic for the uninitiated. The web site www.ClimateAnalyzer.org , funded by 3 NPS I&M networks, provides a single location for accessing climate data from 5 different weather station types in standard graphical and tabular formats. The site is dynamic, receiving new data from SNOTEL, USGS, and NCDC every 24 hours. It uses Python to generate fresh graphs and tables with the new data whenever a user needs them. The site is available now online. The public can set up a similar site for their region using the free source code.

Value proposition: **Anyone interested in using climate data more efficient may use the web site as is or download source code to set up a custom site.**

Keywords: **climate data analysis**

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The Presidio of San Francisco: Opportunities and Challenges of a Public/Private National Park

5332

Paper

The Presidio is a relatively new public/private national park unit in San Francisco that after 15 years of diminishing federal funding is now financially self-sufficient. This business oriented experiment in national park management has presented both challenges and opportunities regarding how ecosystems projects are implemented. As a former US Army base the land was altered but rare remnants of natural San Francisco are left including endangered species, riparian, marsh, lake, dune and serpentine habitats. The Presidio Trust and NPS are now stitching the natural systems back together while keeping historic landscape values. Unique legislation has allowed for more administrative flexibilities than other national park units. This paper explores the salient facets of this atypical national park: the benefits and difficulties for ecological management; funding, contracting and hiring practices; the expense of urban ecosystem restoration; and visions of turning a fragmented land into a rich learning landscape.

Value proposition: **Benefit and difficulties your park may encounter in a public/private environment. Ecological lessons of attempts of restoration at urban serpentine, lake, and stream sites.**

Keywords: **public/private, restoration, urban**

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Diffusion of the TreadLightly! Education Program Among OHV Users

5253

Paper

Currently off-highway vehicle and 4X4 driving is one of the fastest growing outdoor recreational pursuits. With increasing off-road vehicle use, negative ecological and social impacts can ensue. In units where off-road driving occurs, the NPS uses the Tread Lightly! (TL!) educational program to promote driving practices that reduce impacts on the environment, improve safety, and build respect for others utilizing the area. We undertook the first study to investigate the efficacy of this program by surveying permitted off-road drivers from Big Cypress National Preserve and Canyonlands National Park. The results of the study indicate that the TL! message is relatively well diffused. Group sizes, motivations for participation, and other characteristics differed across the sites. Age, experience level, group size, and skill level influenced drivers' attitudes and intentions to follow TL! recommended behaviors. Implications of the results are discussed as well as the best mechanisms for distributing educational materials.

Value proposition: **They will learn about the diffusion of the TreadLightly! program among OHV users and its effectiveness to reduce environmental impacts and increase safety.**

Keywords: **OHVs, TreadLightly, Education**

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NPS Ocean Stewardship: Strengthening Our Community of Practice

4726

Affinity Meeting

This meeting will provide a forum for staff from the 85 ocean, coastal, and Great Lakes units of the National Park System, the six regions that contain these parks, and the Natural Resource Stewardship and Science Directorate to discuss common issues. The NPS Ocean and Coastal Resources Branch and Regional Ocean Coordinators will provide brief updates on ongoing efforts to address climate change, fisheries, water quality, National Ocean Policy, invasive species, marine debris, and other shared concerns. Park resource managers will have time to convey their needs to regional and national coordinators. This session will enhance coordination and technical assistance in coastal park research, management, and policy.

Value proposition: **Ocean and coastal parks are dispersed yet connected by threats to ecological integrity. Parks and programs will exchange ideas and approaches to meeting these challenges.**

Keywords: **oceans, coastal, coordination**

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A Review of Mapping Wilderness Character for National Park Wildernesses

5080

Paper

Recent development of methods to map wilderness character, applied to the Death Valley Wilderness, provide for the first time a spatially explicit understanding of wilderness character. Such a map can be used to identify areas in the wilderness which are vulnerable to impairment, track changes and trends over time, and evaluate how different planning alternatives will affect wilderness character. Further studies at four other parks are underway to refine the methods used to map wilderness character, and to evaluate whether this approach can be applied to a variety of wildernesses, large and small, urban approximate and remote. This presentation reviews the lessons learned about mapping wilderness character and discusses the suitability of this approach as a standardized tool for assessing whether stewardship actions for individual wilderness are fulfilling the mandate to ”preserve wilderness character.”

Value proposition: **Audience will gain an understanding of methods used to map wilderness character, and review case studies from various NPS wildernesses.**

Keywords: **Wilderness, monitoring**

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What We Know about Users of New Transit Systems in National Parks

5279

Paper

New transit systems have been introduced in a number of National Parks over the past 10 years. Examples of parks with new or expanded services include Zion, Acadia, Rocky Mountain, Glacier, and Cape Cod. Surveys have been conducted of riders of these and other transit systems serving National Parks. This paper will highlight the characteristics of visitors using park transit services, the factors influencing their use, and their perceptions of the service and how it adds or detracts from their visitor experience. The paper will highlight the use of this information for planning transit services at other National Parks and public lands, and enhancing existing systems.

Value proposition: **Audience members will learn why visitors use transit at National Parks, what they value from these systems, and possible improvements to better meet visitor needs.**

Keywords: **Transit users**

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Positive impacts of Ranger presence at a remote bear viewing site in Katmai National Park

5083

Poster

Geographic Harbor, in Katmai National Park, is a seasonal bear foraging area that attracts wildlife viewers and photographers. Due to park staffing limitations, rangers are only occasionally present in the area during the bear viewing season. Data on bear and human use, collected from 2007 to 2009 as part of a time-lapse photography project, was analysed to evaluate bear activity levels and spatial use patterns at different visitor levels. This data was then cross-referenced with ranger patrol records to evaluate the effectiveness of ranger presence at minimizing disturbance to bear foraging activities. Bear use decreased with increasing visitor use levels; however, an increase in bear use was observed when rangers were present in the area. Also, visitor distribution was more concentrated during times of ranger presence. This suggests that ranger presence may influence visitor use of Geographic Harbor which in turn minimizes impacts to foraging brown bears.

Value proposition: **By understanding the value of park staff presence at seasonal visitor use areas, managers will be better able to prioritize and justify backcountry staffing needs.**

Keywords: **wildlife viewing, bears**

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Monitoring Trail System Use in Parks

5067

Poster

Visitor use information in parks and other protected areas is critical for many decisions, including funding allocation, resource management, and maintenance. A common type of visitor use information is counts of people using different resources, such as exhibit areas, natural areas, trails or paths. This poster focuses on quantifying the levels of use on trail networks within parks. The poster will describe simplified sampling procedures that can be used to monitor and report total annual or monthly use on sampled trails systems within parks. The poster will also highlight different types of commercially-available automated equipment that can be used to count trail use on a permanent or short-term basis.

Value proposition: **This poster will outline best practices (simplified sampling procedures and automated equipment) for counting and monitoring people on trails and in other common park settings.**

Keywords: **monitoring, counts, use**

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Let's Meet Virtually: Results of Using Social Media for Public Involvement During NPS Planning

4861

Paper

A requirement for public involvement during the planning process combined with budgetary constraints and extreme travel challenges in Alaska makes it difficult to reach our stakeholders. In 2012 the regional planning team and staff at both Lake Clark National Park & Preserve and Bering Land Bridge National Preserve strived to maximize the opportunities for involving the public in the planning process. Beyond the mailed newsletter and onsite meetings, the team published a site specific planning link on the regional webpage, tracked visits and downloads of newsletters online, advertised and hosted virtual meetings utilizing Facebook and Twitter. Online data revealed the team reached a new public. Our willingness to try these innovative techniques opened the door to future communication about the planning and management of national parks. In Alaska, use of the web and social media helped to bridge the gap between time, distance, and cost of reaching stakeholders.

Value proposition: **The presentation will demonstrate how to prepare, advertise, and host a virtual meeting, strategies on collecting and analyzing data, and lessons learned during the process.**

Keywords: **Planning, Social Media**

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Commercial and Independent Visitors at Klondike Gold Rush National Historical Park: Differences between Visitor Groups

5131

Paper

Klondike Gold Rush National Historical Park (KLGO), is one of the most visited NPS units in Alaska. Given the small area that is accessible for day use in the Dyea unit, and high public demand to experience the area, visitor densities have the potential to be very high during peak periods, particularly with visitors on commercial tours. A research project began in 2009 to collect baseline data on visitor use, identify indicators and standards of quality for the visitor experience, and test the acceptability of management strategies to ensure that standards of quality are met. Visitors on commercial bicycle tours were contacted as they boarded transportation back to Skagway. These visitors completed the survey while being transported. Independent visitors were sampled on-site in Dyea and completed the survey before they left the area. Differences were found between these two visitor groups in motivations for visiting and attitudes toward management practices.

Value proposition: **Audience members will gain an understanding about how park visitors who arrive on commercial tours versus those who arrive on their own.**

Keywords: **Indicators, standards**

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Examining the effectiveness of thinning for restoring coastal redwood forests

5081

Poster

Thinning treatments to accelerate succession in second growth coastal redwood forest are in wide application, but the underlying assumptions of these treatments have not been rigorously examined. Perhaps most critically, it is not known what level of thinning is needed to achieve substantial growth responses. To help meet this need at Redwood National Park, we measured forest structure and growth at thinned and unthinned second growth forest stands, and compared these patterns to old growth forests, the restoration reference system. We found that thinning intensities used in the past were not sufficient to elicit meaningful growth improvements for overstory trees (stems >20 cm dbh). Directly modeling the influence of crowding on tree growth, we anticipate that more aggressive thinning prescriptions (e.g., 40% stand basal area removal) will result in significant growth increases. These findings will help determine optimal spacing and species composition to maximize redwood growth response.

Value proposition: **We demonstrate how our measurements and models of tree growth-competition relationships help to create more effective restoration treatments for second growth coastal redwood forests.**

Keywords: **competition, tree growth**

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Mapping Social Values for Ecosystem Services among Outdoor Recreationists at Channel Islands National Park

5133

Paper

Ecological and economic values of nature are increasingly used to define high priority areas for spatial planning and management of protected areas. However, "social values for ecosystem services" – defined as the relative perceived importance of qualities carried by an environment – are not often considered. There is a need to spatially operationalize these human dimensions of natural resources for more effective conservation. This study, using on-site survey data collected from visitors during June-August, 2012 (n=304; 96% response rate), illustrates the relationship between the relative importance of social values and spatially-defined biophysical characteristics of Channel Islands National Park. The high priority areas that were identified on the islands and within adjacent waters are discussed. This study holds relevance for environmental management that strives to identify places of conflicting value, improve the provision of opportunities for restorative experiences in nature, and prioritize decisions about biodiversity conservation and visitor experiences.

Value proposition: **Learn about areas of perceived importance and ecological value at Channel Islands National Park.**

Keywords: **Recreation, ecosystem services**

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Stephen Sutton, Fishing and Fisheries Research Centre, James Cook University

Supporting Experiential Learning in National Parks: Engaging with Fellows from the 2012 Park Break Program

5164

Sharing Circle

Engaging the next generation of park professionals is an increasingly important charge. The Park Break program – a collaborative effort supported by the U.S. Geological Survey, National Park Service, George Wright Society, and other agencies – addresses this challenge by educating and inspiring teams of graduate students in park-based field seminars. In this sharing circle, Fellows of the 2012 Park Break program will exchange ideas about how to optimize the Park Break experience with a focus on the instruction received from park resource managers, researchers, administrators, interpreters, and other professionals. Fellows will also share results from several on-site projects developed at the Delaware Water Gap and Boston Harbor Islands National Recreation Areas. This sharing circle will encourage dialogue about the utility of the Park Break program as a tool for recruiting and training the next generation of protected area managers.

Value proposition: **Learn about an experiential learning program that helps to connect the future generation with parks, protected areas and cultural sites.**

Keywords: **experiential learning**

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Cori Knudten, Department of History, University of California, Davis
Nicholas Rose, Department of Geography, Oklahoma State University

Capturing the multiple values of parks, protected areas and cultural sites

5651

Focus Session

This Focus Session will explore how to put (or not put) a value on natural and other protected area resources. Speakers will discuss various approaches to placing value on these resources including measures of economic impact / welfare analysis and non-material valuations. Presenters will describe the values that each of these approaches address, the advantages and disadvantages, as well as the associated benefits provided to protected area managers. Following these presentations, the panel will further explore these concepts with the audience. This session will complement the National Park Service Call to Action item #14 (Value Added) by defining the alternate valuation systems that can be used to illustrate the importance of parks and protected areas while aligning valuation research with the challenges faced by protected area managers.

Value proposition: **Attendees will learn about the different valuation systems that might be applied to natural and other protected area resources, including strengths, weaknesses, and applicability.**

Keywords: **values**

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John Loomis, Professor, Colorado State University: Confirmed
Kai Chan, Professor, University of British Columbia: Invited
Lynn Koontz, Economist, United States Geological Survey: Confirmed Alternate

Moderator:

Bruce Peacock, Social Science Division Chief, National Park Service: Confirmed

Forecasting Future Climate Impacts on Wildlife of the Arid Southwest

5188

Paper

Utilizing General Circulation Model downscaling, we will present results for 12 bird and reptile responses to Global Climate Change (GCC) in the southwestern US. Our modeling efforts focused on. refinement and testing of down-scaled GCM results and plant and animal population models; II. partner prioritization of wildlife management needs; and III. application of results from the first two modules to forecast the effects of climate change on targeted wildlife species. We will discuss how our Climate Change results were specifically tailored for application within arid southwestern US protected areas through workshops, surveys, and regular meetings of a partner advisory team consisting of public, state and federal wildlife managers. A user-friendly web site for downloading down-scaled GCM data, testing of GCM species models, and projections of future affects on wildlife of greatest concern for land managers will be discussed as one of the products that has been made available.

Value proposition: **Global Climate Change modeling of plant and animal species will demonstrate potential future affects on wildlife for land managers in the southwestern US.**

Keywords: **Global Climate change**

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Managing Hazard Trees around Backcountry Campsites in Rocky Mountain National Park Wilderness

5177

Poster

Rocky Mountain National Park is currently in the midst of a large scale native pine beetle infestation. Tree mortality throughout the park exceeds fifty percent of the total landscape and is predicted to continue through the coming years. Over half of the 250 designated backcountry campsites, all within designated wilderness, have been affected by one or more species of pine beetle since 2007. The result of this infestation has caused an annual and increasing loss of trees in backcountry campsites. Since 2007, a variety of hazard tree mitigation actions have occurred in and around campsites affected by the pine beetle including site closures, campsite relocation, creation of dispersed camping areas, and removing hazard trees. Conditions in and around campsites are monitored on an annual basis in order to determine the efficacy of these different management actions to preserve wilderness character and recreational opportunities.

Value proposition: **Audience will gain insights to consider the trade-offs of managing hazard trees in wilderness and providing for visitor safety.**

Keywords: **Beetle, Tree, Wilderness**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

David Pettebone, Rocky Mountain National Park, Wilderness Program Manager

Stewardship Behavior: Evaluating Great Smoky Mountains National Park's Junior Ranger Interpretive Program

5518

Paper

The authors explored the influence of the Junior Ranger interpretive program at Great Smoky Mountains National Park on youth participants' (ages 8-13) behavioral intentions and behaviors associated with stewardship immediately after and six months after attending the program. Through the use of a stewardship behavior scale, comprised of home, community, and in-park behaviors, the authors found that the Junior Ranger program had immediate, positive, and significant impacts. Longer-term positive effects were found pertaining to in-park stewardship behaviors while home and community behaviors returned to pre-visitation levels. The results suggest that the JR program has the potential to answer the National Park Service Director's "Call to Action" by providing a means of involving visitors in stewardship behaviors on site and inspiring home and community stewardship engagement.

Value proposition: **Want a new tool for evaluating behavioral outcomes from interpretation programs? Learn about the new stewardship behavior scale, comprised of home, community, and in-park behaviors,**

Keywords: **stewardship, interpretation, evaluation**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

R. B. Powell, Clemson University

M. J. Stern, Clemson University

Recreation and Tourism in Marine Protected Areas: Getting the Balance Right

5356

Café Conversation

Human uses of the ocean are expanding rapidly, often in ways not anticipated by prevailing management approaches. Along with growing commercial and energy activities, traditional (e.g. kayaking) and emerging (e.g. paddle boarding) uses are also exploding in many coastal areas. Many marine protected areas are becoming – for better or worse – destinations for recreational activities. How MPAs fare in the face of increased levels and types of human use will depend finding a balance between potential risks of overuse and the value of forging stronger ties between these special places and the people that use and depend upon them. This Café Conversation will explore this trend, share lessons learned, and frame management strategies for sustainable use in MPAs. Discussion topics will include: (i) understanding patterns, drivers and impacts of ocean uses; (ii) identifying compatible uses; (iii) facilitating travel and tourism to MPAs; and, (iv) conveying MPA messages to users.

Value proposition: **This Cafe Conservation is designed to help MPA practitioners anticipate, manage and benefit from the growing trend toward increased recreational uses of coastal areas.**

Keywords: **MPAs, recreation, uses**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Gary Davis, Principal, GEDavis and Associates

Management of Hyperabundant Wildlife Populations in Canada's National Parks: Lessons Learned

5352

Paper

The Parks Canada Agency developed a national policy for managing hyperabundant wildlife populations in Canadian national parks in 2007. These are wildlife populations whose sizes clearly exceed the upper range of natural variability that is characteristic of their ecosystems and are causing demonstrable adverse impacts on ecological integrity. They exist mainly in parks where human activities have interfered with natural ecosystems and ecological processes that have historically regulated wildlife populations. Such populations have been identified in nearly a quarter of national parks, and include the moose in Gros Morne NP and the cormorant in Point Pelee NP. Some populations of some large herbivores also pose significant threats to public safety, mainly due to collisions with motorists. (CONT'D IN SPEC INST)

Value proposition: **Provides an opportunity to share scientific and societal processes and complexities involved in the restoration of ecological integrity in NPs through management of hyperabundant populations**

Keywords: **Hyperpopulations, parks, restoration**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

none

LiDAR a Cure-All? No Matter your Management Objective, All You Need is LiDAR

5543

Paper

LiDAR datasets contain an enormous amount of information. Its size is matched only by the breadth of research applications and management objectives that a single LiDAR dataset can address. This presentation will discuss the LiDAR acquired for Mammoth Cave National Park and derived products (to date). Different algorithms were deployed depending on the intent of the management objective. Natural Resources wanted to expand their polygon vegetation dataset, creating a 3-D vegetation map. Fire Management wanted to quantify the fuel loading across the park; therefore a baseline fuels map was developed. Cultural Resources wanted to identify areas with potential historic anthropogenic remnants; therefore an extensive Digital Elevation Model (DEM) was developed. When one dataset was discussed and developed more and more questions of the data were asked. Tools, models, and algorithms exist, facilitating one LiDAR dataset to meet multiple management objectives.

Value proposition: **See how LiDAR data acquired at Mammoth Cave led to the development of numerous baseline datasets, benefiting the entire park not just one project.**

Keywords: **Remote Sensing**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Justin M. Shedd, Research Associate, Center for Earth Observation, College of Natural Resources, North Carolina State University.
Hugh Devine, Chair, Graduate GIS Program, North Carolina State University.

Moving beyond categories of heritage management in New Zealand and Australian parks

5106

Paper

Parks in New Zealand and Australia have traditionally taken a segmented approach to managing natural, historic and indigenous heritage, with each value being located under different sections of park management plans. Yet the changes that are being set in motion by indigenous political mobilization and cultural redress, such as New Zealand's Treaty of Waitangi Settlement process, is making visible how this kind of categorized management approach is increasingly problematic. This paper argues that a more integrated approach is needed and suggests that the concept of 'cultural landscapes' stands out as an attractive means of dismantling the different categories of heritage being used in park management across New Zealand and Australia. The discussion will touch on how cultural landscapes might be a way of creating a window between 'indigenous' and 'settler' heritage constructs and thereby shifting the focus towards a broader and more meaningful concern with the whole-worldly experience of parks.

Value proposition: **Cultural landscape is a concept that all nations with settler cultures might find useful in negotiating the changing shape of our twenty-first century world.**

Keywords: **cultural landscapes, heritage**

Lead author • session organizer • poster / demo / exhibit presenter:
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Names of additional authors / panelists / presenters (if any):

New Directions in Interpretation

5682

Focus Session

The landscape occupied by the 21st-century learner has changed dramatically in the past decade. The National Park Service (NPS) launched its first park website in mid-1990s. Since then, annual visitation has exploded to 94 million. Added to the mix are a range of social media platforms, mobile applications, and distance and online learning. The enormous educational opportunities created by technological advances are amplified by the recognition that formal education is just one piece of the learning puzzle and that informal education or "free-choice learning" is equally important.

The 21st-century learner has changed as well. Information processing, communication, and problem-solving skills are integral. Collaboration, cooperative learning, and self-direction shape the learning experience. Learners are looking for personalized experiences driven by their interests, and learning can occur at any time and in any place. The learner takes these experiences and attaches them to their educational infrastructure while creating their own understanding. The 21st-century learner is also used to contributing to their learning experience. This type of engagement will become even more prevalent as a generation brought up with

Value proposition: **Participants will gain a better understanding of the needs of the 21st-century learner and will begin to develop the skills to meet those needs.**

Keywords: **education, technology, interpretation**

Lead author • session organizer • poster / demo / exhibit presenter:

Julia Washburn Associate Director for Interpretation and Education

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Names of additional authors / panelists / presenters (if any):

Milton Chen, Edutopia - The George Lucas Educational Foundation

Keith Krueger, Consortium for School Networking

Allison Druin, University of Maryland

Kevin Clark, George Mason University

Courtney Allen, NPS/Colorado State University

Theresa Coble, Stephen F. Austin State University

National Park Service CESU/RLC Joint Meeting

5024

Business Meeting

National Park Service Research Learning Center staff, Cooperative Ecosystem Studies Unit coordinators, and other invited participants will have strategic conversations about collaborative approaches to supporting the mission of the NPS.

Value proposition: **Participants will generate ideas for greater collaboration between RLCs and CESUs**

Keywords: **CESU, RLC**

Lead author • session organizer • poster / demo / exhibit presenter:

Tim Watkins Science & Education Coordinator

National Park Service tim_watkins@nps.gov

Names of additional authors / panelists / presenters (if any):

Film Festival and Discussion: Young People Helping NPS Respond to Climate Change

5058

Day Capper

NPS's annual George Melendez Wright Climate Change Youth Initiative sponsors young adults to work on climate change issues in national parks. Students who receive graduate fellowships conduct their own independent research. Students who are hired into internships complete a variety of projects designed by park staff. This session will feature at least 10 interns and fellows who worked in research, resource stewardship, communication, interpretation and education, and mitigation in 2012. These young people will each present a brief home-made video that tells a story about their experience, describe their work in the context of their educational and professional goals, and discuss how their experience has shaped their ideas about climate change and the national parks they are inheriting. A facilitated conversation after the films will allow presenters and audience members to learn from each other across the generations, linking experience with fresh perspectives on parks, climate change, and the future.

Value proposition: **Experience the creativity, insight, and energy brought by young people to complex climate change problems in parks and learn how to benefit from the program.**

Keywords: **Film, Youth, Climate**

Lead author • session organizer • poster / demo / exhibit presenter:

Tim Watkins Science & Education Coordinator

National Park Service -- Climate Change Response Program tim_watkins@nps.gov

Names of additional authors / panelists / presenters (if any):

National Park Service Research Learning Centers Business Meeting

5277

Business Meeting

Business meeting for RLC-associated staff.

Value proposition: RLC staff will have the rare chance to meet in person and discuss common interests and needs

Keywords: RLC

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Restoring Meadows and River Processes through Removal of Abandoned Infrastructure

5225

Paper

The floodplains of Yosemite Valley support relatively rare mid-elevation Sierran habitats - historically characterized by interconnected wet meadows, riparian forests, oak woodlands, and sparse conifer stands. Due to fire suppression, changes in cultural practices and substantial infrastructure development, the natural systems of Yosemite Valley have changed. Roads, utilities, culverts, and ditches can alter surface and groundwater hydrology, fragmenting floodplain connectivity. Historically, when infrastructure was upgraded or replaced, the existing features were left and continued to impact ecosystem processes. Over the last twenty years, Yosemite staff have worked to remove abandoned infrastructure, and to restore meadow and river processes by removing fill dirt, ditches and utility lines that effectively serve as drains. While vegetation changes are not only attributable to infrastructure, every reduction in fragmentation restores some floodplain connectivity. For this work, we have developed effective techniques to restore hydrology and native plant communities while minimizing impacts to these fragile systems.

Value proposition: **When infrastructure is replaced or upgraded, abandoned features are commonly left but continue to impact ecosystem function and needs to be removed for habitat restoration.**

Keywords: **restoration, floodplain, infrastructure**

Lead author • session organizer • poster / demo / exhibit presenter:

Judi Weaser Branch Chief of Vegetation and Ecological Restoration, Resources

Yosemite National Park judi_weaser@nps.gov

Names of additional authors / panelists / presenters (if any):

The International Ranger Federation supports Protected Area Workers throughout the World

5483

Poster

The International Ranger Federation links more than 55 ranger associations representing countries and states around the world. It supports field level staff at parks and protected areas by fostering professional development, organizing training sessions, developing standards, supporting rangers in danger, and hosting World Ranger Congresses every 3 years. The next WRC will be in Estes Park, CO in 2016, and will be part of the 100th Anniversary celebration of the NPS. Supporters and sponsors are needed. See internationalrangers.org for more information.

Value proposition: **They will learn about an organization with affliates in more than 50 countries that supports the on-the-ground protectors of wildlife and parks.**

Keywords: **parks, rangers, international**

Lead author • session organizer • poster / demo / exhibit presenter:

Meg Weesner Executive Committee Member

International Ranger Federation mweesner@att.net

Names of additional authors / panelists / presenters (if any):

Monitoring techniques for springs on the Colorado Plateau

5161

Poster

The Northern Colorado Plateau Network Inventory and Monitoring program is charged with developing statistically robust long-term monitoring datasets to provide national park managers with information on key park ecosystems. On the semi-arid Colorado Plateau, springs were selected as an important ecosystem for their rarity, biodiversity and endemism, and their potential sensitivity to climate change. Monitoring Colorado Plateau springs is challenging because of variation between sites and the fragility of certain spring types, particularly the hanging gardens unique to the Plateau. Pilot testing methods for their suitability in the field and their ability to detect statistical trends is part of developing a robust monitoring program. We present pilot data and power analyses used to develop the Northern Colorado Plateau Network springs monitoring sampling design for hydrologic and vegetation variables.

Value proposition: **Learn application of techniques for monitoring and statistical evaluation of monitoring sampling designs.**

Keywords: springs, monitoring

Lead author • session organizer • poster / demo / exhibit presenter:

Rebecca Weissinger Ecologist

Northern Colorado Plateau Network I&M rebecca_weissinger@nps.gov

Names of additional authors / panelists / presenters (if any):

Carolyn Hackbarth, Northern Colorado Plateau Network, National Park Service

Living with Fire: How Climate Change is Resetting Our Ecosystems

5650

Focus Session

Climate is one of the fundamental drivers of wildfire. Hotter, drier conditions tend to produce more extensive and frequent fires due to drier fuels and reduced precipitation and stream flow. As climate continues to warm over the 21st century, climate models project longer fire seasons and more large fires, which may transform forested ecosystems in the western U.S. However, there is significant regional variability in how these processes play out. What are the most appropriate and effective management actions for coping with fire in a changing climate? Are large-scale changes in forest cover inevitable with rising temperatures in the West? The session will accomplish four objectives: 1) establish the basic connection and regional variations between climate change and fire in the West, 2) present an example from the Southern Sierra Nevada of the application of science to the adaptation of wildfire management under climate change, 3) explore the applicability of these approaches to other regions in the West, and 4) identify practices and policies that can be implemented in the near term for managing fire in forested ecosystems under a changing climate.

Value proposition: **The audience will be challenged to rethink practices and policies for fire management under climate change. There will be several follow-on concurrent sessions..**

Keywords: **climate change, fire**

Lead author • session organizer • poster / demo / exhibit presenter:

Leigh Welling Chief, Climate Change Response Prorgam

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Names of additional authors / panelists / presenters (if any):

Anthony Westerling, University of California, Merced

Patrick Gonzalez, National Park Service

Respondents: two or three regional or park fire managers

Nature's Notebook: Tracking Phenology for Research, Management and Education in the Face of Climate Change

5103

Workshop

This workshop will introduce participants to the programs and products of Nature's Notebook, a national-scale observation program designed to increase our understanding of climate change and environmental variation on the phenology of natural ecological systems, and to inform climate-smart adaptation. We will introduce participants to a variety of supporting tools available to engage scientists, managers, students, and the public in phenological studies and monitoring programs that will contribute to and utilize the new national database for phenology. In addition, we will describe, demonstrate, and discuss opportunities to integrate phenology, ecology, and climate change research into classrooms and citizen science programs. We will introduce resources, methods, and case studies; the workshop will culminate in breakout group discussions to address specific questions. Participants will leave the workshop with tools and techniques, appropriate for a wide variety of protected areas, that they can bring to their own science, management, or education programs.

Value proposition: **Learn how to implement phenology monitoring for science, education and/or decision-making on your protected area using an off-the-shelf, broadly-tested, national-scale program**

Keywords: **adaptation, monitoring, engagement**

Lead author • session organizer • poster / demo / exhibit presenter:

Jake Weltzin Ecologist

USGS jweltzin@usgs.gov

Names of additional authors / panelists / presenters (if any):

Other workshop leaders will include members of the staff of the USA National Phenology Network.

The effects of sea level rise on the federal candidate Chromolaena frustrata, Everglades National Park

5355

Poster

Everglades National Park includes unique plant communities and rare plant species that will be impacted by increased salinity from sea level rise. Developing and prioritizing effective conservation strategies requires that land managers understand how individual species and the plant communities they occupy will respond to predicted environmental changes. However, little information is available for most species. This study begins to address this issue by assessing which life history stages of the rare coastal herb, Cape Sable thoroughwort (Chromolaena frustrata) are vulnerable to increasing salinity levels. Results indicate that increased soil salinity inhibits seedling germination and establishment in this species, but does not appear to diminish survival or growth rates of adult plants. Conservation strategies that include population augmentation or reintroduction efforts need to include a contingency for failure resulting from the inability of seeds to germinate or become established in high salinity environments even if viable adult populations are present.

Value proposition: **This poster demonstrates a real world example of the impacts of sea level rise on coastal rare plant species and the need for conservation actions.**

Keywords: **Rare plants, conservation**

Lead author • session organizer • poster / demo / exhibit presenter:

Kristie Wendelberger PhD Candidate

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Names of additional authors / panelists / presenters (if any):

Jimi Sadle, Everglades National Park

Dr. Sonali Saha, Institute for Regional Conservation

Dr. Jennifer H. Richards, Florida International University

Marine Protected Areas: Tools for Conserving Our Seascapes

5656

Focus Session

Like landscapes, seascapes are large, multiple use areas. Recently, they have been defined more specifically as areas in which government authorities, private organizations and other stakeholders cooperate to conserve the diversity and abundance of marine life and promote human well-being. Seascapes provide a useful framework for bringing together diverse stakeholders interested in many uses to discuss and plan for ocean areas that can accommodate multiple uses as well as the long term conservation of ecosystem functions and services over the long-term. Marine protected areas are key element within seascapes for protecting coastal and ocean resources. This session will look at how MPAs can be used within the context of larger seascapes to achieve these objectives.

Value proposition: TBD

Keywords: marine protected areas

Lead author • session organizer • poster / demo / exhibit presenter:
Lauren Wenzel Acting Director
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Names of additional authors / panelists / presenters (if any):

Challenges and Opportunities in Conserving Seascapes (Speaker: Ashton Jones, Conservation International - invited)

• What are seascapes?

• How the marine environment is different than the terrestrial

• Institutional opportunities and challenges for seascape conservation

• How conservation challenges are different.

Management options for protecting seascapes (Speaker: Cliff McCreedy, NPS)

Landscape Conservation - The Role of National Park Advocates

5646

Paper

In recent years views on how national park resources should be managed and protected have undergone a remarkable transformation, from an inward focus to one that recognizes the inextricable ecological connection between parks and their surrounding landscapes. This transformation is reflected in a continuum of seminal reports and initiatives, including 2008's National Parks Second Century Commission, 2009's Landscape Conservation Cooperatives, 2010's America's Great Outdoors, 2011's NPS Call to Action, and 2012's Revisiting Leopold. As NPS and other lands agencies transform how they do conservation, so must the NGOs that support them. This session/discussion will explore national park advocates role in landscape conservation, using specific examples of on the ground work (Crown of the Continent, California Desert), major ecosystem restoration initiatives, and policy advocacy. The goal of the session/discussion is to foster understanding of what is being done, and what NGOs should be doing going forward to support landscape conservation.

Value proposition: **This session/discussion will foster understanding and discussion of what's being done by NGOs, and what needs to be done, to support landscape conservation.**

Keywords: **landscape, conservation, parks**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Jim Stratton, Senior Director, Alaska and Northwest Regions, National Parks Conservation Association

Jim Nations, Vice President, Center for Park Research, National Parks Conservation Assocation

David Lamfrom, Calfironia Desert Field Representative, National Parks Conservation Association

Michael Jamison, Crown of the Continent Program Manager, National Parks Conservation Association

Conserving the Agricultural Heritage of Canada's National Capital Greenbelt

5238

Paper

In the 1960s, the Canadian Government set aside farmland and natural areas on the southern edge of Ottawa, creating what is known today as the National Capital Greenbelt. It so hoped to constitute a reserve of green space in proximity to the city and a boundary for urban sprawl. Encompassing 79 square miles of forests, wetlands and fields, as well as 60 operating farms, this area is valued today as a symbol of Canada's rural landscape, within easy reach for Ottawa's residents and visitors. Yet in spite of its public ownership, the agricultural heritage of the Greenbelt is subject to many of the same trends and threats as agricultural heritage throughout Canada. Over past years, the National Capital Commission, the agency responsible for the Greenbelt, has developed strategies and tools for managing this cultural landscape, some of which offer insight on solutions for the conservation of similar agricultural landscapes.

Value proposition: **The Greenbelt is a useful microcosm for understanding trends affecting Canada's agricultural heritage, as well as a valuable laboratory to develop conservation strategies for it.**

Keywords: **agricultural heritage, tools**

Lead author • session organizer • poster / demo / exhibit presenter:

Ève Wertheimer PhD Student

Canada Research Chair on Built Heritage, University of Montreal evewertheimer@yahoo.ca

Names of additional authors / panelists / presenters (if any):

Digital Preservation: Preserving and Sharing the World's Greatest Treasures Using 21st Century Technology

5513

Panel Discussion

Long-standing partnership between the National Park Service and CyArk, a 501c3 non-profit organization with the mission of digitally preserving cultural heritage sites through collecting, archiving and providing open access to data created by laser scanning, digital modeling, and other state-of-the-art technologies, has resulted in digital models of some of the world's most significant cultural heritage sites. More than a dozen national park sites have been scanned and are accessible worldwide virtually. Apps, web sites, tools, toys and educational products are now available on-line, giving access to millions of visitors and preservation supporters worldwide. Current NPS icons now accessible include: San Antonio Missions NHS (a World Heritage Site nominee), Mt. Rushmore, and the Manzanar NHS. Western National Parks Association (WNPA) and other NPS cooperators are developing new ways to enhance visitation, virtual visitation, and visitors experience beyond traditional publications and in-park retail transactions.

Value proposition: **Attendees will gain insight into new techniques for preserving nationally significant cultural heritage sites using laser scanning. Technology and practical application will be discussed.**

Keywords: **Digital Preservation, scanning**

Lead author • session organizer • poster / demo / exhibit presenter:

John Wessels Regional Director - Intermountain Region, National Park Service

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Names of additional authors / panelists / presenters (if any):

Chris Lehnertz, Regional Director, Pacific West Region, National Park Service
Mike Reynolds, Regional Director, Midwest Region, National Park Service
John Wessels, Regional Director, Intermountain Region, National Park Service
James E. Cook, Executive Director, Western National Parks Association
Elizabeth Lee, Director of Operations, CyArk

Periphyton sampling, the last frontier in the Big Cypress National Preserve.

5282

Paper

We are exploring the use of periphyton: a community of algae, cyanobacteria, and invertebrates, to monitor water-quality impacts to Big Cypress National Preserve. Periphyton responds to changes in environmental conditions and has been used as an early-warning indicator for Everglades restoration. In this project, we have implemented monitoring in the northwest portion of Big Cypress National Preserve to explore the associations with higher nutrient surface waters. Periphyton samples have been collected annually over the last four years in impacted and unimpacted hydrological basins within the preserve. We explored variation in algal assemblages in two habitat types and investigated spatial patterns and temporal resilience of diatom communities in impacted and unimpacted basins. Results indicate a strong association between diatom community structure and water quality. Periphyton diatom community structure appears to be a good indicator because it integrates successional responses to changes in water quality.

Value proposition: **Diatom communities in wetlands are a good indicator of water quality impacts and can provide actionable information to resource managers.**

Keywords: **Periphyton, water-quality, indicator**

Lead author • session organizer • poster / demo / exhibit presenter:

Kevin R. T. Whelan Community Ecologist

South Florida/Caribbean Inventory and Monitoring Network, National Park Kevin_R_Whelan@nps.gov

Names of additional authors / panelists / presenters (if any):

Raul Urgelles, South Florida/Caribbean Inventory and Monitoring Network, National Park Service.

Imperiled Promise: Continuing the Discussion on the State of History in the National Park Service

5555

Panel Discussion

What is the state of history in the National Park Service one year after the Organization of American Historians released Imperiled Promise: The State of History in the National Park Service? This session continues a reflective conversation between leaders in NPS history and the report authors that began in the August 2012 issue of The George Wright Forum. Panelists will describe new initiatives, programs, and pilot projects that address the report's major findings, especially a pronounced "divide" between history and interpretation. Panelists also will address the need to improve communication between scholars and practitioners, provide better training for historical interpretation, create a history workforce for the future, increase support for research and professional growth among NPS staff, craft partnerships and adopt technologies that advance research and interpretation, become better stewards of the agency's history, incorporate park histories into interpretive and management plans, and expand the NPS approach to civic engagement.

Value proposition: **The audience will learn about and discuss current issues and new directions in the NPS history and interpretation divisions.**

Keywords: **history, interpretation, policy**

Lead author • session organizer • poster / demo / exhibit presenter:

Anne Whisnant Deputy Secretary of the Faculty/Adjunct Associate Professor of History

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Names of additional authors / panelists / presenters (if any):

Stephanie Toothman, Associate Director, Cultural Resources, National Park Service
Julia Washburn, Associate Director for Interpretation and Education, National Park Service
Anne Mitchell Whisnant, Deputy Secretary of the Faculty/Adjunct Associate Professor of History, University of North Carolina at Chapel Hill
Don Stevens, Midwest Regional Historian, National Park Service
Susan Trail, Superintendent, Antietam National Battlefield, National Park Service
Rolf Diamant, National Park Service, Retired [Confirmed, as moderator]

Cyberinfrastructure for Connection the Parks Community

5482

Workshop

The Open Parks Grid is a web portal to one of the top five super computers at a university. This portal has been designed to unite the distributed parks community through a collection of tools. These include a repository of newly digitized data, GIS resources and services, funding initiatives, and mechanisms to connect nationally and globally in a secure way to work in large and small groups to solve problems that connect the parks community across many jurisdictions. The current partners for this project are the National Park Service and the World Bank Global Tiger initiative. The workshop will be designed to incorporate participants feedback into the development of this newly deployed tool after five years of development into a collective coordinated mechanism for stewardship.

Value proposition: **Introduction to the Open Parks Grid, and use of tools of the web portal, with specific examples of how to use the grid capabilities.**

Keywords: **Cyberinfrastructure, sharing knowledge**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Chris Vinson, Clemson Libraries, Clemson University
Scott Hammel, Clemson Computing and Information Technology, Clemson University
Betty Baldwin, Parks and Conservation Area Management, Clemson University

Stewardship across a "Lightshed" through Citizen Science

5546

Poster

Those charged with conserving natural lightscapes have looked to the concept of watersheds to model their stewardship efforts. In concert with the 2012 BioBlitz at Rocky Mountain National Park, the NPS and community partners orchestrated a citizen science project to help understand and support that park's "Lightshed." The Little Thompson Observatory and the NPS Natural Sounds & Night Skies Division developed a methodology for using inexpensive Unihedron Sky Quality Meters™ to survey the region. Transects were taken across Colorado Front Range cities that impact the park's night sky and who's citizens enjoy the nearby national park. The advantages and limitations of such an effort are examined, and results from the survey presented.

Value proposition: See the results of a citizen science survey of light pollution

Keywords: lightscape, citizen science

Lead author • session organizer • poster / demo / exhibit presenter:

Jeremy White Physical Scientist

National Park Service chad_moore@nps.gov

Names of additional authors / panelists / presenters (if any):

Dr. Andrea Schweitzer

Daniel Greenidge

Protecting forest biodiversity: Understanding climate change refugia for management

5316

Poster

A substantial portion of Sierra Nevada floristic biodiversity occurs in various refugia. Cold-refugia (refugia) form at the intersection of relatively mesic areas and cold-air pools in basins and drainages from valleys up to mid-slope and north-facing slopes. Here, many species exist at the southern extent of their ranges and do not exist outside of these refugia at this latitude. Climate change's predicted increased warmth and amplified disturbances may cause local extirpation of some refugia species. Concomitantly, these regions may become climatic refugia for other species which are currently common in the region but may become rare and/or restricted to refugia with climate changes. Refugia not only have distinct communities, but they may also exhibit distinct ecological processes from surrounding areas, such as fire frequency or severity. I present a preliminary spatial analysis of cold-air pools with fire extent and severity. This study enhances land managers' ability to protect refugia biodiversity.

Value proposition: **This study creates a framework for managers to mitigate climate change's impacts on biodiversity by focusing on climate refugia and their distinct ecology.**

Keywords: **refugia, fire, climate-change**

Lead author • session organizer • poster / demo / exhibit presenter:

Kate Wilkin PhD Student and 2012 National Park Service George Melendez Wright

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Names of additional authors / panelists / presenters (if any):

Dr. Scott Stephens: Department of Environmental Science, Policy, & Management at University of California, Berkeley

Dr. Maggi Kelly: Department of Environmental Science, Policy, & Management at University of California, Berkeley

Dr. Alison Colwell: Yosemite National Park

Reaching across cultures: comparing local community perceptions toward national parks in Colorado and Tanzania

5498

Paper

Parks and protected areas around the world are beginning to realize the importance of practicing collaborative conservation with various stakeholders, especially people living near their borders. Focusing on human interactions with the environment is crucial for finding effective solutions for environmental issues. Conducting comparisons of collaborative research may enable different communities to learn from each other's experiences.

I used open-ended interviews and photovoice to learn about the attitudes and perceptions of local communities toward Great Sand Dunes National Park in the San Luis Valley of Colorado. I also assisted fellow graduate student, Gloria Sumay, with similar research that used the same methods with villagers living near Tarangire National Park in Tanzania. I worked with fellow graduate student, Gloria Sumay, to compare responses from both communities in an effort to explore what researchers and various stakeholders can learn from conducting cross-cultural comparisons of collaborative conservation research.

Value proposition: **The cross-cultural comparison will highlight how national parks can begin to learn from collaborative conservation strategies employed in other parts of the world.**

Keywords: collaborative conservation

Lead author • session organizer • poster / demo / exhibit presenter:

Kate Wilkins Graduate Student

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Gloria Sumay received her Master's in Ecology at Colorado State University. She currently works for the Tanzanian park service working on human interactions with wildlife.

Application of the VERP Planning Framework at Pinnacles National Monument: Development of Indicators and Standards

5091

Poster

Pinnacles National Monument draws a growing number of visitors for day hiking and to observe its resident California Condors, wildflowers, and unique cave formations. Application of the National Park Service's Visitor Experience and Resource Protection (VERP) Framework was supported by conducting a visitor survey in 2012 (N = 393). This survey used attitudinal questions, photo simulations and normative approaches to 1) refine and validate indicators for the visitor experience, and 2) gather data to help formulate standards for crowding at main attraction sites, hiking encounters, waiting times for parking, and waiting times to enter caves. Additional data were collected to assess the monument's experiential carrying capacity by comparing standards against reported conditions. Results indicate that conditions experienced by visitors are on average better than their reported standards and that very few people are displaced by current use conditions. Implications for visitor use management and monitoring of future conditions are presented.

Value proposition: **Results from a 2012 visitor survey in (Pinnacles) show that very few people are displaced currently and conditions on average are better than reported standard**

Keywords: **Pinnacles, VERP, carrying**

Lead author • session organizer • poster / demo / exhibit presenter:

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Climate Change Scenario Planning Lessons from Alaska

5145

Paper

Climate change scenario planning exercises have now been implemented for every national park, preserve and monument in the Alaska Region, two-thirds of the total area of the National Park System. Although these areas are experiencing visible and measurable changes attributable to climate, workshop participants sometimes differed about reasons and implications. Working through multiple scenarios enabled the participants to set aside predetermined beliefs, to create and explore hypotheses about the future based on the best available science and the participants' own knowledge and experience. Through five workshops, hundreds of potential effects, implications, and recommended management actions were identified for natural and cultural resources; facilities and infrastructure; social, economics, community and subsistence; communications, interpretation and education; research and information needs. Concerns and recommendations that were common across large geographic areas will be presented, along with examples of others that were location specific.

Value proposition: **We will share experiences, observations, and lessons learned through five workshops over three years, focused on climate change across all of Alaska's national parks.**

Keywords: **Climate, Alaska, Scenario**

Lead author • session organizer • poster / demo / exhibit presenter:

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How Artists Influence Decisions about Protected Areas

5146

Paper

Artists have influenced the decisions for most of national parks, refuges and wilderness areas in the US, including nearly all in Alaska. Their artwork is now a crucial component of our heritage. People experience wild and historic places in different ways. Many people who care deeply about wildlife, culture, science and history may never visit these parks in person. Art can provide people with a rich park experience wherever they may be, without which many might never appreciate the diversity of special places that are preserved as parks. Art helps people to appreciate our heritage and to understand that such places must still be protected for our children and grandchildren to experience the wonder and excitement of knowing them. Partnerships with and among artists working in parks provide rich opportunities for people to experience and learn about parks today, and expand the heritage for future generations to share.

Value proposition: **A quick overview of artists' influences on the US national parks, refuges, and wilderness areas inside and outside of Alaska.**

Keywords: **Art, culture, history**

Lead author • session organizer • poster / demo / exhibit presenter:

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Intensity Thresholds: Do They Have a Future with NPS?

5573

Panel Discussion

Both impact intensity thresholds and significance levels have been used in National Park Service (NPS) National Environmental Policy Act (NEPA) documents since 2001. In some instances, courts have rejected their application and directed the NPS to develop additional NEPA analyses. To strengthen their NEPA documents, NPS has been developing different approaches to impact analysis and determinations of significance levels. Panelists will describe the current process for developing intensity thresholds as well as the new directions NPS is currently considering for impact analysis. Attendees will be given the opportunity to debate the pros and cons of intensity thresholds and consider new approaches to define impact intensity and significance.

Value proposition: **Panelists will provide insight about the strengths and weaknesses of NPS intensity thresholds as well as the rationale for considering alternative approaches to impact analysis.**

Keywords: **threshold, impact, NEPA**

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NPS Environmental Quality Division (EQD)

2-3 other consultants with significant NPS NEPA experience

Integrating vegetation, hydrology, and geomorphology data in northern Colorado Plateau wadeable streams

5202

Poster

The Northern Colorado Plateau Network (NCPN) of the National Park Service monitors vegetation, hydrology, and geomorphology at wadeable streams in four parks on the Colorado Plateau. Riparian systems face a number of anthropogenic threats, including stream-flow damming or diversion, channel-stabilization structures, invasive exotic species, livestock grazing, and groundwater pumping. These disturbances can alter watershed conditions and directly or indirectly influence downstream riparian ecosystems. Developing credible, efficient monitoring approaches will help in assessing riparian-system health and provide early warning of system degradation. Monitoring was initiated in 2008, and NCPN will begin to look for trends after 5 full years of data collection.

Value proposition: **Others, especially other I&M networks, will learn how we are integrating and analyzing our riparian data, which will facilitate discussion for future analyses.**

Keywords: **riparian, monitoring**

Lead author • session organizer • poster / demo / exhibit presenter:

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Post and Share if You "Like" Science: The Utility of Social Media for I&M Networks

5480

Paper

Use of social media by national park units is growing by the day, but participation by NPS inventory & monitoring networks has been limited thus far. Social media presents I&M networks with a clear opportunity to improve daily communications, expand our reach, and bring the network to park staff and the general public, rather than relying on them to come to us. Based on the experiences of two I&M networks with more than 700 combined Facebook followers, this paper will explain the benefits of I&M use of social media (Facebook, Flickr, and YouTube), provide ideas about how to craft a social media plan that addresses strategic communications goals tailored to the needs of I&M networks, identify challenges networks face with social media, and share advice about how to make sites effective, fun, informative, and legal while avoiding pitfalls and trouble.

Value proposition: **Members will learn why and how to improve daily communications with park staff and the public by incorporating social media into I&M communications.**

Keywords: **SocialMedia, I&M, communication**

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Connecting People with Nature

5579

Panel Discussion

Concerns have been expressed that people are increasingly being disconnected from nature; a situation that calls for urgent action at all levels. PAs can be used as strategic avenues for connecting people with nature due to the great range of values and benefits they provide to diverse communities, partners and stakeholders from local to global levels. Besides being cornerstone of biodiversity conservation and sustainable tourism, PAs also protect critical components of the planetary life support systems that are central to human well-being, including those that enhance food security and human health. Connecting people to PAs in particular, and to nature in general calls for enhanced collaborations with traditional and non-traditional partners, and finding creative ways of inspiring broad-based awareness, support, and engagement. The panellists will address these issues as well as strategies for establishing guidelines, targets and measurable outcomes for achieving this goal; and mechanisms to share best practices.

Value proposition: **Discussions on strategies for connecting people with nature using NP and PA programs, drawing from the values and benefits they provide to the global community.**

Keywords: **People, nature, PAs**

Lead author • session organizer • poster / demo / exhibit presenter:

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Jon Jarvis, Director, US National Park Service
Luis Fuego, President, CONANP (Comisión Nacional de Áreas Naturales Protegidas, Mexico)
Ernesto Enkerlin Hoeflich, Chair, IUCN World Commission on Protected Areas

Putting Natural Solutions for Climate Change to Work in North American Parks

5700

Focus Session

North American parks and other protected areas have important roles to play in helping ecosystems, species and human communities adapt to and mitigate climate change. These roles include conserving biodiversity and other ecosystem services, connecting landscapes so species can adapt to changing conditions, providing natural laboratories for research, and inspiring new generations of stewards. The session will provide an overview of the IUCN concept of Natural Solutions and case study examples of how that concept is being applied in North American parks and protected areas. A panel of agency heads for national parks in Canada, U.S. and Mexico will address how their organizations are working together to capture and promote best practices from these examples at national and international levels. The audience will be encouraged to participate in a discussion with the panel about how to foster a system of parks and protected areas in North America for protecting, connecting, and restoring ecosystems to benefit ecological and human communities.

Value proposition: **The audience will be introduced to the concept of natural solutions to climate change and the role North American parks and protected areas can play.**

Keywords: **climate change, adaptation**

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Jon Jarvis, National Park Service, U.S.

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Luis Fueyo MacDonald, National Commission for Natural Protected Areas, Mexico

Taking Action on Climate Change in the National Park Service

5517

Exhibit

The NPS Climate Change Response Program (CCRP) provides information, guidance, and tools to NPS parks and programs to respond to the varied challenges of climate change. This exhibit articulates the key climate change messages of the NPS and highlights major resource challenges and opportunities for action Servicewide. It is an opportunity for attendees to interact with CCRP staff and learn about the steps that the NPS has taken to provide the best available science, policy, and planning tools to adapt resource management and communicate climate change to both NPS staff and the public. The exhibit will introduce the recently completed NPS Climate Change Action Plan, which articulates high priority actions that the NPS is undertaking in the next 1-2 years. The exhibit will also highlight key projects and tools designed to inform decision-making, and guidance on how attendees can become involved to most benefit their specific needs.

Value proposition: **Learn about the official climate change messages of the NPS, how parks and programs are responding to the challenge, and how attendees can become involved.**

Keywords: **climate, change, program**

Lead author • session organizer • poster / demo / exhibit presenter:

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Facilitating Knowledge Exchange about Wildland Fire Science

5506

Poster

The Joint Fire Science Program's (JFSP) Knowledge Exchange Consortia Network is actively working to accelerate the awareness, understanding, and adoption of wildland fire science information by federal, tribal, state, local and private stakeholders within ecologically similar regions. Our network of

14 regional consortia provides timely, accurate, and regionally relevant science-based information to assist with fire management challenges. Regional activities include online newsletters & announcements, social media, regionally-focused web-based clearinghouses of relevant science, field trips & demonstration sites, workshops & conferences, webinars & online training, and syntheses & fact sheets. This poster provides an introduction to and map of the regional consortia.

Value proposition: **Poster viewers will become familiar with the fire science consortia network as a resource and be able to identify the consortium that serves their area.**

Keywords: fire science

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Why Do Parks Have Friends? A Statistical Analysis of "Friends of Groups" and National Parks

5612

Paper

Approximately half of the National Parks have Cooperative Agreements (CAs) or recognized relationships with "Friends of" Groups (FOGs). Why do these relationships exist in some parks but not others? Why do some parks have CAs and others FOGs? What are the characteristics of the parks and communities surrounding them that lead to these relationships? Do these relationships indicate a larger dynamic at play such as efforts to enhance local control in parks? We use a logit analysis to model the relationship between parks and FOGs/CAs to address these questions. Variables examined include: characteristics of parks (including size, age, visitor characteristics, visit characteristic, FTEs, park type – e.g., historic vs. scenic, etc.) and characteristics of the surrounding community (including demographics, "ruralness", retired population, political characteristics, etc.). Results will help us understand the relationship between parks and their FOGs, as well as how and why communities choose to interact with National Parks.

Value proposition: **A sophisticated statistical analysis allows insights beyond individual case studies into what drives the relationships between "Friends of Groups" and individual NPS units.**

Keywords: **FOGs, CAs, statistics**

Lead author • session organizer • poster / demo / exhibit presenter:

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Effects of environmental concern and visitor motivation on place attachment among outdoor recreationists

5622

Paper

Research into the connections formed between people and places (i.e., "place attachment") lends insight into the importance of protected natural settings in human society. However, less is known about the factors that contribute to these connections. This study examines the effects of environmental worldviews and the perceived benefits of recreational experiences on place attachment. Using data collected in an on-site survey of visitors to Hinchinbrook Island National Park, Australia (n = 219), we test the theoretical proposition that place attachment is driven by a number of factors, including more stable underpinning beliefs about the natural world. Findings suggest that the development of attachment to parks and protected areas is causally anteceded by environmental concerns and motivations to engage in outdoor recreation. This research identifies ways that managers can more effectively increase the perceived importance of protected areas among outdoor recreationists at Hinchinbrook Island National Park.

Value proposition: **Understanding the connections between people and protected natural areas and learn about factors contributing this relationship in the context of the National Park.**

Keywords: **place attachment, values**

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Gerard T. Kyle (Texas A&M University)

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Cooperative Ecosystem Studies Units Network

4721

Exhibit

The Cooperative Ecosystem Studies Units (CESU) Network is a national consortium of federal agencies, tribes, academic institutions, state and local governments, nongovernmental conservation organizations, and other partners working together to support informed public trust resource stewardship. The CESU Network includes more than 300 partners, including 13 federal agencies, in seventeen CESUs representing biogeographic regions encompassing all 50 states and U.S. territories. The CESU Network is well positioned as a platform to support research, technical assistance, education and capacity building that is responsive to long-standing and contemporary science and resource management priorities.

Value proposition: **This exhibit will demonstrate the value of the CESU Network—highlighting projects and providing information to existing and future partners in tribes, federal bureaus, and academia.**

Keywords: **partnerships**

Lead author • session organizer • poster / demo / exhibit presenter:

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Streamlining Park Resource Information for the Public and Park Staff at Yellowstone

5491

Poster

Yellowstone National Park created the "Resources and Issues" (R&I) handbook in the mid-80s to help new interpreters quickly learn about the park's resources, current issues, and park areas. The handbook is updated annually and available to the public in park bookstores and on the park's website. The 2012 edition was 200 pages long and addresses most park resources in varying degrees of depth and answers frequently asked questions. The R&I handbook is updated annually, but the park's website, which includes more than 10,000 web pages, and some site bulletins covering similar topics are not always as frequently updated. The task of updating the same information presented in different media is time consuming and Yellowstone seeks to improve this process. By allowing the R&I handbook be the source for the other forms of media as appropriate, updates will be more frequent and facts will be consistent among different park media.

Value proposition: **Parks with large volumes of online and print publications will be interested in Yellowstone's effort to seek an efficient process to update information annually.**

Keywords: **Publications, design, current-information**

Lead author • session organizer • poster / demo / exhibit presenter:

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Janine Waller, Yellowstone National Park

Increasing public awareness and safety in Pacific West parks with illegal marijuana cultivation

5580

Poster

Illegal marijuana cultivation on public land is a threat to public safety and the environment, and impacts the National Park Service's ability to conduct research, monitoring, and restoration. Though the issue is widespread in the Pacific West, public awareness about the issue and its impacts is not high. This project will develop tools and strategies for three parks (Whiskeytown, Sequoia and Kings Canyon, and Yosemite) to effectively communicate the damage to public land and threats to visitor and staff safety caused by this cultivation. Primary audiences are the public, partner agencies, congressional staff, and gateway communities. This project will support the Reclamation and Restoration Best Management Practices developed by the Pacific West Region's multi-disciplinary marijuana work group. Products will be created with the support of an interdisciplinary team including interpreters, resource managers, and law enforcement officers, and will build on an Intra-Regional Communication Plan developed through the Student Conservation Association.

Value proposition: **The communication strategies and products from this project may assist protected areas and private landowners and support public safety regarding this complex and sensitive topic.**

Keywords: **Illegal-marijuana-cultivation, communication-tools, sensitive-and-complex-topics**

Lead author • session organizer • poster / demo / exhibit presenter:

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Cultural Resources in Wilderness: Successful, Balanced Management

5000

Panel Discussion

Managing cultural resources within wilderness continues to be a topic of concern for public lands agencies and the public. This interagency panel will present current agency policy for managing various cultural resources within wilderness and highlights of recent successful projects. Representatives from the National Park Service, U.S. Forest Service, and Bureau of Land Management will discuss and compare agency policy and innovative projects, as well as recent guidance on the role of cultural resources in wilderness character. Presentations are followed by a Q and A session. The goal and intent of this session is to enhance understanding and communication on this topic, clear up current misconceptions and misunderstandings, and share examples of how the spirit and law of both the 1964 Wilderness Act and the 1966 National Historic Preservation Act can be fulfilled in the balanced management of cultural resources in wilderness.

Value proposition: **Successful tactics for co-managing cultural resources in wilderness from NPS, BLM, and USFS, and new developments in applying cultural resources to wilderness character are featured.**

Keywords: **cultural resources, wilderness**

Lead author • session organizer • poster / demo / exhibit presenter:

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Chris Barns
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Laura Kirn

Moving Forward on Coastal Climate Change: From Research Needs to Adaptation Strategies

5318

Invited Papers Session

This session will focus on the issue of climate change adaptation within the coastal national parks and surrounding areas. Speakers will share their personal experiences trying to identify areas of vulnerability and what steps they have taken to aid adaptation to climate change in coastal parks. Climate change impacts include increased sea level, storm surges, and changes in storm intensity. The presenters represent a wide range of disciplines ranging from NPS managers to partners in academia. This session is intended as an opportunity for greater communication between scientists and policy makers and to encourage collaboration between the NPS and partners. There will be an introduction, five presentations consisting of 20 minutes (15 minute presentation and 5 minutes Q&A) per speaker and time for follow up questions.

Value proposition: **Learn what coastal NPS managers and partners are doing to identify vulnerabilities and develop adaptation strategies for issues including sea level rise and storm surge.**

Keywords: **climate adaptation, coastal**

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IRMA: The Tool to Find, Share, and Manage Your Park's Natural and Cultural Resource Information

5293

Invited Papers Session

IRMA is a practical, web-based, state-of-the-art system for data and document discovery, retrieval, and sharing that allows multiple data systems to be linked. The DOI selected IRMA as their "signature initiative" in 2012 for improved customer service and delivery of science products. IRMA has a growing Data Store that now includes tens of of thousands of documents and data sets, and it also encompasses NPSpecies (park species information), visitor use statistics; and more. This session brings together a range of IRMA users and showcases the benefits of this increasingly integrated information system.

Value proposition: **IRMA (Integrated Resource Management Applications) – learn how parks, programs, and USFWS refuges successfully use this web-based system to manage natural and cultural resource information.**

Keywords: **data, information, resources**

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Cave Resources of the National Park Service: From Archeology to White Nose Syndrome Assessment

5542

Invited Papers Session

There are 35 parks in the National Park Service whose responsibility it is preserve and protect cave resources. Caves are among the last areas on earth to undergo exploration and recent research has revealed a host of new information about cave resources beyond the interesting geological features the public associates with caves. Some of these discoveries include new cave-adapted species, impacts of surface activities on caves, complexity of water systems on cave hydrology, microorganisms and their role in the creation of cave features, paleontology and archeological sites. The range of resources and their interconnectivity pose challenges for resource managers. This session of invited papers will assist resource managers in identifying the variety of resources found in caves, and in turn help parks to develop management priorities to minimize impacts from visitation and surface activities for preservation and protection of fragile cave resources.

Value proposition: **Participants will gain understanding of the complexity and diversity of the fragile resources found in caves, leading to better preservation and protection of cave resources.**

Keywords: **caves, resource management**

Lead author • session organizer • poster / demo / exhibit presenter:

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"Enjoy the View": Call to Action #38- Part 1

5397

Invited Papers Session

Park visitors typically rank scenic views in the top five reasons for visiting a park. Inspiring vistas can lift the human spirit, expand our sense of place, and provide connections to the natural world and our history as a country. Clean, clear air is critical to the appreciation of scenic views, to human health, and the health of ecosystems. However, encroaching development can dramatically alter views beyond our boundaries and most parks experience some level of air pollution that can degrade scenic views and impact natural resources.

This session highlights the state of visual resource and air quality protection in the NPS by presenting several case studies of successful viewshed partnerships and improving air quality. Programmatic methods for addressing scenery and air quality issues will also be addressed as will the specifics of how parks can become involved in Call to Action # 38: Enjoy the View.

Value proposition: **The new Call to Action item: "Enjoy the View" will explore how protecting viewsheds and air quality are interrelated and achievable goals for the NPS.**

Keywords: **Viewshed, Scenery, Air**

Lead author • session organizer • poster / demo / exhibit presenter:

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This is proposed as a a two part session. My colleague Melanie Ransmeier (303-969-2315, melanie_ransmeier@nps.gov) will be chairing part II if these are accepted.

Public Participation in Scientific Research (PPSR): Themes and Status of the Discipline

5412

Invited Papers Session

Citizen science, or Public Participation in Scientific Research (PPSR), is a rapidly growing and maturing discipline. PPSR projects can be effective tools for protected area managers to achieve multiple goals including: engaging the public, increasing scientific literacy, conducting research and increasing research capacity, engaging new audiences, and growing the next generation of stewards. With the growth of PPSR as a discipline has come greater understanding of the benefits, pitfalls, and best practices. This session will present overviews of PPSR as a field (including its history and current status), highlight key considerations in the design and implementation of PPSR projects, and provide a snapshot of what research is telling us about participatory science. Attendees will learn about the principles of PPSR and after this session will be better able to implement PPSR projects.

Value proposition: **Attendees will receive the latest information on tools, research findings, strategies and best practices for designing and implementing PPSR projects in their own parks/reserves.**

Keywords: **Public, Participation, Research**

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Deep-time Perspectives and Understanding Change on Public Lands

5499

Invited Papers Session

Archeology on public lands is commonly conducted in the context of legal requirements for other projects; such projects are limited in scale to impact areas, and resulting information is often of little use toward addressing "big picture" questions. Consequently, archeological information is seldom integrated into other programs. However, decades of archeological projects have accumulated large datasets; combining these with other types of existing data allows for powerful analyses. Multidisciplinary studies are of great use to natural and cultural resource management, facilities and planning, and interpretation. This session highlights projects across the central United States that incorporate new and existing (archeological and other) data to better understand the evolution of landscapes, land use, and, ultimately, how best to plan for the future on public lands. This session includes a brief introduction to the session (5 minutes), four papers (25 minutes each), and time for Q&A (15 minutes).

Value proposition: **Session will present examples of multidisciplinary archeological research that inform on landscape-level behaviors, highlighting how these studies benefit multiple park programs.**

Keywords: climate, landscapes, archeology

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Disturbed Lands: Restoration Progress on Paper and on the Ground

5459

Invited Papers Session

Restoration of human-disturbed resources and systems is a fundamental component of the NPS mission, and is an affirmative obligation under NPS policy. Restoration projects take place along beaches affected by navigation channels, areas affected by roads and logging, abandoned mine sites, wetland areas drained by farmers, and others. Restoration is an intrinsic component of the Call to Action and Leopold Revisited reports, both of which recognize the need to address stressors, protect resources, and enhance visitor connections to parks in safe and educational ways. This session would inform the audience about programmatic-level progress in restoration of abandoned mine sites, and about park-specific restoration projects, illustrating that collaboration, transparency, peer review, and information- and workload-sharing among various NPS offices and with other stakeholders is the best way for the NPS restoration program to succeed. Six presenters will each speak for 12 minutes, each followed by 6 minutes of Q&A.

Value proposition: **Presentations about restoration milestones (release of AML report, efforts to resolve a longstanding internal NPS dispute, and three park projects) will enhance NPS restoration efforts.**

Keywords: **disturbed, restoration, AML**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Landscape Conservation Design (Part I): Recent Partnership Efforts to Design Sustainable Landscapes

5171

Invited Papers Session

Conservation organizations, federal/state agencies, and researchers have produced a variety of "landscape-scale" planning processes and tools over the past two decades yet the diversity and intensity of environmental and human-induced stressors have continued to challenge the conservation community to establish new partnerships and methods for collectively assessing the current environmental condition, describing potential future scenarios, and designing sustainable landscapes in a systematic and transparent manner. Many such efforts recognize the benefits derived from expert opinion and empirical data associated with specific conservation features combined with clearly defined objectives, vulnerability assessments, modeling, and spatially-explicit resource information. This session will review five recent partnership efforts – four project-specific presentations and one technical tool assessment – which will be used as a foundation for an informal "cafe conversation" with conference participants (see Landscape Conservation Design (Part II)). Each speaker will be allotted up to 20-minutes including Q&A.

Value proposition: **Audience members will be introduced to the topic of landscape conservation design using a variety of on-the-ground, partnership-driven case studies from across the country.**

Keywords: **Landscape, Planning, Partnerships**

Lead author • session organizer • poster / demo / exhibit presenter:

Rob Campellone Landscape Conservation Design Coordinator

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Names of additional authors / panelists / presenters (if any):

N/A

People and Protected Areas on the Cusp of the Anthropocene

5594

Invited Papers Session

Humans have inhabited and interacted with earth systems for at least 3 million years, with the last 150,000 years dominated by anatomically-modern forms. During that time, humans have progressively improved their overall population numbers and survival capabilities. Human influence has radically transformed certain ecosystems and humans now dominate many regional ecosystems, as well as the overall biosphere through potentially radical climatic change. The archeological markers for many of these events provides a set of lessons that may both show the trajectory of humans on the earth and how that trajectory might be changed. These lessons should be applicable to subject matters as diverse as agricultural practices, social stability and resilience, and the modern concept of wilderness.

Value proposition: **Session attendees will have archeological examples of the progressive intensification of human-environment interactions and better discernment of the future of these interactions.**

Keywords: **Anthropocene, archeology, collapse**

Lead author • session organizer • poster / demo / exhibit presenter:

Brinnen Carter Cultural Resource Manager

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Names of additional authors / panelists / presenters (if any):

Keeping it Wild in the NPS: Integrating Wilderness Character in Park Planning

5168

Invited Papers Session

The National Park Service (NPS) has recently released Keeping it Wild in the National Parks: A User Guide to Integrating Wilderness Character into Park Planning, Management and Monitoring, which will be incorporated as guidance into Reference Manual 41. This session will address integration of wilderness character into various types and aspects of planning, including Park Foundations, Resource Stewardship Strategies, Wild and Scenic River Management Plans, and wilderness impact analysis. While the focus is on NPS efforts, the approaches are broadly applicable to planners and wilderness managers from any agency as we all seek to fulfill our respective agency missions and the ideals of the Wilderness Act. These 20 minute presentations include an introduction, followed by five topical presentations on integrating wilderness character into specific types of planning efforts.

Value proposition: **Attendees will gain increased understanding of new NPS guidance regarding preservation of wilderness character to better prepare for meaningful engagement in planning efforts involving wilderness.**

Keywords: **wilderness character, planning**

Lead author • session organizer • poster / demo / exhibit presenter:

Sandee Dingman Natural Resource Specialist

Lake Mead NRA and NPS Wilderness Character Integration Team sandee_dingman@nps.gov

Names of additional authors / panelists / presenters (if any):

More High Fives, Fewer Headaches: Examples of Collaboration in Wilderness Management

5330

Invited Papers Session

Wilderness encompasses an array of interdisciplinary dimensions that can prove both critical and complex. The 1964 Wilderness Act mandates the preservation of wilderness character, requiring all management actions in designated wilderness - like those related to wildland fire, air quality and smoke management, and science monitoring - to uphold these characteristics. The five presentations in this session will highlight one of the above topics in the context of wilderness management, thereby featuring some of the complexities of wilderness management that are best addressed, and most sustainably resolved, through collaboration and the prioritization of co-management principles. Each presentation is 15 minutes long, followed by a five minute audience Q&A (for each presentation). At the completion of all five presentations, the presenters and audience will be encouraged to consider the meta-implications of this session through discussion related to wilderness management that spans all of these examples (20 minutes – facilitated by organizer).

Value proposition: **Audience will learn about wilderness management complexities that were resolved through intentional interdisciplinary collaboration and new integration concepts for wilderness preservation in park planning**

Keywords: **wilderness, science, fire**

Lead author • session organizer • poster / demo / exhibit presenter:

Erin Drake Wilderness Communications Specialist

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Names of additional authors / panelists / presenters (if any):

Monitoring to Management—and Back

5735

Invited Papers Session

While monitoring is acknowledged as a critical component of strategic resource conservation, particularly in a time of rapid environmental change, the methods for effectively getting monitoring data before managers and the public are still a work in progress. This session looks at the spectrum of applied monitoring, from invaisve species to absent apex predators, to aspects of wilderness. We will finish with a discussion to include audience insights turning data into information.

Value proposition: **Monitoring with scientifically-reviewed protocols is recognized as a critical component of natural resource management in the 21st century.**

Keywords: **Management, Analysis,**

Lead author • session organizer • poster / demo / exhibit presenter:

Peter Dratch Lead Biologist

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Names of additional authors / panelists / presenters (if any):

Jana Newman, US Fish and Wildlife Service

Information and Tools to Support Smoke Management

5319

Invited Papers Session

Smoke and its impacts on our visitors, park resources and our employees is of increasing importance as wildifres become more common and larger and the need for prescribed fire to lessen fuel loading goes up. This session will provide technical information on the emissions from fires, the representation of smoke dispersion and transport through air quality modeling, show how this information can be used in improved decision-making process for fire managers. In addition, how these tools will improve communication with NPS visitors and nearby communities as to the impacts of wildfire or prescribed fire.

Value proposition: **Understanding the effects of wildfire and prescribed fire smoke on park resources, NPS employees and the public should improve fire management decisions and communications**

Keywords: **Wildland Fire, Smoke**

Lead author • session organizer • poster / demo / exhibit presenter:

Mark Fitch Smoke Management Specialist

National Park Service mark_fitch@nps.gov

Names of additional authors / panelists / presenters (if any):

Mapping of Acoustic Resources and Noise

5139

Invited Papers Session

Two approaches to predicting acoustical conditions in parks will be discussed. One takes measurements of noise radiated by each source, accounts for the decrease in noise intensity with distance, and can drape predictions of received noise levels across park landscapes. The second builds upon correlations between geospatial resource measures and an extensive archive of sound level monitoring to develop a predictive tool for ambient sound levels (with and without anthropogenic noise). Collectively, these methods provide opportunities to evaluate the acoustical consequences of park management alternatives without requiring additional acoustical monitoring. Noise is one of the most pervasive and fastest growing pollutants; this session offers tools for authoritative and balanced impact assessment. 15 minute talks, with 5 minute Q&A, and a 20 minute discussion session at the end.

Value proposition: **The audience will learn about the latest methods for predicting acoustic resource conditions and noise exposures using computer models.**

Keywords: **soundscape, noise, GIS**

Lead author • session organizer • poster / demo / exhibit presenter:

Kurt Fristrup Branch Chief, Science and Engineering, Natural Sounds and Night Skies

National Park Service kurt_fristrup@nps.gov

Names of additional authors / panelists / presenters (if any):

Vulnerability to Climate Change of Key Resources in National Parks

5313

Invited Papers Session

Climate change poses a fundamental challenge for natural resource management: Climate patterns are shifting in space and time, but national parks, national forests, and other natural areas remain at fixed locations. In response, the National Park Service (NPS) and its partners are analyzing the vulnerability of species, ecosystems, and other key resources in over 25 national park-based analyses. This session will provide the latest results from five completed national park vulnerability analyses. The audience will learn results for example parks, applications to adaptation of resource management, and lessons for future analyses in other parks and protected areas. This will strengthen the ability of the NPS to implement one important goal of the NPS Climate Change Response Strategy "Use the best available scientific data and knowledge to inform decision making about climate change." Each speaker will speak for 19 minutes and engage in audience discussion for 5 minutes.

Value proposition: **The audience will learn the latest results of climate change vulnerability analyses for national parks. This will provide lessons for future analyses in other parks.**

Keywords: **Climate change, vulnerability**

Lead author • session organizer • poster / demo / exhibit presenter:

Patrick Gonzalez Climate Change Scientist

National Park Service patrick_gonzalez@nps.gov

Names of additional authors / panelists / presenters (if any):

Taking Action for Climate Adaptation

5395

Invited Papers Session

Most resource managers are acutely aware of the need to "do" climate change adaptation, but are confused about how to proceed. Few NPS (or other) staff know what tools are available to support adaptation, or how to access or use the tools. This session focuses on this need. The session begins by presenting an overarching climate change adaptation framework that articulates the many components and actions that contribute to adaptation. This clarifies the role of existing activities in climate adaptation, forms the basis for a 'NPS Adaptation Toolkit', and provides a context the presentations. This is followed by more detailed accounts of specific applications. These illustrate the acquisition, interpretation, and application of information that is required by most plans and analyses to support climate change adaptation in protected areas.

Value proposition: **Presentations describe tools and processes that are now available to support climate change adaptation. The focus is on doing adaptation now.**

Keywords: **climate, adaptation, tools**

Lead author • session organizer • poster / demo / exhibit presenter:

John Gross Climate Change Ecologist

National Park Service john_gross@nps.gov

Names of additional authors / panelists / presenters (if any):

Biosphere Reserves: A New Look at Relevance to Meet Today's Challenges in Protected Areas

5220

Invited Papers Session

This session would call to the attention of the current generation of protected area managers and administrators the concept, history and usefulness of Biosphere Reserves (BRs) in accomplishing the tasks of conserving biological diversity, providing nature's services, increasing visitation and need for greater outreach into surrounding communities. It would incorporate three paper presentations on this topic for which Abstracts have already been submitted. In addition, it would bring the experiences of at least two BRs, one from Canada and one from Mexico. The papers will be followed by a 30-minute facilitated discussion of a mechanism to establish an information exchange network between existing and potential BRs in USA, Mexico, and Canada.

Value proposition: **Will acquaint park professionals with an old concept with new relevance to challenges of climate change, biodiversity conservation, and community outreach; propose an information network.**

Keywords: **biosphere reserves, information**

Lead author • session organizer • poster / demo / exhibit presenter:

Larry Hamilton Senior Advisor

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Names of additional authors / panelists / presenters (if any):

Web Maps and the National Park Service

5531

Invited Papers Session

In the past couple of years, web maps have seen increased usage across the National Park Service. These maps are an ideal tool for bridging the gap between technical and non-technical users - both within and outside of the NPS. In addition, recent developments in web technologies and the increasing pervasiveness of "slippy map" interfaces like Google Maps are helping ensure that web maps are here to stay. This session will focus on specific web map implementations within the park service, with case study presentations from a variety of programs and regions.

Value proposition: **Learn how the National Park Service is using web maps to communicate important information about its resources both internally and to the public.**

Keywords: **GIS, Mapping, Data**

Lead author • session organizer • poster / demo / exhibit presenter:

Nate Irwin EGIS & Web Mapping Coordinator

National Park Service nate_irwin@nps.gov

Names of additional authors / panelists / presenters (if any):

Sustainable Transportation for National Parks

5423

Invited Papers Session

Last year, nearly 300 million visitors traveled to, from, and within the national parks using the extensive networks of transportation corridors, including roads, trails, bike paths, and public transit. In addition to delivering visitors to these resources, transportation can be a form of recreation itself, offering most visitors their primary opportunities to experience and enjoy these natural and cultural landscapes. Transportation is also an important tool to sustainably manage visitor use in parks to protect park resources and promote visitor enjoyment. Papers in the session will consider the effects of shuttle system features on visitor experience quality; relationships between transportation planning decisions and visitor-created resource impacts at recreation sites; methods to assess the long-term financial, ecological, and social sustainability of transportation systems; a framework for transportation planning at a regional scale; and the potential for transportation strategies to improve access to national parks for minority populations.

Value proposition: **Attendees will hear about concepts and methods being developed and applied to adapt "conventional" transportation planning practices to the national park context.**

Keywords: **Transportation, access, capacity**

Lead author • session organizer • poster / demo / exhibit presenter:

Steve Lawson Director

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Names of additional authors / panelists / presenters (if any):

Brett Kiser, Resource Systems Group, Inc.
Robert Manning, University of Vermont
Peter Newman, Colorado State University
Chris Monz, Utah State University
Jeff Hallo, Clemson University

Trends in Soundscape Management Issues

5584

Invited Papers Session

This soundscape management session of five 15-minute presentations will focus on the latest advances in policy, guidance, and outreach regarding excessive motorcycle noise in national parks and introduce the Soundscape Restoration Initiative that will provide tools and guidance for minimizing park-generated noise from park facilities, operations, and maintenance activities. We will also discuss progress made in developing air tour management plans based on recent amendments to the National Parks Air Tour Management Act that affects over 80 parks in the National Park System. The Pacific West Region soundscape coordinator will talk about guidance that has been developed to provide a consistent approach to protecting wilderness soundscapes from air tour noise. The NPS Intermountain Region soundscape coordinator will share several success stories about negotiating with the Air Force order to protect park soundscapes from military jet noise. Each presentation will be followed by a five minute question and answer session.

Value proposition: **Learn about current soundscape management and policy direction involving motorcycles, commercial air tours, military overflights, and best managment practices for noise reduction in national parks**

Keywords: **Soundscapes, motorcycles, overflights**

Lead author • session organizer • poster / demo / exhibit presenter:

Vicki McCusker Overflights Program Manager

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Names of additional authors / panelists / presenters (if any):

Stewardship through Communication

5289

Invited Papers Session

Resource stewardship cannot solely be an intellectual exercise. Getting the word out about a resource issue and assuming that if the public only had information x, then some magical form of stewardship will occur relies on the premise that our audiences suffer an information deficit. More frequently, it is the lack of relevancy, not the lack of information that keeps people from engaging in stewardship. Effective resource stewardship depends on the public caring enough about a resource they will take action or support actions taken by land managers. For the public to care, the resource or issue has to have relevance in their personal lives and experiences. When resource managers and interpreters collaborate, visitors have greater opportunities to learn about a resource and to start to care for it. That collaboration leads to creating relevance and greater resource stewardship.

Value proposition: **Participants will learn about examples of collaborative projects between interpretation and resource management. The purpose is to inspire new collaborative efforts.**

Keywords: **interpretation, management, stewardship**

Lead author • session organizer • poster / demo / exhibit presenter:

Sara Melena Education Specialist

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Names of additional authors / panelists / presenters (if any):

Julia Washburn, Interpretation and Education Associate Director, NPS

Mike Whatley, Office of Education and Outreach Program Manager, NPS

Inventory and Monitoring Collaboration

5738

Invited Papers Session

Landscape-scale conservation has a much better chance of success when multiple partners are engaged. We provide examples of collaboration across agencies, disciplines, eco-regions, and taxa, to serve as an operational model and demonstrate how working together as a conservation community effectively provides conservation delivery at the multiple scales.

Value proposition: **We must work together as a conservation community to effectively deliver landscape-scale conservation.**

Keywords: **collaboration, landscape, partners**

Lead author • session organizer • poster / demo / exhibit presenter:

Kris Metzger Regional I&M Coordinator

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Names of additional authors / panelists / presenters (if any):

Richard Easterbrook, I&M Branch, USFWS

Making Data Valuable to Others

5737

Invited Papers Session

Effective dissemination and communication of monitoring data and results is central for successful collaboration on conservation initiatives – yet it often occurs as an afterthought. These talks provide examples of how to deal with the challenges of delivering data and effectively communicating the relevance of the findings to many audiences.

Value proposition: **Landscape conservation can only be accomplished if the data is accessible and its relevance to accomplishing management objectives is clear.**

Keywords: **dissemination, communication, data**

Lead author • session organizer • poster / demo / exhibit presenter:

Jana Newman National I&M Coordinator

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Names of additional authors / panelists / presenters (if any):

Peter Dratch, FWS I&M Initiative, Supervising Ecologist, Peter_Dratch@fws.gov, 970.266.2923

The Sound Sessions: How Social Science Informs the Protection of the Acoustic Environment

5469

Invited Papers Session

More than 90% of visitors to national parks consider opportunities to experience natural sounds as an important reason for visiting national parks. Yet anthropogenic noise in and around these areas can mask natural sounds and negatively affect visitor experiences. Fortunately, policies and programs have been established to better protect these resources and social conditions, and specify that parks should integrate monitoring and planning efforts to protect natural and cultural soundscapes. Since our original discussions at the GWS meeting in Philadelphia, social scientists, biologists and acousticians have teamed up with the United States National Park Service (USNPS) Natural Sounds and Night Skies Division to explore cognitive issues, build simulation models of, and derive management actions in order to protect natural quiet and the soundscapes of national parks. This session will present 4 papers and a "lesson--learned" overview covering the latest social science models and data, informing unit level management actions.

Value proposition: **Audience members will receive information that can be applied to inform future soundscape research and potential management techniques to mitigate anthropogenic noise in protected areas.**

Keywords: **Natural-Sounds, Social-Science, Management**

Lead author • session organizer • poster / demo / exhibit presenter:

Peter Newman Associate Dean

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Names of additional authors / panelists / presenters (if any):

Derrick Taff, Post Doctoral Research Associate, Department of Human Dimensions of Natural Resources, Warner College of Natural Resources, Colorado State University

Shale Oil and Gas Development: Poised to Overwhelm Parks and Visitors

5343

Invited Papers Session

Shale oil and gas development in the U.S. is one of the most quickly expanding trends in onshore domestic hydrocarbon exploration and production. The lower 48 states have a wide distribution of shales containing vast resources of oil and natural gas. Hydrocarbon production from the Bakken Shale in ND and Marcellus Shale in the northeast may potentially affect park resources and values in over 50 parks and the quality of life for local residents and park visitors. As technologies advance and the price of oil and gas increases, many more park units may be faced with intensive shale development in and near parks. Session presenters will provide an overview of the issues surrounding shale oil and gas development, and the technologies that make it possible. Following the talks, a 30 minute panel discussion will center on how land managing agencies are mitigating the effects of this fast paced, industrialized activity.

Value proposition: **Participants will understand of the effects of shale oil and gas development and an awareness of the technologies associated with the emerging energy boom.**

Keywords: **Marcellus, Bakken, hydrocarbons**

Lead author • session organizer • poster / demo / exhibit presenter:

Lisa Norby Supervisroy Physical Scientist

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Names of additional authors / panelists / presenters (if any):

Energy Development In and Near Parks: Hot Topics

5525

Invited Papers Session

As energy development in the U.S. intensifies, parks are faced with addressing and minimizing the direct and indirect effects to park resources and values from drilling and mining activities. Park and central office staff are tasked with reviewing, evaluating, and approving proposals to develop oil and gas resources within parks and to work with other agencies to minimize impacts from energy and mineral development near parks. Presentations include overviews of several policy and regulatory tools, opportunities to collaborate with stakeholders and other agencies, air quality analyses, natural sounds and night skies modeling, and viewshed analyses to help protect park resources and values. As time allows, the remaining few minutes will be used to answer questions from session participants.

Value proposition: **Participants will gain an understanding of policy, regulatory, and science-based tools to mitigate the effects of energy, mineral, and other developments within and near parks.**

Keywords: **hydrocarbons, coal, regulations**

Lead author • session organizer • poster / demo / exhibit presenter:
Lisa Norby Supervisroy Physical Scientist

National Park Service, Natural Resource Stewardship and Science Directorate, lisa_norby@nps.gov

Names of additional authors / panelists / presenters (if any):

Energy Development In and Near Parks: Hot Topics

6670

Invited Papers Session

As energy development in the U.S. intensifies, parks are faced with addressing and minimizing the direct and indirect effects to park resources and values from drilling and mining activities. Park and central office staff are tasked with reviewing, evaluating, and approving proposals to develop oil and gas resources within parks and to work with other agencies to minimize impacts from energy and mineral development near parks. Presentations include overviews of several policy and regulatory tools, opportunities to collaborate with stakeholders and other agencies, air quality analyses, natural sounds and night skies modeling, and viewshed analyses to help protect park resources and values. As time allows, the remaining few minutes will be used to answer questions from session participants.

Value proposition: **Participants will gain an understanding of policy, regulatory, and science-based tools to mitigate the effects of energy, mineral, and other developments within and near parks.**

Keywords: **hydrocarbons, coal, regulations**

Lead author • session organizer • poster / demo / exhibit presenter:
Lisa Norby Supervisroy Physical Scientist

National Park Service, Natural Resource Stewardship and Science Directorate, lisa_norby@nps.gov

Names of additional authors / panelists / presenters (if any):

Renewable Energy Development 2.0: Case Studies and Applications for Enhanced Resource Protection

5582

Invited Papers Session

Driven by federal and state policies and financial incentives, our nation is experiencing a rapid expansion in renewable energy development and related electric transmission upgrades, in a widespread effort towards creating a "New Energy Frontier." While these efforts are laudable from climate change, air quality, and homeland security standpoints, many of the pilot projects are sited near parks, cultural sites, and other protected areas and have the potential to cause direct and landscape-level adverse impacts to protected and treasured resources. This session relies upon specific case studies of applied science to explore the efforts of the scientific community to create better tools for siting, design, mitigation, and monitoring for the next generation of renewable energy projects. Each presentation will last 15 minutes. Session will include issue overview by the chair, and joint panel discussion and Q&A session with the audience following the presentations.

Value proposition: **New tools for identifying resource conflicts and improving siting and mitigation of utility-scale renewable energy projects to better protect parks, cultural sites, and protected areas.**

Keywords: **renewable energy, mitigation**

Lead author • session organizer • poster / demo / exhibit presenter:

Sarah Quinn External Renewable Energy Program Coordinator

National Park Service sarah_quinn@nps.gov

Names of additional authors / panelists / presenters (if any):

"Enjoy the View": Call to Action #38- Part 2

5416

Invited Papers Session

Park visitors typically rank scenic views in the top five reasons for visiting a park. Inspiring vistas can lift the human spirit, expand our sense of place, and provide connections to the natural world and our history as a country. Clean, clear air is critical to the appreciation of scenic views, to human health, and the health of ecosystems. However, encroaching development can dramatically alter views beyond our boundaries and most parks experience some level of air pollution that can degrade scenic views and impact natural resources.

This session highlights the state of visual resource and air quality protection in the NPS by presenting several case studies of successful viewshed partnerships and improving air quality. Programmatic methods for addressing scenery and air quality issues will also be addressed as will the specifics of how parks can become involved in Call to Action # 38: Enjoy the View.

Value proposition: **The new Call to Action item: "Enjoy the View" will explore how protecting viewsheds and air quality are interrelated and achievable goals for the NPS.**

Keywords: **Viewshed, Scenery, Air**

Lead author • session organizer • poster / demo / exhibit presenter:

Melanie Ransmeier Natural Resource Specialist

National Park Service - Air Resources Division melanie_ransmeier@nps.gov

Names of additional authors / panelists / presenters (if any):

The first part of this session, if accepted, will be chaired by my colleague Tamara Blett (303-969-2011, tamara_blett@nps.gov)

Spatial Technologies for Monitoring, Evaluating and Managing Visitor Use

5353

Invited Papers Session

Spatial technologies, including GIS, GPS and remote sensing, have emerged as powerful platforms to investigate and integrate diverse elements of parks and protected areas. Their application to visitor use management and recreation carrying capacity has been somewhat less developed. Recent research is, however, applying and adapting spatial methods and technologies to the study of visitor use in parks and protected areas. These applications include modeling of recreation sites and facilities, monitoring visitor use and behavior, and analysis of recreation resource use and user impacts. These, applications are uniquely suited to integrated, adaptive and proactive social and physical resource management. Through an organized progression of five 20 minute oral presentations this session will illustrate innovative and efficient applications of spatial technologies for visitor use monitoring and management. Methodologies are designed to capitalize on and extend the skills and equipment available to agencies and managers.

Value proposition: **This session illustrates innovative, accessible spatial technologies (GIS, GPS, remote sensing) for integrated, efficient and informative visitor use monitoring, evaluation and management in diverse settings.**

Keywords: **Visitor Use, Spatial**

Lead author • session organizer • poster / demo / exhibit presenter:

Nathan Reigner Graduate Research Assistant

University of Vermont, Park Studies Laboratory nreigner@uvm.edu

Names of additional authors / panelists / presenters (if any):

J. Adam Beeco - Parks, Recreation, and Tourism Management, Clemson University

The Many Sides of Cultural Resources in Relation to Climate Change

5382

Invited Papers Session

Cultural resources are unique, built, placed, intangible, biotic, material, irreplaceable, and all over the place, among many other qualities. They are resources because they are links to the human past and all the activities and decisions that lead to the natural and cultural world we live in today. Therefore, assessing and responding to the impacts of climate change on cultural resources and drawing out and using the information those resources contain requires a diverse set of tools and techniques. This session overviews work now underway in the National Park Service to integrate cultural resources into the full arc of climate change response: from vulnerability assessment to adaptation options to interpretation and application of cultural research findings.

Value proposition: **Session sets out state of the art in addressing impacts of climate change on cultural heritage and translating information they contain for future adaptation.**

Keywords: **climate, culture, adaptation**

Lead author • session organizer • poster / demo / exhibit presenter:

Marcy Rockman Climate Change Adaptation Coordinator for Cultural Resources

U.S. National Park Service marcy_rockman@nps.gov

Names of additional authors / panelists / presenters (if any):

Nighttime Recreation and Night Skies in National Parks

5363

Invited Papers Session

Papers discussing research to guide management of nighttime recreation, protection of night skies, and good lighting practices in national parks will be presented. National parks serve as some of the last refuges for natural night environments, and many park visitors seek natural night experiences in national parks. Nighttime in national parks offers unusual recreation opportunities. Moreover, biological processes of plants, animals, and humans benefit from natural darkness. Little empirical research examines how visitors value nighttime recreation activities and resources in national parks. This session will highlight papers that support establishing indicators and standards for high quality night recreation and night sky viewing experiences, as well as assess the current conditions of some night resources found across several National Park Service units. Presenters will be allotted 20 minutes each: 15 minutes for the presentation itself and 5 minutes for audience Q&A.

Value proposition: **Attendees will gain an understanding of why and how visitors value nighttime experiences and resources in parks. Good lighting practices will also be discussed.**

Keywords: **lightscapes, darkness, nocturnal**

Lead author • session organizer • poster / demo / exhibit presenter:
Ellen Rovelstad Graduate Research Assistant
Park Studies Laboratory, University of Vermont erovelst@uvm.edu

Names of additional authors / panelists / presenters (if any):

NPS–USGS Collaboration to Support Science and Resource Management in the National Parks

5328

Invited Papers Session

A 2-hour concurrent session of 5 invited papers will focus on collaboration between NPS and USGS staff to support park science and resource management and USGS mission work in hazards, water resources, climate studies, and mapping. The session will include a 10 minute overview followed by 20 minute oral paper presentations. Each presentation will include both a NPS and USGS co-author who demonstrate successful collaboration. The presentations represent an excellent cross-section of the hundreds of collaborative NPS – USGS projects which span from the everglades to the arctic. In some instances USGS scientists are stationed in parks and are members of park management teams to provide day to day support in planning and decision-making. This session will serve as the initial celebration of the upcoming 100 years of NPS – USGS collaboration and the NPS Centennial in 2016.

Value proposition: **Session illustrates the diverse scientific support available to NPS from USGS. Presentations demonstrate successful collaboration addressing mission critical science and resource management issues in parks.**

Keywords: **Collaboration, USGS, NPS**

Lead author • session organizer • poster / demo / exhibit presenter:

Vincent Santucci Senior Geologist / Liaison

National Park Service - Geologic Resources Division vincent_santucci@nps.gov

Names of additional authors / panelists / presenters (if any):

Bruce Heise, Geologist, Geologic Resources Division, National Park Service,Denver, CO;
Linda Jacobsen, U.S. Geological Survey, Associate Program Coordinator, National Cooperative Geologic Mapping Program, Reston, VA;
Peter T. Lyttle, U.S. Geological Survey, Program Coordinator for National Cooperative Geologic Mapping and Landslide Hazards, Reston, VA

Paleontology of the National Parks

5425

Invited Papers Session

A 2-hour concurrent session of 5 invited papers will focus on paleontological resource and resource management in the NPS. The session will include a 10 minute overview followed by 20 minute oral paper presentations. Each presentation will highlight some cutting edge research or resource management activities involving NPS fossils. A good cross section of presentations in this session demonstrates the diversity of paleontogical resources represented in the NPS.

Value proposition: **Rich and diverse paleontological resources documented in the national parks attracts considerable paleontological research. This session showcases some cutting edge research involving NPS fossils.**

Keywords: **paleontology, fossil, parks**

Lead author • session organizer • poster / demo / exhibit presenter:
Vincent Santucci Senior Geologist / Liaison
National Park Service - Geologic Resources Division vincent_santucci@nps.gov

Names of additional authors / panelists / presenters (if any):

In the Heat of the Battle, Managing Resources and Disasters

5392

Invited Papers Session

We hope to combine fire and all hazard incident management into this session in order to capture the lessons learned from managing resource issues to lessen the impacts of fires and other disasters.

Value proposition: **Resource managers need to be involved during the management of an incident in order to mitigate resource imapacts**

Keywords: **Fire, Disaster Management**

Lead author • session organizer • poster / demo / exhibit presenter:

Richard Schwab Post-Fire Programs Coordinator

NPS Fire Management Program Center richard_schwab@nps.gov

Names of additional authors / panelists / presenters (if any):

Using Prescribed Fire and Vegetation Treatments as Resource Management Tools

5470

Invited Papers Session

Prescribed fire and vegetation management is a vital ingredient in the management of resources. Resources managers need to work with fire managers to stir this ingredient. Without shared involvement, resources will either be at the table or on the menu.

Value proposition: It is not will it burn up, it is when. If we can't stop it, we have to live with it and manage it.

Keywords: Prescribed Fire, Ecology

Lead author • session organizer • poster / demo / exhibit presenter:
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Names of additional authors / panelists / presenters (if any):

Quantifying and Understanding Border-related Impacts in National Parks

5350

Invited Papers Session

Resource issues resulting from border related activities in border parks impact both cultural and natural resources in diverse ways. The nature and extent of such issues varies widely and in many instances such impacts have been sustained for a prolonged period of time. The complexity of these issues frequently presents the NPS with difficult challenges to address. Several resent research and assessment efforts have quantified the nature and extent of such impacts in multiple border parks. This session presents results from these efforts and reveals a number of ways that the NPS is using them to mitigate the effects of border related impacts.

Value proposition: **Border related activities impact NPS resources in diverse and profound ways. Several recent research and assessment projects have attempted to quantify and understand these impacts.**

Keywords: **Border, Mexico**

Lead author • session organizer • poster / demo / exhibit presenter:

Mark Sturm Ecologist

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Names of additional authors / panelists / presenters (if any):

n/a

Making Monitoring Data Accessible

5734

Invited Papers Session

The increased emphasis on monitoring as an integral part of resource managment decision-making has also recognized that the data, expensively obtained from these monitoring efforts, must be analyzed, shared and distributed. This session provides examples of collaborative efforts in data sharing from Alaska to Albermarle Sound. It demonstrates how common enterprise platforms and technical solutions such as web services can be used to put usable information into the hands of managers.

Value proposition: **The impetus for rigourous monitoring by resource management agencies is matched by new technologies for both recording of observations and the sharing of data.**

Keywords: **Database, Web Services**

Lead author • session organizer • poster / demo / exhibit presenter:

Todd Sutherland National Data Manager

U.S. Fish & Wildlife Service Todd_Sutherland@fws.gov

Names of additional authors / panelists / presenters (if any):

Jana Newman, US Fish & Wildlife Service

Connecting Urban Populations to Protected Areas

5189

Invited Papers Session

The opportunity to establish nationally significant urban parks, a new concept for Canada, is well aligned with global Protected Area agencies priority to meaningfully reach increasingly diverse urban populations. This session will explore the many examples and lessons learned from the use of large protected areas in an urban setting to engage and connect city-dwellers with the relevance and value of their national protected heritage. Through a series of invited presentations with international representation, each participant will be invited to present on a case relative to their jurisdiction. Time will be allocated in the last hour of the session to collectively discuss among presenters and the audience the commonalities and solutions to the challenges of connecting urban populations to protected areas.

Value proposition: **Session will explore lessons learned from the use of protected areas in urban settings to connect city-dwellers with the value of their national protected heritage.**

Keywords: urban engagement

Lead author • session organizer • poster / demo / exhibit presenter:

Pam Veinotte Field Unit Superintendent

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Names of additional authors / panelists / presenters (if any):

Louis Lavoie, louis.lavoie@pc.gc.ca

Innovations and Internationalization in Parks and Protected Area Education and Training I

5602

Invited Papers Session

The management of natural resources, land uses and recreational activities in parks and protected areas requires complex strategies which face managers worldwide. Land use conflicts occur whenever stakeholder interests are involved; thus planners and managers need to acquire interdisciplinary skills in order to address these conflicts properly. These sessions aim at allowing an exchange of several examples were innovative ways of improving the education and training in the field of parks and protected areas were pursued. These innovations address either new didactical approaches (methods and techniques) or demonstrate cases in which the internationalization of teaching and training was an important component of the program. Overall, the objective is to help students and managers to develop an understanding for the growing complexity of protected area management. Session attendees will benefit from a facilitated discussion after the presentations.

Value proposition: **These sessions allow managers and academics to learn about innovative approaches, mostly in international settings, in education and training for (future) professionals.**

Keywords: **capacity building, internationalization**

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Robert C. Burns, West Virginia University
Thomas E. Fish, Cooperative Ecosystem Studies Units Network

Innovations and Internationalization in Parks and Protected Area Education and Training II

5603

Invited Papers Session

see part I

Value proposition: s. part I

Keywords: capacity building, internationalization

Lead author • session organizer • poster / demo / exhibit presenter:

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Names of additional authors / panelists / presenters (if any):

Robert C. Burns, West Virginia University

Thomas E. Fish, Cooperative Ecosystem Studies Units Network

Public Participation in Scientific Research: Case Studies from National Parks

5384

Invited Papers Session

Citizen science projects, or Public Participation in Scientific Research (PPSR), are happening in many national parks. PPSR projects can increase scientific research capacity, enrich managers' knowledge of resources, improve public science literacy, strengthen participants' connections to the park, and enhance participants' sense of stewardship. Achieving these outcomes takes careful planning and consideration of achievable goals in science, outreach, and education. This session will present case studies from several national parks that highlight key issues like ensuring high-quality data, reaching and engaging diverse audiences, educating people about science, and connecting scientific results to resource stewardship. The 15-minute presentations will be followed by an interactive and facilitated 45-minute panel discussion with the speakers and audience. Attendees will learn about the practice of PPSR and lessons that can be applied to their own projects.

Value proposition: **Participants will hear about lessons learned by PPSR practitioners within the NPS, and get practical insight into addressing similar issues in their own projects.**

Keywords: **PPSR, science, outreach**

Lead author • session organizer • poster / demo / exhibit presenter:

Tim Watkins Science & Education Coordinator

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Names of additional authors / panelists / presenters (if any):

Christy Brigham, Santa Monica Mountains NRA

Kirsten Leong, NPS Biological Resources Management Division

Angie Evenden, California Cooperative Ecosystem Studies Unit

Fire Science for Resource Management

5376

Invited Papers Session

This session will describe available fire science resources and how they can be used by the natural and cultural resource communities. It will highlight the FFI fire effects monitoring utility, the Joint Fire Science Program, and a national network of fire science knowledge exchange consortia as examples of programs that the resources community can take advantage of to support the need for the best available science.

Value proposition: **Resource and cultural managers will have a better understanding of scientific resources available to support wildland and prescribed fire management.**

Keywords: **Fire Science, Resources**

Lead author • session organizer • poster / demo / exhibit presenter:

Vita Wright Science Application Specialist

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Names of additional authors / panelists / presenters (if any):

Nate Benson

Fire Ecologist

National Park Service

Nate_benson@nps.gov

Fisheries Management in the National Park System

5553

Invited Papers Session

Fishing is the only compsumptive use of National Park Service resources that is allowed by general regulation. Both fishing and the harvest of fish and shellfish fish have the potential to impact targetted species and a wide array of interrelated resources. Thus, where these activities occur, monitoring to assess status and trends is crticial and and more intenstive management is necessary. This session includes papers on approaches to fishery management and monitoring in the National Park System that are currently being employed or may be employed in the future.

Value proposition: **Will stimulate thought and discussion about balancing fishing and the harvest of fish with conservation of resources and provide several practical examples for managers.**

Keywords: **fishing, management, monitoring**

Lead author • session organizer • poster / demo / exhibit presenter:

John Wullschleger Fisheries Program Leader

National Park Service john_wullschleger@nps.gov

Names of additional authors / panelists / presenters (if any):

Nic Medley

Fisheries Biologist

National Park Service

Addressing Threats to Aquatic Systems in the National Parks

5574

Invited Papers Session

Although National Parks were established to protect functioning ecosystems many aquatic systems have been compromised or are at risk of being compromised by or more stressors. Two of the most prevalent stressors impacting aquatic systems are non-native aquatic species and altered water quality. While some non-native aquatic species were introduced intentionally others have actively invaded or are in the process of invading National Park Service waters. Changes in water quality may have direct impacts on native species as well as potentially putting them at a competitive disadvantage relative to non-natives. The papers in this session will provide a sample of strategies that are being employed within the National System to address threats to aquatic systems and native species with particular emphasis on nuisance aquatic species.

Value proposition: **Describes strategies employed in conserving native functioning aquatic systems National Parks. Will provide informationapplicable to other areas with impacted aquatic systems.**

Keywords: **aquatic ecoystem restoration**

Lead author • session organizer • poster / demo / exhibit presenter:

John Wullschleger Fisheries Program Leader

National Park Service john_wullschleger@nps.gov

Names of additional authors / panelists / presenters (if any):

Nic Medley, Fisheries Biologist, National Park Service

NPS Policy-making in the Modern World: Influences, Successes, and Challenges

5479

Invited Papers Session

Barely a handful of scholars today are investigating contemporary NPS policy-making, the major influences thereon, and the primary factors responsible for agency success or failure. This session assembles several the country's scholars who are actively researching the major influences upon contemporary NPS policy-making. The four talks in this session will explore the following questions: What are the primary influences upon contemporary National Park Service policy-making? Why is the agency successful in some policy-making endeavors but not in others? What role do science and politics play in NPS decisions? Each presenter will include both the results of her research as well as his conclusions on how the agency can improve its success rate. The session will also demonstrate that abundant holes exist in our knowledge base regarding the political science of the agency.

Value proposition: **Several scholars investigating contemporary NPS policy-making success gather in this session to discuss what makes the agency successful—or not—in crafting policy.**

Keywords: **policymaking; science; politics**

Lead author • session organizer • poster / demo / exhibit presenter:

Michael Yochim Program Manager

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Names of additional authors / panelists / presenters (if any):

Public Lands and University Partnerships: Cultural Resource Management through the CESU Network

5153

Invited Papers Session

Cooperative Ecosystem Studies Units (CESUs) give public land managers access to more than 300 partners—tribal colleges, state agencies, universities, and research organizations throughout the country. Experts at these institutions provide the research and technical assistance needed for decision-makers charged with identifying, documenting, and protecting complex arrays of cultural resources on public lands. These case studies cover archaeology, cultural landscapes, and environmental history on Bureau of Land Management, U.S. Forest Service, and National Park Service lands. The session will also present the mutual benefits to cooperative projects.

Value proposition: **This session will demonstrate how CESUs can provide valuable assistance to public land managers, students, researchers, and others interested in cultural resource management.**

Keywords: **cultural resource management**

Lead author • session organizer • poster / demo / exhibit presenter:
Cheria Yost Program Assistant
Cooperative Ecosystem Studies Units Network cheri_yost@nps.gov

Names of additional authors / panelists / presenters (if any):

So This is a Cultural Landscape, Eh?

5227

Invited Papers Session

The landscapes of America's national parks are palimpsests of earlier practices, plans and accidents. Some produced benefits while others jeopardized the future. To manage or visit a national park is to enter an arena shaped by its past. In this session the speakers embrace the philosophy of administrative histories; they explore the past at a variety of units "because these things reflect how America chooses to preserve and present important remnants of its cultural and natural history." Two of the speakers look at the impacts of contentious, often political controversies – mining near park boundaries and racial segregation – while the other two speakers explore the more subtle cultural issues of wilderness interpretation and campground design. In each instance, the presenter will illustrate how these issues continue to unfold on park landscapes and suggest how an enhanced understanding of earlier events can offer guideposts toward current and future actions.

Value proposition: **Audience members will gain a better understanding of how current issues sometimes have historical roots, which can provide guideposts for action in a changing world.**

Keywords: **landscapes, history**

Lead author • session organizer • poster / demo / exhibit presenter:
Terence Young Professor

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Names of additional authors / panelists / presenters (if any):

Sea-level Rise Science and Decision-making in an Uncertain Future

5318

Assessing the potential vulnerability of the coastal zone to sea-level rise (SLR) requires integrating a variety of factors, including landscape, habitat, and resource changes, as well as the ability of society and its institutions to adapt. The range of physical and biological responses associated with SLR is poorly understood at some of the critical time and space scales required for decision making. Limitations in the ability to quantitatively predict outcomes affect whether, when, and how some decisions will be made. Thus, decision makers require tools to understand and anticipate the magnitude and likelihood of future SLR impacts, as well as evaluate the consequences of different actions. Probabilistic frameworks that capture potential outcomes and communicate scientific uncertainty provide a means to engage both scientists and decision makers in the development of decision tools, as well as to inform science activities that will result in more useful predictions and products for management.

E. Robert Thieler, U.S. Geological Survey
Nathaniel G. Plant, U.S. Geological Survey
Benjamin T. Gutierrez, U.S. Geological Survey

Evaluating Natural Hazard Risks to Coastal Building Construction Including Sea Level Rise

An approach is presented to standardize the vocabulary and compare the natural hazard risks to coastal construction including information regarding sea level rise when available. By describing risks using the common “currency” of return frequency and normalizing adaptation measures based on return frequency and insurance premiums, managers can make decisions on a leveled playing field. Using published data on flooding, wind (hurricane and tornado), earthquake and comparing societal norms as expressed in building codes, this presentation shows a strategy for adaptation to storm surge/flooding risks that may be usable for other hazards.

Mike Eissenberg, Denver Service Center, National Park Service

Adapting to Climate Change in Coastal National Parks

The Program for the Study of Developed Shorelines has partnered with the National Park Service to identify resources and infrastructure at risk to rising sea levels and the long-term adaptation strategies associated with that risk. The first phase of this collaborative project is focused on identifying all NPS assets vulnerable to a future 1m rise in sea level, within 41 coastal park units. This element of the project utilizes an existing database (NPS Facility Management Software System) containing a comprehensive list of assets for all park units. Vulnerability varies widely. Padre Island National Seashore in Texas, for example, has almost 50% of its assets considered vulnerable and these assets have a total replacement value of over $40 million dollars. Point Reyes National Seashore in California, on the other hand, has only 2% of its assets vulnerable, with a total replacement value of $19 million dollars.

Katie Peek, Program for the Study of Developed Shorelines, Western Carolina University
Robert Young, Program for the Study of Developed Shorelines, Western Carolina University

Protecting and Interpreting Cultural Resources at Canaveral National Seashore

The southeast region contains thousands of cultural resources, with many significant resources already seeing negative impacts from climate change, and many which are threatened by predicted increasing climate change impacts (e.g. sea level rise, increase in severity of storms, changing fire regimes, etc.). Cultural resources are unique in that they can’t usually be moved, and so once damaged or destroyed, are irreplaceable. Canaveral National Seashore is home to one of the largest shell midden mounds in the country. This talk will discuss the archeological value of the site as well as discuss outreach activities that have been implemented to engage the public in this work and teach them about how climate change threatens these resources.

Margo Schwadron, Southeast Region, National Park Service

Preparing for Climate Change Impacts to Archaeological Sites at Point Reyes National Seashore

A cooperative effort between the National Park Service and Sonoma State University identified probable climate change impacts to indigenous, coastal, archaeological sites at Point Reyes National Seashore. GIS models of rising sea levels from the Pacific Institute were used to identify most of the predicted impacts. A sample of threatened archaeological sites from representative geographic areas of the Seashore was selected for on-site investigation and for the development of a range of treatment options that may be applicable to other Point Reyes sites in similar situations. Area-specific management recommendations also resulted, highlighting the need for additional archaeological inventory studies to assist with climate change planning. The project was coordinated from the outset with the Seashore’s single culturally-affiliated tribe, whose participation in the park’s planning and decision-making processes will be critical in determining which treatment options to pursue.

Mark Rudo, Cultural Resources Program, Pacific West Region, National Park Service
Michael Newland, Anthropological Studies Center, Sonoma State University

IRMA In a Nutshell

5293

Maybe you've heard about IRMA, but don't know just what or where it is, or what it can do. This session will give an overview of IRMA's key features, how it benefits parks, programs, and staff, and how to get started using it.

Margaret Beer, NPS Inventory and Monitoring Program

A Park Perspective on Using IRMA

Craters of the Moon National Monument and Preserve (CRMO) recently made the decision to take full advantage of IRMA's capabilities. This session reviews CRMO's FY2012 progress to update existing record profiles in the IRMA Data Store; to scan, upload and link high-priority documents; and to establish park-level protocols for creating new Data Store records. This session will also review the benefits and the lessons learned in making IRMA part of the everyday language for all park divisions and visitors.

Steve Bekedam, Craters of the Moon National Monument and Preserve

IRMA Data Store: An Information Dissemination Solution for Cultural Resource Managers

The IRMA Data Store now includes thousands of Cultural Resource references and has become a primary tool for discovering and downloading Cultural Landscape Inventories, Cultural Landscape Reports, Historic Structure Reports, Historic Resource Studies and other CRM documents. The integration of both natural and cultural resource information in one system benefits parks, programs, researchers and the general public. This session will demonstrate the range and organization of CR references in IRMA, and clarify the protocol for CR references. The session will also explore some new frontiers for CR documents in IRMA, including the standardization of reference keywords, the inclusion of historic property spatial data, and a procedure for obtaining permission for the web display of copyrighted materials.

Bob Sutton, NPS Chief Historian
Susan Dolan, Historical Landscape Architect

US Fish and Wildlife Service, ServCat, IRMA, and the Benefits of Collaboration

The USFWS National Wildlife Refuge System's (NWRS) Inventory and Monitoring Initiative is collaborating with NPS to create a centralized repository for compiling, organizing and serving U.S. Fish & Wildlife Service information. This web repository is a clone of the IRMA Data Store developed by NPS, and has been named the Service Catalog or "ServCat." Like the IRMA Data Store, ServCat is used to compile documents and organize datasets (such as reports, surveys, databases, geospatial data and images), which are then easily discoverable and retrievable using text and geospatial search tools. This sharing of information system architecture is a showcase of cost-effective and beneficial collaboration: it minimizes duplication of effort, leverages investments made, and opens the door to seamless data sharing between DOI bureaus.

Richard Easterbrook, US Fish and Wildlife Service Inventory and Monitoring Program

IRMA Data Store: The Cornerstone of State of the Park Reports

The NPS has begun to produce State of the Park reports (Call to Action item #28) to assess the overall status of park resources and use this information to improve park priority setting and communicate complex park condition information to visitors, the public, and our own park managers and staff in a clear and simple way. This session will demonstrate how the IRMA data system is being used as a key component of the State of the Park reports to allow users to "drill down" to additional detail and sources of information about the resources summarized in the report, such as accounts on the origin and quality of the data, and the methods and analytical approaches used in the assessments. The session will also illustrate how you can easily apply the same capabilities in your own reports, publications, or websites.

Brent Frakes, NPS Inventory and Monitoring Program

Manager's Tools: Exploration and Science within Caves and Karst of the National Park Service

5542

Unlike natural resources at the surface, caves and karst are significant resources found under the earth's surface. These are some of the last unexplored and unknown physical areas on the planet. The discovery and exploration of this hidden world crosses many disciplines including geology, biology, hydrology, archeology, paleontology, paleoclimatology, recreation, and a host of others. Recent ongoing exploration and documentation has increased our knowledge of this hidden realm. To know what it is being managed, NPS managers have been pursuing cutting-edge science, exploring physical dimensions in relation to surface locales, and basic inventories of this fragile underworld. These manager's tools help understanding these complex resources recently have increased both our understanding of these resources and how human interactions can impact these resources. Understanding will assist conservation and protection of resources through the planning and compliance process and lead to education and outreach for park staffs and visitors.

Dale L. Pate, National Cave and Karst Program Coordinator, Geologic Resources Division, National Park Service

Karst and Cave Influences on Regional Hydrology at Grand Canyon National Park

The high plateaus surrounding much of Grand Canyon National Park are the source of the vast majority of aquifer recharge supplying springs and seeps discharging from the canyon walls below. On the canyon's north rim, a well developed karst landscape of sinkholes, solution-enhanced faults and fractures, and caves prevents any perennial streams to exist by rapidly transmitting available water into the regional aquifer system. Grand Canyon hydrologists are using available landform data including satellite imagery, bedrock fracture patterns, and LIDAR datasets in conjunction with hydrologic data from instruments installed in large stream caves and geochemical data from spring waters to delineate the extent and patterns of recharge basins to these springs, one of which (Roaring Springs) is the sole source of water to 4.5 million annual visitors and permanent employees at the park. Understanding the mechanics of these complex systems is necessary for proper protection from future impacts.

Steve Rice, Hydrologist / Cave Resources Manager – Grand Canyon National Park

Cynthia Valle, Hydrologist – Grand Canyon National Park

White Nose Syndrome: Gaining Understanding from Bat Microbiota and Cave Microclimates

Geomyces destructans was recently identified as the pathogenic agent of White Nose Syndrome (WNS), which has killed nearly six million bats in the Eastern US since 2006. In order to understand the ecological backdrop of this emerging pathogen, an investigation of cave microclimates in as yet unaffected western U.S. caves and bat microbiota of cave roosting bats is vital. Fungal, bacterial, and viral samples were collected by swabbing bats recently emerged from hibernation in the WNS-free caves of El Malpais National Monument in New Mexico. DNA and RNA from these samples were extracted and amplified and/or sequenced using next generation sequencing and quantitative PCR. In addition, temperature and humidity readings were collected throughout the hibernation period forming a survey of the cave microclimates. The resulting data provide a novel method for a preliminary assessment of a yet unaffected cave ecosystem.

Kaitlyn J. Hughes, Department of Biology, University of New Mexico
Debbie Buecher, Buecher Biological Consulting
Nicole A. Caimi, Department of Biology, University of New Mexico

Identifying Bats and Characterizing Bat Habitat in Alaska's National Parks

Very little is known about the distribution of bats in Alaska's National Parks. Current studies are underway to identify the types of bats that are present and to understand what habitats they may be using and their role in the local ecosystem. Behavior, habitat and migration patterns are vital to inform natural resource management decisions, especially with the threat of White Nose Syndrome. Understanding bats is important to cultural resource management and for maintenance of historic buildings; bats have been found roosting in buildings at Klondike Gold Rush National Historical, Katmai National Park, and around Wrangell-St. Elias National Park. The National Park Service is working with the Alaska Department of Fish and Game, the University of Alaska, University of Tennessee, and other stakeholders to develop an acoustic call library and analyze bat genetics from wing punches and voucher specimens.

Paul Berger, National Park Service, Alaska Regional Office

Archeology and Grand Canyon National Park Caves

Recent work has brought to light the unique contributions of cave resources to understanding human history and an equally unique challenge of managing cave archeology. With only 5 percent of the park systematically surveyed, there are over 4200 documented archeological sites, more than 60 of which are caves. Grand Canyon's dry caves provide the ideal environment for preservation of woven artifacts (baskets, mats, and sandals), split-twig figurines, arrow shafts and vegetable food remains, among others. The few excavation projects involving archeological deposits have yielded a rich array of materials not often found in open-air contexts. The extremely fragile nature of artifacts, threats from looting and inadvertent damage, rugged and often technical access, and an increase in use of the park's backcountry, present a challenge to adequately managing cave archeological sites. Recent management approaches include a strict non-disclosure policy while partnering with specialized research groups, and conducting work in discipline-integrated teams.

Ian Hough, Vanishing Treasures Archaeologist, Grand Canyon National Park
Ellen Brennan, Archaeologist, Grand Canyon National Park
Steve Rice, Hydrologist / Cave Resources Manager, Grand Canyon National Park

Enjoy the View

5397

The purpose of "Enjoy the View"—one of the new Call to Action items—is to ensure that by protecting visual resources and air quality we can actively preserve stunning views from park service areas for future generations. Many of these views are extremely important to park experiences. Many of them also extend beyond park boundaries and can be affected by actions outside parks that impact air quality and adjoining land use. To make "Enjoy the View" a reality, we will be working with parks and partners to form ten viewshed cooperatives to collectively develop and implement individual action plans for addressing specific visual resource and air quality concerns in a variety of NPS areas. Visual resource inventories and air quality assessments will be part of this process. Viewshed cooperatives will be collaborative groups that serve as models for addressing threats to scenery and air quality in NPS areas.

Mary Gibson Scott, NPS - Superintendent, Grand Teton National Park

Protecting Scenic Ocean Views from our National Seashores

National Seashores offer the public many active pursuits from fishing to surfing. They also offer us a place to look out across an expansive ocean and contemplate and wonder. Such historic views are now at risk of becoming mere memories with pressure mounting to site utility scale wind energy facilities in coastal waters, even off our national seashores. A major effort is underway by the Department of the Interior to lease areas off the Atlantic coast for such facilities beginning at 3 nautical miles and states are contemplating allowing them in state waters, which generally run from just offshore to the 3 nautical mile mark. We can all agree about the need to diversify our nation's energy portfolio. The question is must it come at the expense of treasured ocean views at our national seashores? With careful planning, we can have both. As a nation, we need both!

Mike Murray, Retired Superintendent, Cape Hatteras National Seashore

Clearing the Haze: Improving Visibility in National Parks

National parks possess many stunning vistas and scenery. Unfortunately, these scenes can be diminished by haze causing discoloration and loss of texture and visual range. Recognizing the importance of visual air quality, congress included legislation in the 1977 Clean Air Act to prevent future and remedy existing visibility impairment in class I areas. Since then there have been active programs to monitor the haze, understand its causes, and work towards its reduction. These have been largely successful resulting in visible improvements in many national parks. This presentation will provide an introduction to visibility regulations, how visibility is diminished by air pollution, and the efforts and successes in protecting and improving visibility by the National Park Service and others. In addition, remaining threats to clear air in the parks and work to achieve the ambitious goal to "remedy existing visibility impairment in class I areas" will be discussed.

Bret A. Schichtel, NPS ARD; William C. Malm, CIRA; Jenny Hand, CIRA; John Vimont, NPS ARD; Scott Copeland, CIRA

Incorporating Visual Resources into Cultural Landscape Protection

Visual resources exist both inside parks and outside park boundaries on adjacent lands, where they are managed by other land managing agencies or private owners. Cultural landscapes also exist both inside and outside of national parks, and are vulnerable to visual impacts from adjacent land development. This presentation will explore the relationship of visual resources to cultural landscapes, and provide guidance on when visual resources on adjacent lands should be considered in a Section 106 review of a proposed undertaking. The presentation will also provide recommendations for integrating visual resources in Section 110 Cultural Landscape Inventories, and treatment planning efforts, such as Cultural Landscape Reports.

Susan Dolan, NPS

Air Quality Issues and Improvements at Great Smoky Mountains National Park

Great Smoky Mountains National Park (GRSM) has been conducting air quality monitoring and research for the past 34 years. This has shown that air emissions generated outside the park and the resulting secondary pollutants transported into the park, are adversely impacting park resources (visibility, aquatic and terrestrial resources), visitor enjoyment and potentially public health. Winds blowing toward the southern Appalachian Mountains transport air pollutants not only from local sources in the Tennessee valley, but also from regional sources. Monitoring results show that air quality deteriorated during the 1980's and 1990's. But over the past decade, park air quality improved significantly due to large emission reductions of sulfur dioxide and nitrogen oxides. Nevertheless, considerable challenges lie ahead. The Park will continue to partner with key stakeholders to protect the gains made in air quality, attain the National Ambient Air Quality Standards, and looks forward to restoration of natural resources.

Jim Renfro, Air Resource Specialist, Great Smoky Mountains National Park

Accepted | Accepted w/changes | Redirected to Poster | Poster/Exhibit

Invited Papers Session

Citizen Science and Resource Management: Where We Have Been and Where We Are Going

5412

Public participation in scientific research has a long history. Over much of history people without formal training in science were responsible for most of the science being done. Contributions from the public still make key contributions today. Until recently, their contributions were overlooked by much of the scientific community and the public, but that is changing quickly. The number of projects designed explicitly to engage the public in the scientific process has exploded in recent years. Unfortunately, there are still many challenges to maximizing the benefits of citizen science to science, management, and education. These challenges include limited communication among citizen science practitioners and skepticism about the utility of citizen science to science and management. This talk will review the history of citizen science, describe its utility to past and current science and resource management challenges, and outline some of the next steps for the field as a whole.

Abe Miller-Rushing, Schoodic Education and Research Center

Participation as if People Mattered: Social, Political, and Educational Outcomes of PPSR

PPSR projects are often designed, evaluated, and scrutinized with respect to the rigor of scientific data collection and analysis. Yet, thousands of individuals and hundreds of communities give their time, energy, and expertise in PPSR projects every year, in a wide variety of contexts and disciplines. The social, political, and educational aspects of PPSR deserve critical, interdisciplinary discussions on par with discussions of the natural sciences pursued through these partnerships. What motivates individuals to participate and what do they gain from participation in these endeavors? How does participation affect appreciation of science and environmental stewardship? As practitioners and researchers of PPSR, our work connects to, impacts, expands and inspires work beyond natural science disciplines and networks. We provide examples that demonstrate how these benefits can be as important and rewarding as adding to the scientific base of knowledge.

Kirsten Leong, Heidi Ballard UC Davis, Gerard Kyle Texas A&M

Creating a Community of Practice

Hundreds of PPSR projects have been undertaken in the past two decades, to examine topics ranging from acid rain to backyard birds. Recent efforts to build a community of practice have resulted in a suite of tools and resources to assist practitioners in designing projects that are meaningful to participants, collect accurate data that are analyzed with rigor, and that effectively communicate results to participants and to the greater scientific community. This presentation will introduce existing resources, preview tools in development, and provide access to the growing community of PPSR practitioners. We will also share ideas and invite conversation around the development of a professional association for this field of practice, and how such an association might best serve the needs of parks.

Jennifer Shirk, Tina Phillips, Rick Bonney, Cornell Lab of Ornithology, Department of Program Development and Evaluation.

Partners in Science

At the most collaborative, public participation in scientific research (PPSR) means collaborating with communities to develop an integrated program of scientific research, education, and community action that addresses community priorities and invites community participation at every stage of the scientific process. In the spectrum of ways to engage the public this approach of “co-creation” is the most work intensive and risky, but promises the greatest rewards in terms of diversifying science and ensuring the use and usability of research. This talk will explore several examples of co-creation of science including collaborations with tribal communities around climate change adaptation, work in the Louisiana Delta concerning land loss, and explorations of the link between weather and disease in Africa. It will explore some of the challenges of working this intensively with communities, and suggest a general framework for guiding this kind of community-based science.

Rajul Pandya, University Corporation for Atmospheric Research

Panel Session with Speakers

All of the speakers will participate in a panel where they will answer questions from the audience regarding how to successfully design and implement PPSR projects.

All of the above

Driving Bison over the Edge: How Archeology Can Have a Positive Impact on Park Management

5499

People and bison have coexisted on the plains of North America for about 10,000 years, however, that relationship has changed through time in how bison lived, died, and were used by humans. Wind Cave National Park is home to one of the larger herds of bison on the plains today and archeological evidence suggests they have been there for thousands of years. Recent investigations at two possible Native American buffalo jumps in the park help us understand the past to improve current management of the environment, bison herds, and cultural resources. Geoarcheology helps us understand how the climate has changed over time in the park and archeological evidence helps demonstrate how both people and animals likely adapted to those changes. Using what we have learned to provide the public with a view of our changing past through interpretation, we will bring the value of this archeological data full circle.

Anne Vawser, NPS-MWAC
Timothy Schilling, NPS-MWAC
Albert LeBeau, NPS-MWAC

GIS and Archeological Predictive Modeling at Indiana Dunes National Lakeshore

The National Park Service Midwest Archeological Center is the repository for cultural resource site and survey location data collected for nearly five decades at over 50 parks in the Midwest region. As more and better data are accumulated, focus is now shifting toward integrating these large datasets to address “big picture” issues facing park resource managers. To that end, an ongoing multi-year archeological inventory project at Indiana Dunes National Lakeshore included the creation of an archeological GIS predictive model. The model integrates data collected from small compliance projects to large park wide inventories, and identifies patterns in the environmental characteristics of site locations. This model is then used to identify landforms potentially conducive to past human use, which may therefore contain unidentified archeological resources. The model was tested during the 2012 field season; results and ideas toward its improvement will be presented.

Amanda Davey, NPS-MWAC

The 1927 Ojibwe Cultural Landscape of Voyageurs National Park

Appreciation and preservation of Ojibwe cultural resources is a major focus of Voyageurs National Park, Minnesota. Stereo pairs of 1927 International Joint Commission aerial photography were compared to archeological site locations recorded over the last thirty years. More than 200 historical features were identified, revealing otherwise isolated archeological sites as a system of contemporaneous and interrelated occupations. Through the identification of structural features and vegetation differences, Ojibwe archeological sites are newly associated with one another by trails, piers, portages, and other landscape features. By combining and overlaying these data in a GIS along with modern imagery, historical Ojibwe occupation can be better understood and interpreted by the park as a complex and persistent cultural landscape spanning the lakes of Voyageurs National Park. The results of this project are therefore a combination of archeological and non-archeological datasets, repurposed and recombined to the benefit of the park as a whole.

Andrew LaBounty, NPS-MWAC

Archeological Contributions to Climate Change Studies

Archeological research is positioned to provide unique information on human-landscape interactions during periods of dynamic climate. Several recent projects across the mid-continent highlight the connection between climate change and archeology, informing on various aspects of human behavior throughout the late Pleistocene and Holocene. Deep geomorphic testing of terrace fills at Ozark National Scenic Riverways provides landscape evolution and paleoenvironmental data, and allows for the identification of landforms people could have occupied at various points in time. Archeological and environmental data at Apostle Islands National Lakeshore offer insights on changes in land use through time and ways in which they correlate with environmental shifts. In addition, distribution of eroding archeological sites in several high plains parks may provide a means of examining the rate at which such landscapes have changed over recent millennia. Archeology is a critical component of multidisciplinary studies that seek to understand past

Erin Dempsey, NPS-MWAC
Dawn Bringelson, NPS-MWAC

Creating Landscapes of Change: Evolution and Management of Archeological Landscapes at Knife River Indian Villages National Historic

The archeological study of landscapes provides insight into how cultural practices modify broad spatial areas over time. If archeological study can provide useful information about past cultural practices, how can these studies also inform the management of park units today? Knife River Indian Villages NHS provides a useful example of what archeological landscapes tell us about the past and how these landscapes contribute to helping define park management goals and conditions. This paper will utilize remote sensing technologies including aerial photography and LiDAR to focus on landscape changes that occurred during transitions from Native American villages to Euroamerican homesteading and the establishment of a National Park unit. Park management actions and resource conditions are defined as a new archeological landscape, termed the Preservation Landscape that creates a context for understanding a new era of landscape changes at the Knife and Missouri rivers confluence.

Jay T. Sturdevant, MWAC, NPS

Abandoned Mineral Lands in NPS Units: Inventory and Assessment Study and Findings

5459

The vestiges of mineral operations that predated NPS designations are found in 129 of the 399 units that comprise the National Park system. The largest concentration of Abandoned Mineral Land (AML) features occurs in California parks, where commodities mined vary from precious and base metals such as gold, silver, copper, and lead, to industrial minerals such as talc. All regions have quarries for mineral materials such as sand and gravel. Coal is predominant in the eastern regions, and oil and gas wells are found in the Southeast and Midwest Regions. Many of these features require remedial action to ensure public safety and protect natural and cultural resources.

John Burghardt, National Park Service, Natural Resource Stewardship and Science Directorate, Geologic Resources Division

Connecting People to Parks by Acknowledging Their History: An Alaskan Mining Story

Mining has shaped the history and landscape of Alaska. In an effort to comprehensively understand all aspects of mining in the parks, the Abandoned Mineral Lands program of the NPS has systematically inventoried and assessed hundreds of mining sites within the Alaskan park units. The AML program provided an opportunity to conduct background research necessary for compliance and build a body of knowledge regarding the role of mining in the communities that are now part of the park units. The products of that research further presented an opportunity to highlight individual contributions to the cultural heritage of the parks. By publishing the life story of one of those individuals, the service demonstrated to a strongly-connected local and a broader Alaska mining community that their lives and stories are valued by the National Park Service and created a dialogue with a long disenfranchised group.

Linda Stromquist, National Park Service, Alaska Region

Juggling Competing Goals: Should the NPS Solid Waste Disposal Site Regulations Apply to AML Cleanups?

The NPS is currently determining whether NPS regulations at 36 CFR Part 6, which govern the establishment and operation of solid waste disposal sites in parks, should be applied to abandoned mine land reclamation actions that beneficially re-use mined material. Applying Part 6 to reclamation actions prevents or limits backfilling, recontouring, or other on-site beneficial use of mining wastes, resulting in off-site disposal of that material and importation of non-native material to the site. A draft Director's Policy Memorandum has been developed to clarify that Part 6 does not apply to AML cleanups, which will facilitate the program's progress. With 2,700 AML sites in 127 park units – most of which lack viable financially responsible parties and so will be reclaimed with appropriated funds -- an environmentally protective and cost-effective resolution of the Part 6 question is imperative.

Julia Brunner, National Park Service, Natural Resource Stewardship and Science Directorate, Geologic Resources Division

Restoring Coastal Wetlands While Protecting Archeological Resources at Prisoners Harbor in Channel Islands National Park

Prisoners Harbor, site of the largest backbarrier coastal wetland on the Channel Islands, was occupied by Chumash people for 5,000 years until the 1830s. Ranchers filled the wetland in the late 1800s to build corrals and transportation facilities. They also channelized a creek, disconnecting it from the wetland and causing erosion of a Chumash archeological site. In 2011 the park removed 10,000 yds3 of fill to reestablish wetlands and reconnect the creek and its floodplain. In the process, a historic stone wall was unearthed and midden sites were discovered, requiring on-the-ground design changes. 15,000 native wetland plants were installed and interpretive corrals and wetland observation platforms were built to improve visitor experience. Invertebrates and amphibians colonized ponds within weeks of exposing groundwater, and migratory waterfowl and resident landbirds soon followed. The park and partner The Nature Conservancy now plan to restore 20 acres of riparian woodland upstream of this site.

Paula Power, National Park Service, Channel Islands National Park

Restoration of Requa Hill, Former Air Force and NPS Facilities Site, Redwood State/National Parks

Requa Hill is the site of a former Air Force radar station. Ownership of this facility was transferred to Redwood National Park in the early 1980's and was utilized as the park's maintenance facility. Due to the geological instability of the area, the Requa Hill facility was abandoned in 2009 and a new shared maintenance facility was constructed benefiting both the NPS and State Park partners. In 2011, the abandoned facility at Requa Hill was decommissioned. Decommissioning was a multi-phase effort which included remediation of hazardous materials, removal of all structures and unneeded roads and the restoration of the natural landscape. Maximum effort was expended to minimize the amount of material sent to the landfill. Working with members from the Yurok Tribe, the restoration of Requa Hill was completed and approximately 84% of the material was diverted from the landfill.

Neal Youngblood and Mike Sanders, National Park Service, Redwood National and State Parks

Trans-boundary Landscape Conservation in the Big Bend-Rio Bravo Region of the Chihuahuan Desert

5171

The Big Bend-Río Bravo Initiative holds a bi-national vision for strategic landscape conservation and adaptive management of natural resources along a significant portion of the U.S-Mexico border in Texas, including 300 miles of the Rio Grande and approximately 5.5 million acres of protected areas in both countries. The goal of this initiative is to conserve ecosystems and the services they provide for local citizens, to improve the resiliency of native plant and animal communities, and to enhance opportunities for people to connect with nature and engage in conservation efforts. In recent years, federal and state agencies in Mexico and the U.S., non-governmental organizations, and natural resource experts have nurtured public-private partnerships and worked to over-come obstacles to trans-boundary landscape conservation. This collaborative effort has led to a consensus-based process to develop conservation targets and priorities with recommendations and technical support to guide community and regional conservation planning, design, and implementation.

Aimee M. Roberson, Desert Landscape Conservation Cooperative
Jeff B. Bennett, National Park Service
Joe Sirotnak, National Park Service

A Conservation Landscape for the Future: The Southeastern Conservation Adaptation Strategy

The southeastern United States faces challenges of unprecedented scale and complexity that threaten our natural and cultural resources in the 21st century. Urbanization and its associated impacts, energy development, water stress, and climate change all pose enormous challenges to the conservation community in developing strategies to effectively address these issues. In response, state and federal agencies have endorsed the pursuit of a Southeast Conservation Adaptation Strategy (SECAS), which seeks to define a future conservation landscape capable of sustaining natural and cultural resources at levels valued by society. To develop SECAS, six Landscape Conservation Cooperatives and the Southeast Climate Science Center, will collaborate in a conservation planning framework that assesses the current and future conservation landscape, and defines and identifies priority locations and adaptation strategies for ensuring functional ecosystem processes. SECAS seeks an approach to conservation that is adaptive, allowing for response to changing conditions as they

Greg Wathen, Gulf Coastal Plains & Ozarks Landscape Conservation Cooperative

A Strategic Approach to Conservation Planning and Design in the Columbia Plateau

The National Wildlife Refuge System (NWRS) has recently articulated a vision to “embrace a scientific, landscape-level approach to conserving, managing and restoring refuge lands and waters, and work to facilitate conservation benefits beyond our boundaries”. How will the Pacific Region implement this vision? We have initiated an ecoregional-scale conservation planning project in the Columbia Plateau Ecoregion, in partnership with the Great Northern Landscape Conservation Cooperative. The goal of this project is to work through key principles in landscape conservation design and Strategic Habitat Conservation, and how it relates to the NWRS: identifying surrogate species, landscape integrity, climate change resiliency, connectivity, and spatial design. The Columbia Plateau was also identified as an area of high potential to work with partners on a collaborative approach to conservation planning and design. This presentation will focus on our experiences in collaborative conservation planning and design, with a focus on spatial prioritization

Tom Miewald, National Wildlife Refuge System/North Pacific Landscape Conservation Cooperative
Charles Houghten, National Wildlife Refuge System
Kevin O’Hara, National Wildlife Refuge System

Delivering Conservation and Preserving Livelihoods: Landscape Conservation Planning in Colorado's San Luis Valley

The Southern Rockies have been identified as particularly vulnerable to climate change, and its impacts are already being manifested in the type and timing of precipitation and runoff. This, among other factors, is placing strain on the farmers and ranchers who manage the land and thus provide habitat in much of this region. The conservation community, including the National

Wildlife Refuge System, recognizes that 21st century conservation cannot succeed with 20th century tools and strategies. Here we present the refuges system’s multi-scale planning strategy for the upper Rio Grande watershed in southern Colorado, from dramatically shifting management strategies in the San Luis Valley National Wildlife Refuge Complex to preserving habitat and working landscapes through conservation easements in the new and proposed

Michael D. Dixon, National Wildlife Refuge System
Mike Artmann, National Wildlife Refuge System

Linking Climate Change Vulnerability Assessment to Multi-Site Adaptation Strategies Using Natural Communities

Managers need a better understanding of factors that contribute to climate-change vulnerability of natural communities in order to formulate adaptation strategies. NatureServe worked with federal, state, and NGO partners in the U.S. and Mexico to conduct CC vulnerability assessments of major upland and aquatic community types from the Mojave and Sonoran deserts. This project piloted a new Habitat Climate Change Vulnerability Index, drawing on data from the BLM Rapid Ecoregional Assessments and other research efforts. Assessments addressed CC sensitivity and ecosystem resilience; the latter derived from analysis of CC indirect effects and adaptive capacities. Then in a workshop setting, field specialists refined the assessments, clarified thinking on CC scenarios and stressors, and documented potential strategies along a continuum from immediate “no regrets” actions to “anticipated” or “wait and watch” actions to monitor. By focusing on major natural community types, pragmatic strategies were identified for application across multiple managed

Patrick J. Comer, NatureServe

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Invited Papers Session

Evaluating the Early Anthropocene Hypothesis: How Much Did Pre-agricultural Peoples Impact the Landscape?

5594

The Early Anthropocene hypothesis asserts that early agricultural practices (c. 8-5,000 BP in Eurasia and Africa, c. 5-3,000 BP in North America) had a significant impact on Earth ecosystems. However, to quantify impact, we need to examine initial or baseline conditions; initial conditions for early agriculture are the foraging lifeways that preceded it. Most Anthropocene research is based on chemical patterning used to infer changes in atmospheric and soil conditions. However, human beings are stipulated as the agents of the Anthropogenic change. Therefore a more complete understanding of variability in the lifeways of foraging peoples should be included in models and hypotheses for the onset of the Anthropogenic epoch. In this paper, I use Lewis Binford's environmental and ethnographic database to construct a frame of reference for modelling environmental impacts of late Holocene foragers in North America, and discuss implications for the archaeological record.

Pei-Lin Yu

Meet the New Boss, Same as the Old Boss

Cognitive dissonance in the United States about human-driven climate change shows that more work is needed to show how humans have interacted with earth systems. The historical record of these interactions is extremely short, relative to the thousands of years humans have transformed earth systems. Archeological data sets provide sufficient time depth to better judge the current trajectory of human ecological affairs. Island biogeography, agricultural systems, and resource extraction show that the geographic extent, geological intensity, and temporal depth of human activities are increasing in unprotected and protected areas. Both archeological and historical data show that human social systems collapse if they are not flexible enough—either in geographic range, resource re-allocation, or political structures—to weather shifts in the infrastructures that support them. Archeological and historical examples improve general social understanding of climate change and help identify strategies that will be most effective for coping with climate change.

Brinnen Carter

Defending Cultural Resources from the Well-Intended: Finding a Place on the Team

As integral components of any ecosystem, humans have been impacting their surroundings since their beginnings, and as the name implies, the Anthropocene is the penultimate age of human influence on these environments. Many times, despite the best of intentions, human efforts to protect and preserve their surroundings have resulted in choices being made regarding which resources are spared and which sacrificed, especially when the effort is in response to an emergency. Too often, cultural and archeological heritage is sacrificed to response and mitigation related activities. In this paper, Meredith Hardy presents case studies and lessons learned from large scale environmental modification projects and emergency response, and their often adverse effects on cultural resources.

Meredith Hardy

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Invited Papers Session

Introduction to Wilderness Character in the Context of Planning

5168

This introductory session will define wilderness character and its legal foundations, introduce the five qualities of wilderness character, and provide an overview of the NPS policy and guidance on the preservation of wilderness character. This purpose of this overview is to set the stage for the subsequent presentations highlighting efforts to integrate wilderness character into park planning.

Sandee Dingman, Natural Resource Specialist, Lake Mead NRA and member of NPS Wilderness Character Integration Team

Integrating Wilderness Character into Park Foundations

The National Park Service has set a goal to complete a Foundation Document for every national park unit by 2016. Park foundation documents provide focus for park planning and management, and establish a baseline from which management actions are undertaken and decision plans are developed. Wilderness and wilderness character are important considerations during the foundation document planning process, because a park foundation provides overarching guidance to other plans, including general management plans and wilderness stewardship plans, and informs priorities for future planning needs for wilderness and the park unit. This presentation will provide insight into the foundation document planning process and how to appropriately incorporate wilderness and wilderness character considerations. Additionally, examples will be provided concerning current and completed Foundation planning efforts and how wilderness character was represented.

Sarah Conlin, Natural Resource Specialist, NPS Denver Service Center

Integrating Wilderness Character into Resource Stewardship Strategies

The Resource Stewardship Strategy (RSS) provides an objective basis for assessing the condition of natural and cultural resources relative to reference conditions and documents the science- and scholarship-based comprehensive strategies to achieve and maintain those conditions. The development of RSS indicators and measures is a convenient opportunity to also address wilderness character monitoring needs while minimizing redundant data collection and reporting efforts. The outcomes from RSS strategies and associated actions also provide an opportunity to preserve or improve wilderness character while the qualities of wilderness character provide one way to consider the trade-offs associated with various actions or inactions. This session will provide a conceptual overview of the current guidance and share insights gained in the integration efforts at Pinnacles National Monument as a case study.

David Vana-Miller, Resource Stewardship Strategy Coordinator, NPS Natural Resources Science and Stewardship

Planning for Visitor Use on Wild and Scenic Rivers and in Wilderness

How can we plan for visitation on Wild and Scenic Rivers and in wilderness while protecting river values and wilderness character? Zion National Park, the Bureau of Land Management, and NPS Denver Service Center are developing the Virgin River Comprehensive River Management Plan, which describes the Wild and Scenic River planning framework, addresses best practices for managing use, and presents techniques for establishing user capacity for river segments located within wilderness. The user capacity process identifies visitor experience and resource condition indicators that are protective of wilderness character and river values, outlines the minimum acceptable conditions (standards) for the indicators, and clarifies management actions that could be used to protect and enhance river values and wilderness character. The final step in the user capacity framework includes a clear articulation of the kinds and amounts of use that can be sustained on river segments in wilderness zones.

Ericka Pilcher, Visitor Use Project Specialist, NPS Denver Service Center;

Kezia Nielsen, Environmental Protection Specialist, Zion National Park

Wilderness Impact Analysis: Interagency Consistency and Grounding in the Wilderness Act to Preserve Wilderness Character

For most of the 40+ years since the National Environmental Policy Act was passed, impacts of proposals on wilderness have been addressed vaguely, incompletely, and inconsistently ─if at all─ in environmental compliance documents. Recently, however, the four federal wilderness management agencies have begun to use a common framework, grounded in the Wilderness Act of 1964, for describing and analyzing impacts to wilderness values. The approach uses a specific vocabulary and definitions to describe a handful of qualities that make up wilderness character. This standardized approach improves accountability, transparency, and defensibility. It simplifies impact analysis and promotes meaningful discussions of wilderness related trade-offs within the agency and with the public. The result is better management decisions.

Miki Stuebe, Project Manager, NPS Environmental Quality Division, and member of NPS Wilderness Character Integration Team

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Invited Papers Session

Lessons Learned from Implementing a Framework for Evaluating Scientific Proposals in Wilderness

5330

An NPS interdisciplinary working group was assigned by the Alaska regional director to address concerns about the cumulative impacts related to a growing number of facilities and installations in wilderness, address the perception that NPS was presenting an unwelcoming atmosphere for scientists, and improve decision making consistency between parks. Products and strategies were implemented in 2011 and included a one-year trial period during which all Alaska parks used a modified version of "A Framework to Evaluate Proposals for Scientific Activities in Wilderness" by Peter Landres et.al. After the one-year trial period, the framework was modified further to address the magnitude and scale of wilderness resources in Alaska, the challenges of logistics and access, and the unique legal requirements and policies contained in the Alaska National Interest Lands Conservation Act of 1980 that established many of these areas. Lessons learned in implementing these products will be reviewed and discussed.

Adrienne Lindholm – Alaska Region Wilderness Coordinator

**This paper has already been submitted as a paper for assignment to a concurrent session – Paper proposal # 4769

How Yosemite's Cascade Fire Successfully Defied the Odds in 2012

On June 15th, 2012, lightning ignited the Cascade Fire in the Yosemite Wilderness north of Yosemite Valley. In Yosemite, like much of the Sierra Nevada, however, the winter of 2012 had less than average snow pack that melted out earlier than average, setting up a potentially severe fire season. The Cascade Creek basin is in a 'fire shadow' area where the lack of past ignitions may have been a function of vegetation and snow pack. Despite regionally severe conditions, this area was identified as a potential place to successfully manage fire due to vegetation type, natural barriers, and few previous ignitions. Over the past 40 years managers have been able to observe fire in Wilderness and, combined with current advances in the understanding of fire, are able to prioritize lightning ignitions. The Cascade burned 1,705 acres, a success story given the challenges of today's landscapes.

Kent Van Wagtendonk, Fire GIS Specialist – Yosemite National Park

Incorporating Wilderness Character into Wildland Fire Management

Fire Management Plans and the preservation of Wilderness Character (WC) are closely intertwined. The NPS Wilderness Character Integration Team and agency fire personnel have developed conceptual guidance to aid both fire managers and wilderness managers in how best to integrate wilderness character considerations into the preparation of Fire Management Plans (FMP) and five year FMP updates. This session will discuss what wilderness character is, where and how it interfaces with Fire Management Plan standards, and how fire management data can be used to inform wilderness character monitoring to improve on-the-ground wilderness stewardship. Pre suppression planning that preserves WC without limiting initial attack will be explored as will prescribed fire planning that preserves WC. The moderators will address the balance and tradeoffs between the Natural restorative benefits of fire management with the negative consequences to the wilderness character elements of Untrammeled and Outstanding Opportunities for Solitude.

Sandee Dingman, Natural Resource Specialist – Lake Mead National Recreation Area
Chris Holbeck, Chief of Natural Resources – Midwest Regional Office

Wilderness on the WUI Doorstep: Managing fire in the North Cascades

Like many locales in the West, fires often start within Wilderness areas that can quickly threaten human development, and fire managers are routinely faced with the dilemma of how to manage fires to meet wilderness character objectives while preventing the loss of property on adjacent private lands or other developments. Recent fires in the North Cascades NPS Complex provide vivid examples of the fire management strategies used and the natural/cultural resource and Wilderness considerations involved in determining those strategies that reflect a strong desire to allow fire to play its natural role in the ecosystem. Two recent fires in the Stehekin Valley of the park complex provide instructive examples of the evolution of a park fire program that strives to incorporate wilderness character objectives, respond to private landowner needs via an aggressive fuels management program, and work with other cooperating fire management agencies.

Jack Oelfke, Chief of Natural and Cultural Resources – North Cascades National Park Service Complex

When Worlds Collide: Wilderness Character, Smoke Management, and Public Outreach

The 2010 Sheep Fire presented an ideal opportunity to restore fire to the fire-adapted wilderness of Kings Canyon National Parks and Sequoia National Monument. However, the fire was located east of one of the most compromised airsheds in the nation and proved to be a smoky 9,000 acres as it burned through years of fuels accumulation. It also was located in the cliffs above Cedar Grove, one of the most popular visitor destinations in the park. The air in Cedar Grove became unhealthy and the air district became increasingly concerned as the Central Valley of California fell in non-attainment for ozone standards. The success of the Sheep Fire was due to excellent firefighter tactics, the concerted efforts of fire staff working continuously with the local air district, and information officers who lived in Cedar Grove for the fire's duration to understand the smoke impacts and issues for visitors and employees.

Deb Schweizer – Fire Education Specialist, Sequoia and Kings Canyon National Parks
Kevin Hendricks – Chief Park Ranger, Sequoia and Kings Canyon National Parks

Prioritization of Invasive Plant Species for Management Based on Systematic Sampling

5735

Prioritization of locations and species to manage can increase the cost-effectiveness of management of invasive plants. Using structured decision making techniques to organize our approach, we addressed the problem of inventory and prioritization at the spatial scale of the entire natural area, and established a rapid, systematic inventory protocol that estimates the state (i.e., 4-point ordinal scale) of invasion by each species

Sean Blomquist, I&M Zone Biologist, U.S. Fish and Wildlife Service

Developing and Evaluating Hypotheses from I&M Data

A primary responsibility of NPS I&M Program is the assessment of natural resource conditions. In addition to reporting status and trends, there is a need for the synthesis of data and knowledge into models of how system drivers (e.g., human activities and natural stresses) may lead to changes in important system conditions. Further, it is helpful if such connections are made in a form that is useful for understanding chains of

James Grace, Research Ecologist, U.S. Geological Survey
Donald R. Schoolmaster, Jr., U.S. Geological Survey
Glenn R. Guntenspergen, U.S. Geological Survey

Policy, Protocols, and PRIMR: Enhancing the Quality of Refuge Resource Management

Reliable information provides the foundation for effective resource management. The National Wildlife Refuge System of the US Fish and Wildlife Service recently initiated a national effort to enhance the quality of resource management on refuges by increasing the relevance and rigor of inventory and monitoring data. It has three principle elements: 1) a national policy that stresses linking survey objectives to management objectives in the selection of surveys for implementation; 2) use of reviewed and approved protocols to conduct those surveys; 3) the PRIMR database for documenting the characteristics of those surveys and protocols. We describe each of these elements and how their integration provides the potential for enhancing science-driven management at wildlife refuges.

James P. Ward, Jr., I&M Ecologist, U.S. Fish and Wildlife Service
Peter A. Dratch, I&M Lead Biologist, U.S. Fish and Wildlife Service
Jana Newman, National I&M Manager, U.S. Fish and Wildlife Service

Monitoring the Qualities of Wilderness

As the 50th anniversary of the Wilderness Act approaches, land management agencies with designated and proposed wilderness areas are examining how the law has protected the land. The U.S. Fish and Wildlife Service and National Park Service hired and trained Wilderness Fellows to establish wilderness character measures with refuge and park staff, and collect baseline data for these measures. Measures specific to each site are recorded in the Wilderness Character Monitoring Database. This desktop application categorizes the measures by the five established qualities of wilderness: natural; undeveloped; untrammelled; solitude or primitive and unconfined recreation; and other features of scientific, educational, scenic or historical value. Suggestions by the Wilderness Fellows have refined the current database, and the next step is to fund a centralized web application that all managers with wilderness can use to track the measures they choose, to determine change in wilderness quality.

Peter A. Dratch, I&M Lead Biologist, U.S. Fish and Wildlife Service
Richard Easterbrook, GIS Team Leader, U.S. Fish and Wildlife Service
Simon Kingston, Inventory and Monitoring Division, National Park Service

Life After Monitoring: What Can Managers Do with Monitoring Results to Protect Natural Resources?

The South Florida/Caribbean Inventory and Monitoring (SFCN, I&M) network has been monitoring marine ecosystems at four national parks for over a decade, and seen substantial loss (>60% cover at some parks) of coral reefs, the network's highest-ranked vital sign. Monitoring of fish communities within these parks reveals assemblages lacking in apex predators, and dominated by herbivores and secondary consumers; all

Jeff Miller, Fisheries Biologist, National Park Service

Results from the Deterministic and Empirical Assessment of Smoke's Contribution to Ozone (DEASCO3) Project

5319

The DEASCO3 project applies State Implementation Plan-grade data from monitoring, emissions, and modeling methods to produce analytical results for 2002 and 2008, to assess fire's contribution to elevated ozone episodes across the contiguous U.S. About 20 Case Studies have been developed to characterize the relationship of emissions from fire to ozone concentrations across a broad range of circumstances (e.g., geographic locations, fuel conditions, time of year, fire types, and contributions to elevated background levels and levels in excess of the proposed Ozone NAAQS). The technical analysis work included: 1) emission inventory development for wildland and agricultural fires in 2002 and 2008 across the contiguous U.S.; and 2) deterministic (photochemical grid modeling (PGM) with source apportionment) and empirical analyses to better assess fire's contribution to ozone.

Charles T. (Tom) Moore, Jr., Matthew Mavko, Ralph Morris, David Randall, Mark Fitch, Michael George, Michael Barna, Bret Anderson, John Vimont, Ann Acheson

Smoke/Air Quality Technical Tools from the Deterministic and Empirical Assessment

Conducting technical analyses evaluating fire's contribution to elevated ozone episodes across the contiguous U.S., the DEASCO3 project will apply these analytical results in a set of dynamic and accessible web-based technical tools, to enable Federal Land Managers (FLM) to participate more fully in future ozone air quality planning efforts. About 20 Case Studies are in development to characterize the relationship of emissions from fire to ozone concentrations across a broad range of circumstances. This suite of Case Studies will characterize situations analogous to those that FLMs may face with current conditions and in the future. The online tool will allow FLMs to survey, review, and grab the technical results and findings of the most analogous Case Study(ies) that FLMs can use to effectively contribute to the state and EPA processes of SIP development, declaration of Exceptional Events, nonattainment area designations (NAA), establishing background levels of ozone, and others.

Charles T. (Tom) Moore, Jr., Matthew Mavko, Ralph Morris, David Randall,

Mark Fitch, Michael George, Michael Barna, Bret Anderson, John Vimont, Ann

Assessing and Predicting Smoke Impacts: Case Studies of Smoke Management in Yosemite National Park

In the Central and Southern Sierra Nevada of California, where large urban areas lie in relatively close proximity to fire-adapted forests with high fuel loadings, minimization of smoke impacts remains one of the largest obstacles to implementing large landscape Rx burns, not to mention wildfires with resource benefit components. The solution to this issue lies in producing timely and reliable projections for smoke impacts, on which fire managers can base public information and implement mitigation actions. Much of the error associated with the estimation of smoke impacts stems from uncertainties related to the timing and spatial distribution of emissions from fires. Emissions in turn are very sensitive to landscape fuel loading and fuel moisture conditions that can and usually do vary significantly at sub kilometer scales, especially in complex terrain. We also show how probabilistic approaches to mapping potential fire spread (e.g., FS-Pro) can help fire managers gage smoke.

LelandTarnay

Air Quality Regulatory Needs in National Parks for Smoke Management

Biomass burning emissions (smoke) can have profound short- and long-term impacts on air quality in national parks. Smoke contributes to particulate matter affecting visibility and human health; ozone that can damage plants and animals; and excess nitrogen deposition that can adversely impacting ecosystems. Comparatively little is known about the biomass burning emissions of reactive nitrogen compounds, particularly organic nitrogen (ON) compounds, and their impacts on sensitive ecosystems. This is further complicated by the lack of monitoring data of important reactive nitrogen compounds, including ON. Recent measurements suggest that biomass burning has high emission rates of ammonia and reduced ON. With increasing fire activities, smoke could be a significant source of reactive nitrogen and adversely impact sensitive ecosystems. In this presentation we will review the air quality issues and regulations associated with smoke and present our latest findings concerning the emissions of reactive nitrogen from biomass burning

Bret A Schichtel; Marco A Rodriguez; Michael G Barna; Kristi A Gebhart; Marc Pitchford; William C Malm, Tom Moore

AQ/Smoke Coordination as a Part of Wildfire Response

In the past few years, a limited number of Incident Management Teams responding to wildfires have included Air Resource Advisors (ARA)to handle air quality and smoke coordination. While not a necessary element of every response, certain situations can be managed more efficiently when there is a qualified person addressing smoke and air quality. Local health, transportation, and air quality agencies, residents and local business owners, as well as the personnel in the fire camps, all have an interest the severity, timing, and impacts of smoke. The use of specialized smoke forecasting tools generates information necessary for effective decision-making and then distributed for use through a wide variety of channels, in conjunction with air quality monitors. These efforts have resulted in much positive feedback from the "downwind community," but there is still much to be done. We will review the work of ARA's and the tools used to support Incident Teams.

Mike Broughton

A Survey of Common Noise Sources and Their Spatial and Spectral Footprints

5139

Decades of community noise and national park studies have produced an extensive library of measurements of common sources of noise. This presentation will summarize the range of frequencies and noise output levels of several noise sources that affect parks, and interpret these in terms of the area that would be affected in the absence of terrain shielding. Spreadsheet tools for predicting received noise level as a function of distance from the source will be presented. This information will be combined to offer a programmatic approach for assessing noise impacts for many localized activities or projects in parks.

Jessica Briggs
Cecilia Leumas
Misty Nelson

NMSim, a Software Package for Spatial Mapping of Noise

NMSim (Noise Model Simulation) is a modern noise simulation tool that allows users to quickly and easily estimate the noise emanating from a wide variety of noise sources. NMSim is designed to be easy to use. For example, topographic and ground cover data can be readily imported from the USGS Seamless Data Server. NMSim provides the user with a state of the art tool for calculating the noise either on a grid or at specific locations. NMSim also has a powerful algorithm that can estimate whether or not a noise will be audible. In addition to maps summarizing overall noise exposure, NMSim can generate animations that illustrate the time course of noise exposure.

Bruce Ikelheimer

Blue Ridge Research and Consulting, LLC

Interactive Noise Mapping: A Framework for Iterative Development of Management Options

Mapping noise exposures across large areas with complex terrain is a computationally intensive task that can require a week or more of processing. This delay inhibits the institutional learning process that can emerge from more rapid assessment of noise management alternatives. An alternative approach has been developed, in which contributions from each noise source are modeled in isolation, in the smallest units susceptible to management. This processing step requires substantial computational effort, but it is embarrassingly parallel with existing software. These individual noise predictions are combined these with specifications of management alternatives to add up the aggregate noise exposure. Within the range of alternatives spanned by arbitrary combinations of the individual sources, noise maps can be generated on the order of one minute instead of one week.

Damon Joyce
Kurt Fristrup

A Geospatial Model of Ambient Sound Levels

There has been much effort in the US and worldwide to measure, understand and manage natural soundscapes. This can be a difficult task due to the multitude of sources and complexities of long distance propagation. This talk presents a comprehensive model that relates existing sound pressure levels to geospatial features such as topography, climate, hydrology and anthropogenic activity. The model utilizes Random Forest, a tree-based machine learning algorithm, which does not explicitly incorporate any a priori knowledge of source power or propagation mechanics. The response data encompasses 270 thousand hours of acoustical measurements from 190 sites located in National Parks across the contiguous United States. Cross validation procedures were used to evaluate model performance and identify explanatory variables with predictive power. Using the model, the effect of individual explanatory variables on sound pressure level were isolated and quantified to reveal systematic trends across environmental gradients.

Dan Mennitt

Electronic and Computer Engineering Dept.

Predicting Existing and Natural Sound Levels on Park and Regional Scales

Analyses of park acoustical resources must be capable of encompassing the regional scales of wildlife movements, geophysical processes, and anthropogenic impacts. A geospatial model has been developed that predicts acoustical measures relevant to NPS management. In contrast to most noise models, which focus on the specific behavior of a particular source, the geospatial sound model incorporates ecological, geophysical, climatic, and anthropogenic data to assess general contributions from attributable to these factors. Predicted maps of ambient sound levels across Olympic National Park and Zion National Park will be presented and compared to sound monitoring data collected in these parks.

Dan Mennitt

Electronic and Computer Engineering Dept.

Vulnerability of Ecosystems in the US and Canada to Biome Shifts Due to Climate Change

5313

Climate change is shifting vegetation latitudinally and elevationally in boreal, temperate, and tropical ecosystems. Field research has documented vegetation shifts at the biome level in Yosemite National Park and Noatak National Preserve due to climate change in the 20th century. A change of dominant plant species that changes the biome of an area can fundamentally alter ecosystem structure. Here, we present results of spatial analyses of 20th century climate changes and projected 21st biome changes that identify vulnerable areas in the United States and Canada and potential refugia. We examined the three components of vulnerability: exposure (historic and projected climate), sensitivity (historic vegetation response), adaptive capacity (projected vegetation response). Nearly half of the land area is highly to very highly vulnerable while <5% of the land area is in potential refugia. The spatial results provide data for identifying priority areas for adaptation of natural resource management under climate change.

Patrick Gonzalez, Natural Resource Stewardship and Science, National Park Service, Washington, DC
Ronald P. Neilson; Oregon State University, Corvallis, OR
James M. Lenihan; Pacific Northwest Research Station, USDA Forest Service, Corvallis, OR

Climate Change Vulnerability for Fire in the Sierra Nevada: Challenges Moving from Projection to Action

To inform fire management adaptation strategies for the southern Sierra Nevada, we embarked on a three pronged research effort. First, we used a scenario planning exercise aimed at identifying key uncertainties and vulnerabilities for managing fire under changing climate. Second, we developed a suite of exposure and sensitivity measures of ecosystems. Spatial models that assessed exposure to future fire include: estimates of fire return interval departure (FRID); sensitivity to high intensity fire under dry conditions (FLAMMAP); and a maximum entropy model assess future exposure to fire. Spatial models to assess the sensitivity of vegetation to fire driven change entailed a bioclimatic envelope approach to assess where and when plant communities become sensitive to change. Overlaying community type envelopes allowed us to assess adaptive capacity of communities to change. Finally, we employed a management gaming exercise to vet different fuels management strategies for future outcomes.

Mark W. Schwartz, Department of Environmental Science & Policy, University of California, Davis, CA
Koren Nydick, Sequoia and Kings Canyon National Parks, National Park Service, Three Rivers, CA
James Thorne, Department of Environmental Science & Policy University of California, Davis, CA

Vulnerability of Desert Tortoise, Shivwits Milk-Vetch, Bristlecone Pine, and American Pika in Zion National Park

Though landscape-level assessments of species' reaction to climate change are well under way, there is still little work done on specific species on a park-level basis. To begin to address this we modeled the potential impacts of climate change on local habitat availability for desert tortoise, Shivwits-milk vetch, bristlecone pine, and American pika in and around Zion National Park, Utah. We combined existing species distribution models with local climate data and interpolated climate projections to determine the location and quality of present-day and future potential habitat. Potential habitat in Zion may increase for Shivwits milk-vetch, increase in quality for desert tortoise, but may decline for American pika. Bristlecone pine appears to be stable in the area. We made interpretations that summarized the components of vulnerability and potential impacts to species, their habitat, and to park management to act as a starting point for developing a park-level mitigation and adaptation framework.

David Thoma, Northern Colorado Plateau Network, National Park Service, Bozeman, MT
Henry Shovic, Department of Ecology, Montana State University, Bozeman, MT

Badlands National Park Climate Change Vulnerability Assessment

Climate change presents park resource managers with challenges previously not realized. Traditionally, park managers develop management strategies to control or mitigate natural or anthropomorphic processes affecting resource trajectories towards a desired future. Today's challenge is understanding how resources may respond to shifting climates, potentially creating vulnerability to their persistence in a park through changes in key habitat or biotic processes. This project presents one strategy in assessing park resource vulnerability at multiple levels. Through the adaptation of the Galbraith community assessment methodology and the Wisconsin vulnerability assessment model, the project resulted in an assessment of vulnerability of park resources at the level of ecological communities as well as keystone species. The assessment also incorporated a pilot methodology for assessing the vulnerability of cultural resources, both archeological and ethnographic. Additionally, the project developed NPS downscale climate modeling tools designed for the park

Barry Drazkowski, GeoSpatial Services, Saint Mary's University of Minnesota, Winona, MN
John Gross, Inventory and Monitoring Program, National Park Service, Ft. Collins, CO
Melanie Wood, Climate Change Response Program, National Park Service, Ft. Collins, CO

Vulnerability to Climate Change in North Cascades National Park

In 2011, land managers within the northern Cascades ecosystem established a science-management partnership to increase understanding of climate change, assess vulnerability of natural and cultural resources, and facilitate the development of landscape-level climate-adaptation strategies. We conducted vulnerability assessments in four broad areas: vegetation, wildlife, fish and fish habitats, and hydrology and access. In each subject area we evaluated exposure, conducted vulnerability assessments, identified highly sensitive species or habitats, and developed adaptation strategies and tactics. National Park Service Superintendents and U.S. Forest Service Supervisors were most interested how public access to agency lands might be altered by climate changes. We used the Variable Infiltration Capacity (VIC) macro-scale hydrologic model to project changes in snowpack, flooding, and extreme low flows. The projections were overlaid with roads and trails, infrastructure (e.g. bridges, culverts, and campsites), backcountry use figures, and damage histories from

Regina M. Rochefort, North Cascades National Park, National Park Service, Sedro-Woolley, WA
David L. Peterson, Pacific Northwest Research Station, USDA Forest Service, Seattle, WA
Crystal Raymond, Pacific Northwest Research Station, USDA Forest Service, Seattle, WA

Accepted Accepted w/changes Redirected to Poster Poster/Exhibit

Invited Papers Session

Doing Adaptation: A Framework and Tools for Climate Change Adaptation

5395

Climate change adaptation is a long-term, ongoing process for protected areas. Although currently we often consider climate change adaptation as a separate activity, an ultimate goal is for adaptation activities to become as habitual as preparing for the weather. Climate change adaptation isn't an activity for the future; we can begin now. We describe a framework to illustrate the many, currently feasible actions and activities that will move us towards successful climate change adaptation. However, knowing what you can do isn't the same as knowing how to do it. Using the framework for context, we identify how adaptation actions can be done, and provide examples of on-the-ground adaptation activities relevant to protected areas. A wide variety of tools facilitate climate change adaptation. Knowing what's in the toolkit, and using the right tool for the right job, at the right time, is key to effective and efficient adaptation.

John Gross, National Park Service, Inventory and Monitoring Division, Ft Collins, CO
Cat Hawkins-Hoffman, NPS Climate Change Response Program, Ft Collins, CO
Leigh Welling, NPS Climate Change Response Program, Ft Collins, CO

Historical and Projected Climate Data for Climate Adaptation: For Beginners and Experts

Virtually every climate adaptation project requires evaluation and presentation of historical and projected climate trends. This poses a challenge since few of us are familiar with either the many sources of climate data, or the bewildering wide array of tools and methods to analyze and visualize these data. This presentation focuses on tools that facilitate access to, analysis, and presentation of climate data by both non-technical and technical staff. We describe a spectrum of climate analysis tools and data sources. One end of this spectrum includes web-based applications, like ClimateWizard, which permit non-technical users to quickly and efficiently generate sophisticated analyses and graphics that are provided "ready to use" in reports and presentations. We then describe a select set of tools and data sources that are particularly well suited for park-based studies. These include the NPS Climate Grid Analysis Toolset, geospatial data portals, and select code in the R language.

Kirk Sherrill, National Park Service, Inventory and Monitoring Division, Ft Collins, CO
Bill Monahan, National Park Service, Inventory and Monitoring Division, Ft Collins, CO
John Gross, National Park Service, Inventory and Monitoring Division, Ft Collins, CO

Scaling Up by Measuring Landscape Connectivity and Land Use Change for US Climate Adaptation

Increasingly, park scientists and managers need to "scale up" and incorporate information about ecological flows and landscape connectivity. A key ecological flow is movement of terrestrial animals – which links directly to connectivity, a primary climate adaptation strategy. As part of a series of ecological forecasting and wildlife planning projects, we developed and refined a dataset on landscape-level connectivity for mainland US. We used a gradient-based landscape connectivity approach that estimates how connected a given location is to all other locations within one of ~10 biomes, assuming that movement is related to the degree of human modification. We used a multi-scale landscape permeability model that relies on basic tenants of conservation biology, is relatively robust to climate forecast uncertainties, and directly incorporates measurable impacts due to land use change. We discuss the implications of our national analysis of key connectivity areas and the availability of the database via NPScape.

David M. Theobald, National Park Service, Inventory and Monitoring Division, Fort Collins, CO
Sarah E. Reed, Wildlife Conservation Society and Colorado State University, Department of Fish, Wildlife, and Conservation Biology, Fort Collins, CO

Using NASA Resources to Inform Climate and Land Use Adaptation

Managing for adaptation to future climate and land use change requires improving our ability to forecast biological responses, assess spatial variation in vulnerabilities, and design multi-scale management strategies based on vulnerability and management feasibility. We're developing a four-step climate adaptation strategy in the Great Northern and Appalachian Landscape Conservation Cooperatives using NASA and other data and models. We first quantify historical, contemporary, and future trends in ecological processes and vegetation types using the NASA Terrestrial Observation and Prediction System (TOPS) and the SERGoM land use model. We assess vulnerability of ecological processes and vegetation types to climate and land use change via expert panels that quantify exposure, sensitivity, adaptive capacity, and uncertainty. With agency partners, we will evaluate management options for vulnerable ecosystem components and design multi-scale management approaches for vulnerable elements to illustrate adaptation strategies. We

Andrew J. Hansen, Montana State University
Scott Goetz, Patrick Jantz, Woods Hole Research Center
John E. Gross, National Park Service Inventory and Monitoring Program

Time for a Resurrection of Biosphere Reserves?

5220

Conservation biology tells us that to be effective as conservers of biological diversity and evolutionary processes, protected areas are often: too small, wrong shape, poor perimeter-to-area ratio, unbuffered, and unconnected to other reserves. In the USA, only a few protected areas are large enough to meet the challenges of climate change, aggressive alien invasives, large carnivore conservation, and increasing human backcountry visitation. Surrounding these "cores" with a buffer of nature-friendly land-uses can effectively increase the size and modify the shape of the core, within a Conservation Area. The concept and designation of Biosphere Reserve (BR) provides a practical model for meeting some of these challenges. A Biosphere Reserve is an internationally recognized, planned conservation area, initiated by UNESCO's Man and the Biosphere Program in 1974. There are currently 580 BRs in 114 countries, but the idea and use has been "mothballed" in the USA mainly for political reasons.

Larry Hamilton, IUCN WCPA, Charlotte, VT

U.S. Role in the World Network of Biosphere Reserves

Cold war science diplomacy resulted in the Man and the Biosphere (MAB) Programme of UNESCO (1971) and its flagship project that has led to the World Network of Biosphere Reserves (WNBR) now counting 610 sites in 117 countries. Since then, US collaboration in MAB has dwindled and the US has not proposed new sites since 1996 and has not yet undertaken periodic reviews of its 47 biosphere reserves as required by the Statutory Framework of WNBR (1995). The Russian Federation and many developing and developed countries are very active in WNBR. Since 2008, biosphere reserves are viewed as landscape, regional-scale laboratories for experimenting with sustainable development pathways for conservation areas and associated communities. Opportunities and challenges for a new era of US collaboration within WNBR are explored and suggestions made in the context of preparations for the 6th World Parks Congress in Australia in 2014.

Natarajan Ishwaran, Visiting Professor, International Centre on Space Technologies for Natural and Cultural Heritage, Beijing, People's Republic of China
Sarah Gaines, Programme Specialist, Man and the Biosphere Programme Secretariat, UNESCO, Paris, France

Thirty-five years of the Mexican Modality of Biosphere Reserves

Pending

Ernesto Enkerlin, Chair, IUCN WCPA, Monterey, Mexico

Information Sharing within the World Network of Biosphere Reserves

The International Biosphere Trust, chartered to support information sharing and collaboration among biosphere reserves, will cooperate with the George Wright Society and UNESCO to initiate information among biosphere reserves. T he World Network of Biosphere Reserves now includes 610 reserves in 117 countries, and 80 or more of these areas include World Heritage sites. This provides a wide array of efforts in different natural and cultural settings that are trying to solve interlinked problems such as biodiversity conservation, climate change, food and water supplies. We can benefit from and contribute to their experience, and create synergy by sharing information. A format developed for Best Practices in the Southern Appalachian Highlands will be used to describe several biosphere reserves. The format includes key elements such as: project objectives and rationale, implementation history; partners and funding sources; achievements, and social, environmental and economic benefits; Challenges; and transferability.

Tom Gilbert, International Biosphere Trust, Knoxville, TN

Discussion on Establishing a Biosphere Reserve Information Network

A group examination of the values and limitations of forming an information exchange network for North American biosphere reserves, and of the potential for a rebirth in the USA of this model for protected areas. A format developed for Best Practices in the Southern Appalachians will be offered to characterize biosphere reserves projects.

John Peine (facilitator), Southern Appalachian Field Lab / USGS, Knoxville, TN
Tom Gilbert, International Biosphere Trust, Knoxville, TN

Better Collaboration through Web Mapping

5531

Natural Resource Condition Assessments (NRCA) focus on getting the most up to date condition information to park managers about natural resources in their parks. The data utilized to determine condition information comes from a variety sources including the National Park Service Inventory and Monitoring programs and other scientific projects that have taken place in the park. To improve data review efficiency in the Intermountain Region, web mapping has been incorporated as part of the NRCA process. The web map is developed from any relevant data before the scoping meeting takes place, and additional pertinent data is added at various stages during the project. The web map allows all staff that are part of the project to review the same data in a geographically relevant online tool that is accessible from often dispersed locations.

Melanie Myers, Research Associate, Colorado State University

Using Web-Based Interactive Maps to Support Park Management

The National Park Service (NPS) Intermountain Region (IMR) Geographic Resources Program (GRP) is looking for ways to increase access to geospatial data in Parks to support planning and management. Web-based technology is advancing and most people have become familiar with on-line mapping sites. GPR is looking to tap into that familiarity and develop NPS Park specific mapping viewers for Park and IMR staff to visualize their geospatial data for a Park, including Park boundaries, natural and cultural resources, trails, campgrounds, facilities, etc. These viewers are being used to create a common operating picture of geospatial data for Park planning, resource management, and compliance activities.

Darcee Killpack, Intermountain Region GIS Coordinator, National Park Service

Sage Wall, Research Associate, Colorado State University

NPMap: Geospatial Tool to Collect Wildland Fire "Core Data"

The National Park Service spends considerable resources collecting spatial data related to wildland fire. Most of this data exists in a non-centralized fashion; stored on various computers at parks, regions, and databases external to the NPS. Until now there has not been a centralized store of this spatial information or a method for non-technical users to access and update that information. As a result, data that could be available to assist in planning, budgeting, and emergency response decisions or to showcase the excellent work of the Fire program does not exist. NPMap changes all this by providing the Fire community with a non-technical application to create and update spatial data. NPMap allows personnel to input information with little training and also creates a "value add" to field users in the form of template maps, web viewers for the data, and a NPS-wide view of the data.

Skip Edel, Geospatial Fire Analyst, National Interagency Fire Center

Cartography for the Web

The NPMap team, in collaboration with the National Park Service's Harpers Ferry Center, recently undertook a project to convert the traditional Harpers Ferry unigrid maps to a set of GIS-based online basemaps that can be used in the park service's web products. This talk will focus on the goals of the project, some of the challenges involved with migrating maps designed for print to the web, and the progress made to date. One particular focus will be placed on the unique cartographic challenges posed by a project of this scale.

Mamata Akella, Research Associate, Colorado State University

Web Mapping for Public Outreach

The NPS Air Resources Division (ARD) in the Natural Resource Stewardship and Science Directorate has collaborated with the NPMap team over the past two years to develop several web map based air quality data delivery products. These products present complex national level data sets through a map interface and are a key component of ARD's information outreach strategy. In combination with the ARD public web page, these maps are intended to communicate air quality conditions, illustrate concerns, and provide data to park staff, researchers, permit applicants and the public in a clear and accessible way. This talk will go over several examples of these maps and explain the process of including a NPMap on a public web page.

Melanie Ransmeier, Air Resources Division, National Park Service
Drew Bingham, Air Resources Division, National Park Service

Evaluating the Long-Term Sustainability of Shuttle Service in Mount Rainier National Park

5423

Conventionally, shuttle service planning includes analysis of operational requirements and financial feasibility to service expected ridership demand, and primary measures of success include passenger volumes serviced relative to cost. In the context of national parks, operational efficiency and cost effectiveness are necessary, but not sufficient factors to evaluate the long-term sustainability of shuttle systems. For example, shuttle systems that are highly effective and efficient at accommodating visitor demand, may deliver unsustainable levels of visitor use, with respect to resource protection and/or visitor experience objectives. This paper presents the results of a study in Mount Rainier National Park to assess the long-term sustainability of shuttle service options, not only in terms of operational requirements and financial feasibility, but in terms of crowding-related capacities for visitor destinations serviced by the shuttle system. Limitations and benefits of the approach are considered for planning sustainable shuttle systems in national parks.

Brett Kiser, Resource Systems Group
Steve Lawson, Resource Systems Group
Bryan Bowden, Mount Rainier National Park, National Park Service

Natural Resource Consequences of Park Transportation System Delivery: An Example From Rocky Mountain National Park

Recreation resource change is often the result of visitor use off of designated trails and sites. Changes to transportation systems and subsequent changes to visitor loads on a trial system can have consequences for resource change off of hardened surfaces. Understanding current resource conditions from both a biophysical and social standpoint can provide a baseline to which transportation-related resource change can be compared. An integrated approach was utilized to examine off-trail resource impacts, visitor judgments of ecologically important resource impacts, and the degree of visitor's exposure to impaired resources in Rocky Mountain NP. Finding show that visitors are interacting with resource conditions which are found to be unacceptable for significant portions of their hikes and are using off-trail areas at densities likely to result in additional resource change. Changes to visitor delivery to trailheads have the potential to influence both visitor behavior and exposure to impaired resources.

Christopher Monz, Utah State University
Ashley D'Antonio, Utah State University
Peter Newman, Colorado State University

Geography, Minority Visitation, and the Accessibility of "America's Best Idea" in a Multicultural Nation

It has been said that national parks are "America's Best Idea," yet visitors to these sites are overwhelmingly white. A number of theoretical perspectives have been proposed for the absence of minority visitors, including socioeconomic marginality, differing cultural norms, and the lingering legacy of discrimination, but geography is not one of the usual explanations. We examine this issue with the expectation that geography is an important part of the explanation for low minority visitation rates. This study uses the geographic concept of accessibility to examine the spatial relationships between national parks and potential minority visitors. Accessibility was measured using driving times between 285 parks and county populations, with the results compared to a visitation database compiled for fifty-one park units. There is a relationship between park visitation and the location of minority populations, in the sense that racial or ethnic minorities are disproportionately represented at closer and smaller national parks.

Joe Weber, University of Alabama
Selima Sultana, University of North Carolina at Greensboro

Transportation as Recreation: Extending the Recreation Opportunity Spectrum

Transportation is fundamental to parks and outdoor recreation. For example, every year millions of visitors travel to, from, and within national parks. But transportation can be more than this – it is often a form of recreation itself, offering most visitors their primary opportunities to experience and enjoy parks and related areas. The Recreation Opportunity Spectrum (ROS) is a systems-oriented framework used to plan and manage diverse outdoor recreation opportunities. The purpose of this paper is to continue developing the ROS tool as it relates to transportation management and planning in outdoor recreation based settings. Social surveys conducted during the summers of 2009 and 2010 were designed to seek indicators and standards of quality across multiple modes of transportation and various contexts of outdoor recreation based tourism. The data collected help inform this conceptual model for a proposed recreational travel opportunity spectrum.

Peter Pettengill, Grand Canyon National Park, National Park Service
Robert Manning, University of Vermont
Rudy Schuster, USGS

Shuttle System Design Features Important to Visitors at Cumberland Island National Seashore

A shuttle system (a recent statutory requirement) is being implemented at Cumberland Island National Seashore (CUIS) to increase visitor access to the site's natural and cultural resources. The design of this system, or others like it, must be particularly sensitive to the context in which it is implemented. A visitor survey (N = 227) was conducted to gather information on design features that visitor want or do not want in the shuttle system. The survey asked respondents to evaluate the type of vehicle, power/fuel sources, vehicle features, vehicle sounds, and costs of ridership. Additional analyses provide insights into attitudinal differences based on past visitation to CUIS, perceptions of existing travel experiences at CUIS, and users' home residence (metropolitan versus non-metropolitan). Results indicate that visitors most want a transportation system with a vehicle type, power source, and features that match their current experience of interacting with historical aspects of CUIS.

Jeffrey C. Hallo, Clemson University
Robert E. Manning, University of Vermont

Protecting National Park Soundscapes: Best Available Technologies and Practices for Reducing Park-generated Noise

5584

Recently, the NPS Natural Sounds and Night Skies Division (NSNSD) conducted a survey to help identify common sources of noise in National Parks. The results of this survey coupled with a review of past requests from parks for technical assistance from NSNSD indicated that park facilities, operations, and maintenance activities result in a substantial portion of noise in national parks. The results highlighted a need to provide park managers with specific tools for preventing and/or mitigating noise impacts generated by internal operations. In response, the Soundscape Restoration Initiative (SRI) was developed to providing tools and guidance for addressing park generated noise. This presentation discusses the SRI and describes the process of identifying best available technology and best management practices for minimizing park-generated noise through a collaborative working group convened by NSNSD under the auspices of the National Academy of Engineering. Preliminary results of the workshop will also be presented.

Frank Turina, PhD, Program Manager,

Policy Planning and Compliance

Addressing Excessive Motorcycle Noise in National Parks

For many motorcyclists, National Parks offer superlative riding opportunities. Many bikers seek out naturally beautiful places to ride and being on a bike gives riders a sense of connection to nature. However, the number of parks reporting excessive motorcycle noise has increased and motorcycles are among the top sources of noise complaints. NSNSD measured motorcycle noise at several National Parks and determined that the loudest motorcycles (often those with modified exhaust systems) were audible for many miles. In response, NPS has conducted acoustical analyses and reached out to various stakeholder groups to better understand the issue. Recently NSNSD attended a Motorcycle Noise Roundtable at the National Academy of Engineering and initiated a public outreach campaign related to the effects of motorcycle noise. This presentation discusses a variety of NPS efforts designed to better understand the issue and protect park resources from the effects of excessive motorcycle noise.

Karen Trevino

Chief, Natural Sounds and Night Skies Division

NPS Intermountain Region and the Air Force: Collaborating with Our Military Counterparts

In the past few years the Intermountain Region Natural Resources Division has been collaborating with the WASO Natural Sounds and Night Skies Division and the United States Air Force (USAF) on current USAF planning efforts - both environmental assessments and environmental impact statements. These efforts include: the expansion of the Powder River military airspace with the potential to impact Little Bighorn Battlefield NM and associated NHL's in IMR and MWR; the Low Altitude Tactical Navigation area based out of Cannon AFB with the potential impact to numerous parks in NM and CO; Petroglyph NM and C-130 night time landings; F-35A training and operational base expansions; relocations of F-16's from Luke AFB to Holloman AFB and its potential impact to White Sands NM. Learn about relationship building, effective mitigation discussion, coordinating with our military counterparts and supporting each other's missions.

Theresa Ely

Physical Scientist

At Long Last: Greater Flexibility in Implementing the National Parks Air Tour Management Act!

Amendments to the National Parks Air Tour Management Act enacted in 2012 provide NPS and the Federal Aviation Administration greater flexibility in implementing the Act and resolving various issues. New provisions for exempting parks with fewer than 50 air tours annually, withdrawing exemptions, voluntary agreements, and a reporting requirement for air tour operators will be discussed as well as an update on progress in resolving National Environmental Policy Act issues with FAA. NPS and FAA are in the early stages of developing voluntary agreements at several parks and progress in developing those agreements will be shared, including lessons learned.

Karen Trevino

Chief, Natural Sounds and Night Skies Division

NPS Pacific West Region Wilderness Air Tour Noise Assessment Strategy

The preservation of natural soundscapes is a key component of protecting Wilderness character. The National Park Service is responsible for determining visitor and resource impacts from the presence of air tours in Wilderness as part of developing Air Tour Management Plans. The principle of nondegradation will be applied to management of air tours in Wilderness, and each wilderness area's condition will be measured and assessed against its own unimpaired standard while integrating the new Wilderness Character guidelines. The goal of the Strategy is to develop a consistent regional approach to protecting Wilderness areas from air tour noise impacts by using a framework to apply consistent noise standards. An important step in this process is the development of wilderness soundscape tiers based on existing noise impacts from air tours. Tier definitions range from Tier 1 (no air tour impacts) to tier 4 (heavily impacted by air tours).

Judy Rocchio

Air Quality – Natural Sounds – Dark Night Skies

Accepted | Accepted w/changes | Redirected to Poster | Poster/Exhibit

Invited Papers Session

Bridging the Gap between Natural Resources and Interpretation

5289

It is imperative that we enhance the communication between resource management and interpretation so that we are better able to convey the impacts and implications of resource issues to the visitors, students, and other groups that our interpreters interact with daily. To engage the public on our resource issues, the NPS Southeast Region, held a Natural Resources/ Interpretation Workshop, in Asheville, North Carolina in 2010. This workshop brought together the disciplines of natural resource management and interpretation/education. The workshop provided a forum for joint problem solving, translating science into messages that are relevant and understood by nonscientists, and investigating tools and techniques for reaching diverse audiences. This presentation shares examples of the benefits of this workshop and collaborative efforts such as an action plan for the lion fish invasion, educational materials about the effects of releasing exotic pets, and interpreting the civil war during the sesquicentennial.

Sherri Fields, Program Manager, Natural Resources Southeast Region
Don Wollenhaupt, Program Manager, Interpretation and Education, Southeast Region
Carol Shively, Education Coordinator, Southeast Region

Scan Me! New Technology Meets Traditional Wayside: An Innovative Approach to Communicating Climate Change

Many parks already experiencing the impacts of climate change are seeking innovative ways to interpret this for their visitors. A group of staff from the NPS Climate Change Response Program, Harpers Ferry Design Center, and representatives from 10 national parks are developing a series of waysides that address the climate change impacts to natural and cultural resources as well as to the visitor experience. These waysides will be grounded in each park's unique context but will utilize new technology like quick response (QR) codes to connect them to each other. This will allow visitors learning about melting glaciers in Kenai Fjords in Alaska to scan the QR code and discover how this change is affecting sea level rise in Everglades in Florida 5,000 miles away. The first series of exhibits will focus on parks impacted by sea level rise, while the second series will bridge parks conducting phenology programs.

Larry Perez, Science Communication Specialist, Everglades National Park

Using QR Codes to Raise Awareness about White-nose Syndrome in Bats

White-nose syndrome (WNS) is a disease of cave-hibernating bats caused by a fungus, Geomyces destructans. After being discovered in New York in the winter of 2006-2007, WNS has spread to 18 additional states and 4 Canadian Provinces devastating the populations of bats in its path. White-nose syndrome is threatening bat populations, as well as visitor use of recreational caves. To prevent spread by people, the NPS is closing caves or asking visitors to go through a decontamination process before entering. To raise awareness about WNS and engage the public in stewardship, the Natural Resource Stewardship and Science Directorate is creating movies accessible on the internet and linked to QR codes that can be posted on cave closure signs, fact sheets, back-country permits, or other locations. QR codes also provide a unique opportunity to learn about where people are accessing the movies, which can allow for more targeted outreach efforts.

Todd Edgar, Web Manager, Natural Resource Stewardship and Science, NPS
Kevin Castle, Veterinary Medical Officer, Biological Resource Management Division, NPS

Climate Change: One Park's Strategy to Communicate a Complex and Controversial Topic

Climate changes in the Southern Appalachian mountains are subtle which presents a special challenge in telling the stories of this controversial topic. Great Smoky Mountains National Park has developed a suite of strategies to get park related climate messages out to several different target audiences. In collaboration with Resource Management, the park's education staff has developed a citizen science phenology monitoring study, podcasts, teacher trainings, curriculum-based education programs and several items for increasing staff knowledge.

Susan Sachs, Education Coordinator, Appalachian Highlands Science Learning Center

Collaborating for Success: Characterizing Air Quality on NPS and FWS Lands

5738

NPS and FWS are collaborating to characterize air quality conditions in FWS wilderness areas, based on an approach used successfully to develop an air quality inventory for the NPS I&M Program. Air quality is recognized as integral to park integrity, as it affects both visibility (how well and how far we can see) and ecosystem health (nutrient cycling, biodiversity). Because so few parks have on-site monitoring (<25%), the

Ellen Porter, Air Resources Division, National Park Service
Jill A. Webster, Air Quality Branch, US Fish and Wildlife Service
John D. Ray, Air Resources Division, National Park Service,

Implementing Phenology Monitoring on NWS Refuges to Inform Management in an Era of Climate Change

The National Wildlife Refuge System (NWRS) Inventory and Monitoring (I&M) initiative, administered by the U.S. Fish & Wildlife Service (USFWS), has targeted phenological monitoring as a priority task. The USFWS and the USA-National Phenology Network (USA-NPN) share common goals of understanding and communicating the phenology of plants, animals, and landscapes in response to rapid climate change.

Carolyn Enquist, USA National Phenology Network & the Wildlife Society

Jana Newman, Fish and Wildilife Service, Inventory and Monitoring Branch

Strategic Park and Refuge Partnerships for Promoting Climate Change Adaptation

Landscape Conservation Cooperatives (LCCs) provide an important mechanism for neighboring landowners to coordinate their resource management practices, thereby promoting climate change adaptation through increasing the effective sizes, latitudinal and elevational gradients, and connectivity of their individual management units. Such local partnerships must be further evaluated relative to other important

William Monahan, Inventory and Monitoring Division, National Park Service
Jana Newman, Inventory and Monitoring Branch, US Fish and Wildlife Service
David Theobald, Inventory and Monitoring Division, National Park Service

Partnership-based Monitoring of Coastal Salt Marshes in the South Atlantic LCC: Case Study

In 2010, as a part of the Obama Administration's efforts to prepare for landscape-scale conservation challenges such as climate change, agencies within the Department of Interior were charged with developing a coordinated strategy to integrate mitigation and response planning efforts. Agencies were directed to ensure that managers of trust resources were using current science to prepare for expected changes, and to do so that

Joe DeVivo, National Park Service
Laurel Barnhill, US Fish and Wildlife Service

Conservation Design on the Gulf Coast Prairies LCC: Prioritizing Sustainable Conservation Lands

Marsh habitats of the Gulf Coast Prairie Landscape Conservation Cooperative (GCPLCC) house a diverse spectrum of species, whose populations are threatened by anthropogenic stressors, climate change and sealevel rise. We'll be talking about our approach to prioritize habitats within the coastal areas of the GCPLCC which includes predicting future change to inform a strategic expansion of conservation areas by the USFWS

Kristine Metzger, US Fish and Wildlife Service
Steven Sesnie, US Fish and Wildlife Service
Grant Harris, US Fish and Wildlife Service

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Invited Papers Session

5737

Coordinated Data Management for Avian Monitoring

The U.S. Fish and Wildlife Service and its conservation partners have been monitoring birds since the Migratory Bird Treaty Act was passed in 1918. To maximize the value of data from this extensive effort, data collection and management needs to be coordinated, so that bird data can be summarized and analyzed to support planning and management at local (refuge), regional and national scales. We will suggest two different approaches to bird data management. One approach is a distributed data management model. The other approach uses a centralized application. These different approaches to data management illustrate the challenges posed in attempting to coordinate regional and national data collection and management.

Lee O'Brien, US Fish & Wildlife Service
Melinda Knutson, US Fish & Wildlife Service
Bill Thompson, US Fish & Wildlife Service

Monitoring and Multi-scale Analysis of Dominant Vegetation in National Parks of the Southern Colorado Plateau

We're monitoring the vegetation of predominant park ecosystems to describe status and trends in composition, structure and diversity. We expect the different capacities of plants to match the prevailing environment will result in changing plant assemblages through time. As part of our role to identify and interpret trends, we need to determine what kinds and scales of environmental and historical controls are

Lisa Thomas, National Park Service
Jodi Norris, National Park Service
Kristin Straka, National Park Service

Upper Columbia Basin Network (UCBN): Dissemination of Monitoring Results to Park Staff and Visitors

One important, yet often overlooked aspect of natural resource monitoring, is the dissemination of results to a variety of audiences. The Upper Columbia Basin Network (UCBN) has developed a hierarchy of communication products that target specific audiences ranging from park natural resource staff and interpretive rangers, to the general public. Products include: annual reports, oral presentations, resource

Eric Starkey, National Park Service

Giving National Park Service Employees the Science They Want

Frankly, generating any interest in natural resources monitoring on a network-wide scale to the average NPS employee is like explaining the macroeconomics of dog food distribution to a poodle. If it doesn't involve them directly, it's just white noise. As an Inventory and Monitoring (I&M) Science Communicator, relaying general natural resources status and trends across a large geographical area falls on mostly deaf ears. To

Corbett Nash, National Park Service

Conserving the Future: Wildlife Refuges and the Next Generation

The National Wildlife Refuge System faces unprecedented new challenges and Conserving the Future: Wildlife Refuges and the Next Generation is intended to inspire and empower current Service employees to lead the Refuge System in the coming decades. Our vision is to embrace a scientific, adaptive, landscapelevel approach to managing refuge land and waters. This partner-based focus of conservation planning

Anna Harris, US Fish & Wildlife Service
Noah Kahn, US Fish & Wildlife Service

Using Personality Measurements in Field Research on Soundscapes: Two Brief Options

5469

Collaborative research utilizing laboratory, internet, and park visitor samples has focused on creating short, field viable measures of two individual differences related to soundscape research—noise sensitivity (NS) and motivation for sensory pleasure (MSP). Five studies, including two in national parks, were conducted to reduce the 21-item NS and 15-item MSP scales to five item versions. Results show that the new versions are internally consistent, highly correlated with the original, and stable across a five week delay. The scales are also predictive of noise annoyance ratings, sound related motives, and noise acceptability judgments. The presentation of this research will focus on these traits and their use in noise research, while also outlining the measurement properties of the shortened measures. Discussion of where such measures would be most beneficial for existing soundscape research in natural spaces and recreation will be included.

Jacob A Benfield, Pennsylvania State University–Abington;
Gretchen A. Nurse, University of Arizona
Paul A. Bell, Colorado State University

Cognitive, Affective, and Biophysical Response to Motorized Noise in National Parks

Noise from motorized vehicles in protected areas has the potential to negatively impact the experience of visitors at both cognitive and emotional levels. In this laboratory study, subjects evaluated landscape scenes from national park settings while listening to both natural sounds (i.e., birds, wind, and water) and anthropogenic motorized sounds (i.e., motorcycles, snowmobiles, and aircraft). Subjects assessed the scenes along a range of cognitive dimensions, and affective data were acquired in response to the combined visual and auditory stimuli that were experienced. Biophysical data (heart rate and galvanic skin response) were concurrently obtained to measure autonomic nervous system reactivity, as an indicator of emotional arousal. Biophysical approaches may provide useful complements to traditional survey research in protected areas, especially with regard to more subjective affective data. Combining cognitive, affective, and biophysical data can improve validity for researchers and managers studying the impact of soundscapes on visitor experience.

David Weinzimmer, Colorado State University
Peter Newman, Associate Dean of Warner College of Natural Resources, Colorado State university
Derrick Taff, Postdoctoral Research Associate, Human Dimensions of Natural Resources, Colorado State University

Modeling and Mapping Visitors' Exposure to Roadway Noise and Natural Sounds in Yosemite National Park

Park roads provide the primary means by which the public is able to access, and in turn, enjoy national parks. At the same time, vehicle noise from park roads can predominate national park landscapes, causing impacts to wildlife resources and the quality of visitors' experiences. Consequently, transportation planning in national parks must consider impacts to the quality and character of park soundscapes. This paper presents the results of a study to assess transportation-related impacts to visitors' opportunities to experience natural sounds and quiet in the Tuolumne River watershed within Yosemite National Park. Roadway noise modeling tools were used to map the spatial extent and intensity of roadway noise originating from Tioga Road and propagating across the landscape in the Tuolumne River watershed. Further, information from the roadway noise model was integrated with GPS-based hiking track data to model visitors' exposure to roadway noise, natural sounds, and quiet while hiking.

Eric Talbot, Resource Systems Group
Steve Lawson, Resource Systems Group
Brett Kiser, Resource Systems Group

Aviation Noise Exposure: Impacts on Visitor Experience and Soundscape Perception

Nearly 4,000 backcountry visitors were surveyed at eight locations in four National Parks (Grand Canyon, Bryce Canyon, Zion, and Glacier) in a joint Federal Aviation Administration and National Park Service research program to further the understanding of aviation noise on the park visitor's experience and perception of the natural soundscape. Experts from the fields of social science, natural resource management, and acoustics collaborated on the development of multiple survey instruments that were employed to allow for direct comparison of different research strategies. Together with corresponding measurements of the soundscape and aircraft noise, the visitor surveys are used to examine the correlation between noise exposure and visitor responses. Analyses conducted to-date include 1) comparison of the survey instruments, 2) identification of salient noise exposure metrics and circumstances which influence response, and 3) development of quantitative noise-exposure—visitor-response curves.

Amanda S. Rapoza, U.S. Department of Transportation, Research and Innovative Technology Administration, Volpe

Protecting Soundscapes in U.S. National Parks: Lessons Learned from the Laboratory to the Field

Researchers and protected area managers' are working together to protect natural soundscapes in U.S. National Parks. In this paper, soundscapes have been defined as the total acoustics environment and includes the sounds of nature and as well as anthropogenic noise (unwanted sounds). In particular, human-caused noise can mask the sounds of nature and detract from the quality of the visitor experience and have negative impacts on wildlife in parks and protected areas. Over the past decade, researchers at Colorado State University and Resource Systems Group have teamed up with the United States National Park Service (USNPS) to explore, build simulation models (based on visitor tracks from deployed GPS units) of, and derive management actions in order to protect natural quiet and the soundscapes of national parks. This paper will provide an overview of challenges and successes of these efforts in order to create a list of lessons learned.

Peter Newman, Colorado State University, Colorado, USA, Peter.Newman@Colostate.edu
Derrick Taff, Colorado State University, Colorado, USA, Derrick.Taff@Colostate.edu
Steve Lawson, Resource Systems Group, Inc., Vermont, USA, Steve.Lawson@rsginc.com

Unconventional Oil and Gas Development – An Assembly Line

5343

Oil and gas drilling and production is an industrial activity with its own line up of associated environmental consequences. Add the vast resources of previously uneconomic shales into the mix and you have an industry on steroids. This presentation covers the advances in drilling and hydraulic fracturing techniques that have made development of "unconventional" shale plays possible, and compares the connected impacts of their development with those of traditional oil and gas drilling and production. From that comparison, one can draw a few implications for units of the National Park System. This presentation will cover the technologies used to recover oil and gas resources from shale deposits and the associated impacts of the intensive development.

Pat O'Dell, National Park Service, Natural Resource Stewardship and Science Directorate, Geologic Resources Division

Hydraulic Fracturing: The Real Risks to Drinking Water Supplies Associated With the Subsurface Process

Hydraulic fracturing has been used by the oil and gas industry as a well/reservoir stimulation technology to enhance well productivity since the mid 1940's. Approximately 1.2 million fracks have been completed without documented chemical impact to a potable aquifer. Fracking is used narrowly by the oil and gas industry and state regulators to describe the reservoir/well "stimulation process" or more broadly by the public and EPA to encompass nearly every aspect of unconventional resource development that fracking coupled with other new technologies make possible. Fracking has transformed uneconomic, low permeability sandstones and shales to highly productive oil/gas reservoirs adding a huge new domestic reserve base with significant energy pricing and security benefits. This presentation explores in some detail industry fracking practices, why so few subsurface impacts seem to occur based on the theoretical and empirical evidence and what the real threats to drinking water supplies will likely be going forward.

Pete Penoyer, National Park Service, Natural Resource Stewardship and Science Directorate, Water Resources Division

North Dakota National Parks: In the Midst of the Bakken Boom

All three NPS sites in North Dakota – Theodore Roosevelt National Park, Fort Union Trading Post National Historic Site, and Knife River Indian Villages National Historic Site - are being severely impacted, both directly and indirectly by the largest oil boom in the United States in the last 50 years. The threats and potential threats are serious and numerous but the parks are working to mitigate and minimize the impacts. Energy development has resulted in a wide range of current and potential direct adverse impacts to viewsheds and soundscapes. Additionally, the parks are experiencing indirect effects such as lack of housing for park staff, increase in crime, dangerous and substandard road conditions, fragmentation of wildlife habitat surrounding the parks, lack of lodging and camping for park visitors, deterioration of the visitor experience, and deterioration of the quality of life for residents in communities near NPS sites.

Valerie Naylor, National Park Service, Theodore Roosevelt National Park

Marcellus Shale Development in the Northeast Region: New Frontiers in Energy Development in the East

The development of the Marcellus Shale in the Northeast U.S. has raised important resource and policy issues for the NPS. Once considered too expensive to extract, the resources of the shale plays in the Appalachian Basin have become a keystone to America's natural gas supply. A majority of mineral ownership is held by private or state entities, which adds layers of cooperation and complexity not often encountered in federal land management. New technologies continually move development at a quick pace. Different state regulations create concentrated hot spots of development and eastern River Basin Commissions approach water use differently. Although potential resource impacts have been identified, new federal research and science plans may take years to complete. This presentation will focus on the lessons learned and new challenges the NPS faces in balancing the needs of domestic energy development with the need to protect park resources for future generations.

Holly S. Salazer, National Park Service, Northeast Region

Panel Discussion: How Can the NPS Mitigate Impacts from Energy Development?

Each presenter will have 5 minutes to discuss "So now what do we do?" The panelists will explore partnerships, collaborative techniques, and legal and policy technical solutions to help mitigate the potentially overwhelming effects that shale oil and gas development can have on NPS units. After four brief presentations, the audience will have an opportunity to discuss additional solutions and ask the presenters questions about their experiences with shale oil and gas development.

Valerie Naylor, National Park Service, Theodore Roosevelt National Park

Holly S. Salazer, National Park Service, Northeast Region

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Invited Papers Session

Updating the National Park Service's Nonfederal Oil and Gas Regulations

5525

In 1979, the NPS promulgated regulations governing the exercise of nonfederal oil and gas rights in units of the National Park System. At present, 668 private oil and gas operations exist in 12 park units. Certain provisions in the 9B regulations exempt 51% of these wells and operators do not need to meet NPS operating standards and are creating unnecessary impacts on park resources and visitor experience. Because of these exemptions and other gaps in the current 9B regulations, the NPS has undertaken a rulemaking effort to update and improve their overall effectiveness. This presentation will discuss the potentially adverse effects of nonfederal oil and gas operations in units of the national park system, authority that exists under the current 9B regulations to avoid and minimize impacts, and the proposed regulatory revisions that will improve a park manager's ability to protect park resources and values.

Edward Kassman, Jr., National Park Service, Natural Resource Stewardship and Science Directorate, Geologic Resources Division

Coal Mining in Tennessee and Kentucky and the Protection of Downstream National Park Units

The Big South Fork National River and Recreation Area and the Obed Wild and Scenic River are located on the Cumberland Plateau of Kentucky and Tennessee. Historic coal mining impacts are visible in the parks and mining is presently occurring in the watersheds above both parks. Mining impacts that affect park waters include increased alkalinity of surface water, increased sediment in streams, acid mine drainage, and loss of fish and mussels. In Tennessee, the U.S. Office of Surface Mining regulates coal mining permits. Cooperative research projects and multi-agency watershed planning efforts have encouraged communication between agencies. Coal mine permit reviews have been the most effective method to articulate NPS concerns about individual mining projects and participation as a cooperating agency in federal undertakings is the most effective method for stating NPS concerns for large areas. Protection of park resources requires communication and active participation in external mineral issues.

Tom Blount, National Park Service, Big South National River and Recreation Area

Reducing Air Resource Impacts from Energy Development Projects

Clean air, unimpaired scenic views and thriving healthy ecosystems are important resources and values that define national parks and other protected areas. Land management agencies have traditionally been engaged in Clean Air Act (CAA) oversight for large sources. But the realm of sources affecting protected areas is shifting from CAA-regulated point sources to unregulated or under-regulated "area" sources. In particular, oil and gas development is booming in many areas, leading to air resource deterioration in traditionally rural, unimpaired areas. In response, land management agencies have developed collaborative and innovative methods to ensure that air quality analyses are conducted, and appropriate mitigations are employed. This session will briefly frame the issue, address the technical tools available to assess impacts, and lastly discuss the policy solutions to ensure air quality and resources sensitive to air pollution are protected.

Andrea Stacy, National Park Service, Natural Resource Stewardship and Science Directorate, Air Resources Division

Tools to Protect Treasured Landscapes - Viewshed Analyses

Many National Parks and other park units have spectacular views that look outside the park across lands that are managed by other agencies or are privately owned. As part of its approach to visual resource management, NPS is using GIS tools and field investigations to understand how much of the viewshed is actually visible and the extent to which the viewshed is visible from various areas within a park. These tools will assist parks in the inventory and evaluation of the viewsheds and their importance to the visitor experience. With this information the park can work cooperatively with land management agencies and community partners to protect viewsheds. This presentation will review some results of using these viewshed analysis tools and how they can better inform park managers to support compatible land uses adjacent to parks while protecting the most treasured views across these shared landscapes.

Mark Meyer, National Park Service, Natural Resource Stewardship and Science Directorate, Air Resources Division

Predicting Natural Ambient Sound Levels and Noise Propagation from Energy Development in National Parks

Noise and light pollution are spatially extensive environmental impacts from most energy development projects. For sound, new GIS tools are available to predict what the natural sound levels should be in the absence of all noise – the natural ambient level – as well as the existing sound level with noise included. Other software provides explicit spatial modeling of the spread of noise across landscapes, to map the distribution of noise levels and predict how far it will be audible. For light, a mix of quantitative models and qualitative criteria are available for assessing the potential spatial extent of impacts. Despite their seemingly ephemeral nature, noise and light pollution are increasingly chronic phenomena on regional and continental scales. Mitigation is both desirable and practical.

Kurt Fristrup, National Park Service, Natural Resource Stewardship and Science Directorate, Natural Sounds and Night Skies Division

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Invited Papers Session

North Dakota National Parks: In the Midst of the Bakken Boom

6670

Valerie Naylor, Superintendent, Theodore Roosevelt National Park

Shale Development in the Northeast Region: New Frontiers in Energy Development in the East

The development of the Marcellus, and soon Utica, Shales in the Northeast U.S. has raised important resource and policy issues for the NPS. Once considered too expensive to extract, the resources of the shale plays in the Appalachian Basin have become a keystone to America's natural gas supply. A majority of mineral ownership is held by private or state entities, adding layers of cooperation and complexity not often encountered in federal land management. New technologies continually move development at a quick pace. Different state regulations create concentrated hot spots of development and eastern River Basin Commissions approach water use differently. Although potential resource impacts have been identified, new federal research and science plans may take years to complete. This presentation will focus on the lessons learned and new challenges the NPS faces in balancing the needs of domestic energy development with the need to protect park resources for future generations.

Mary C. Krueger, Northeast Region, National Park Service

Unconventional Oil and Gas Development: An Assembly Line

Pat O'Dell

Hydraulic Fracturing: The Real Risks to Drinking Water Supplies Associated With the Subsurface Process

Pete Penoyer

Reducing Air and Viewshed Impacts from Energy Development Projects

Clean air, unimpaired scenic views and thriving healthy ecosystems are important resources and values that define national parks and other protected areas. Air pollution and visual threats to these resources often come from outside park boundaries. Increasingly, the realm of sources affecting protected areas is shifting from regulated point sources to unregulated or under-regulated "area" sources, including oil and gas development and utility-scale renewable energy projects. This is leading to air resource and viewshed deterioration in traditionally rural, unimpaired areas. In response, land management agencies have developed collaborative and innovative methods to ensure that air quality analyses are conducted, viewsheds are identified, considered and protected, and appropriate mitigations are employed. This session will briefly frame the issue, address the technical tools available to assess impacts (e.g., GIS and air quality models), and lastly discuss the policy solutions to ensure that air resources and sensitive viewsheds protected

Andrea Stacy, Air Resources Division, National Park Service
Mark Meyer, Air Resources Division, National Park Service

A Geospatial Analysis of Potential Resource Conflict Resulting from Energy Development within Park Landscapes

5582

Responding to cumulative impacts with consistency across park and regional boundaries at landscape-scales requires establishing an objective, consistent, and proactive approach to identifying adjacent or proximal areas with explicit or potential connection to NPS resources. Utilization of available geospatial data and analytic tools to assess potential risks of proposed external land use actions represents a viable approach for dialog with NPS managers, other agencies, and groups proposing land use actions. Our response to the Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States highlights the benefit of adopting this approach for addressing potential resource conflicts across broad geographic extents. This resource conflict analysis engaged multiple levels in the NPS organization and incorporated authoritative resource data. Moreover, the experience highlights the potential to respond in a consistent and timely manner, acting as an initial screening procedure.

Kirk Sherrill, Managed Business Solutions, National Park Service, Natural Resource Stewardship and Science Directorate, Inventory and Monitoring Division, Fort Collins, CO
Dan McGlothlin, National Park Service, Natural Resource Stewardship and Science Directorate, Water

Advancing Offshore Wind Development: Working with Tribal Partners to Identify Submerged Native American Archaeological Sites

New England states are increasingly becoming the focus of proposed offshore wind development to supplement or fulfill renewable energy objectives. The Bureau of Ocean Energy Management (BOEM) is currently funding a cooperative study with the University of Rhode Island and the Narragansett Indian Tribe to develop a science-based, standardized “best practices” methodology for identifying submerged ancient Native American archaeological resources. Archaeological resources on the Outer Continental Shelf are unique because they are non-renewable, irreplaceable, and their discovery is unpredictable. These resources are directly related to past human behavior, are a fundamental element of our nation’s heritage, and have the potential to contain human remains. This study will assist BOEM, individual States, and Tribal communities in evaluating proposed offshore wind energy projects and with developing the appropriate information-gathering protocols and survey measures to avoid or mitigate adverse effects to National Register-eligible or -listed

Brian Jordan, Federal Preservation Officer, Bureau of Ocean Energy Management

Development by Design: Supporting Energy Development Done in the Right Way and the Right Places

The Nature Conservancy (TNC) is developing a number of tools to enhance the decision-making process for energy development. Goals for renewable energy development and biodiversity conservation are synergistic, but they are not currently aligned to ensure that areas of conservation value are protected from development and prioritized for mitigation offsets. Presentation will introduce the TNC’s Development by Design strategy and specific tools as they relate to renewable energy development, including TNC’s recently published study on enhancing conservation-compatibility of solar energy development. Through the use of appropriate decision-making tools for site selection and mitigation activities, planners could reduce development impacts on areas of higher conservation value and reduce trade-offs between creating a green energy economy and conserving biodiversity.

Joseph Kiesecker, Lead Scientist, The Nature Conservancy
Laura Crane, Director of the Renewable Energy Initiative, The Nature Conservancy
Richard Cameron, Senior Conservation Planner, The Nature Conservancy

Characterizing Tribal Cultural Landscapes for Resource Preservation and Protection During Renewable Energy Development

Understanding the types and locations of significant cultural resources is essential to their preservation and protection during offshore renewable energy development. A National Oceanic and Atmospheric Administration project, funded by the Bureau of Ocean Energy Management, is working with Native American communities to develop a proactive approach to characterizing areas of tribal significance that should be considered in the planning process. Using a holistic cultural landscape approach that integrates science with historical, archaeological, and traditional knowledge, this project will develop: a tool describing best practices for tribes to identify and convey areas of significance; and case studies from three West Coast tribes demonstrating how to use this tool. These will provide a transferable and transparent method to document places and resources significant to coastal tribal communities. Energy planning and siting decisions, and the required impact assessments, can be made more appropriately and efficiently, avoiding conflicts, controversies, legal

Valerie Grussing, Cultural Resources Coordinator, National Marine Protected Areas Center, National Oceanic and Atmospheric Administration

Utilizing Visual Impact Evaluation for Offshore Renewable Energy Development in Protection of National Seashore Viewsheds

Many National Parks and other protected areas provide unique opportunities to experience expansive, unobstructed views. Scenic views are highly valued by park visitors, relevant to the natural and/or historical condition of the landscape, and are afforded protection under NPS Management Policies. The NPS, in collaboration with the Bureau of Ocean Energy Management and the State of North Carolina, contributed to the design of a pilot visual resource simulation for potential offshore wind impacts to the scenic viewsheds off the North Carolina coast, including Cape Hatteras and Cape Lookout National Seashores. These simulations will be distributed for public review and comment as part of the BOEM environmental review process of the North Carolina offshore wind energy lease blocks, and greatly enhance informed decision-making on the identification of appropriate leasing areas. This pilot project represents a way forward for interagency collaboration on viewshed protection.

Patrick Kenney, Superintendent, Cape Lookout National Seashore, National Park Service
Brian Krevor, South Carolina Environmental Lead, Bureau of Ocean Energy Management

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Invited Papers Session

Beautiful Views: NPS roles in improving visibility and enhancing clean air in parks

5416

Visibility, and overall air quality, in national parks can be impaired by human caused emissions from local sources or transported long distances. Understanding the relative importance of different source types and regulatory options to reduce emissions is essential to protecting visibility. Sulfate, primarily from fossil fuel combustion, dominates haze in the eastern US. Fossil fuel combustion, including electric utilities, industry, motor vehicles, and marine shipping, also contribute to nitrate particles in haze across the country. In the western US, wildfire, dust, and pollutants originating outside the continental US are important, and difficult to control, contributors to haze. In response, States and EPA have implemented controls for major sources. However, oil and gas production and emissions have increased significantly in the past decade and are of concern for several western parks. Examples of emissions sources and actions the NPS can take will be discussed.

Pat Brewer, NPS ARD

Protecting Shared Viewsheds – Examples from Blue Ridge Parkway & Grant Kohrs National Historic Site

The conservation of scenery is explicitly identified in the NPS Organic Act as one of the fundamental purposes for the establishment of parks and national monuments. Despite the historic lack of a NPS wide program to protect views that extend beyond park boundaries, extensive work has been done by individual parks to preserve park character and protect views that are integral to the visitor experience. This presentation will review how collaboration with surrounding communities and partners at Blue Ridge Parkway, in NC and VA, and Grant Kohrs Ranch National Historic Site, in MT, have resulted in crucial viewshed protection. Blue Ridge Parkway developed a Scenery Conservation Program that incorporates extensive involvement with county governments, private landowners, developers and other agencies. At Grant Kohrs Ranch, protection of the historic landscape setting was also achieved through collaboration with surrounding land owners and agencies.

Laura Rotegard, NPS

An Approach for Protection of Treasured Landscapes Across Shared Viewsheds.

The idea that people value scenic landscapes and that viewing spectacular scenery is a primary element of their enjoyment of the outdoors has long been a focus of land management agencies. The US Forest Service and Bureau of Land Management have visual resource programs in place to guide the management of the visual landscape within their respective multiple use missions. The conservation of scenery is explicitly identified in the National Park Service (NPS) Organic Act as one of the fundamental purposes for the establishment of parks. While the NPS has successfully protected the scenery within parks, many of our most treasured scenic views are across lands that are not managed by NPS and we have lacked a consistent approach to address these shared viewsheds. This presentation will provide an overview of the system that the NPS is developing to assist in the management of shared viewsheds.

Mark Meyer, NPS ARD

Panel Discussion - Part 1

Session participants will lead a discussion of “Enjoy the View”: Call to Action #38. We invite questions and ideas from GWS attendees for how to make this an effective action for the NPS.

Mary Gibson Scott, NPS; Mike Murray, Retired NPS; Bret Schichtel, NPS; Susan Dolan, NPS; Jim Renfro, NPS; Pat Brewer, NPS; Laura Rotegard, NPS; Mark Meyer, NPS; Carol McCoy, NPS

Panel Discussion - Part 2

Session participants will continue discussing “Enjoy the View”: Call to Action #38. We invite questions and ideas from GWS attendees for how to make this an effective action for the NPS.

Mary Gibson Scott, NPS; Mike Murray, Retired NPS; Bret Schichtel, NPS; Susan Dolan, NPS; Jim Renfro, NPS; Pat Brewer, NPS; Laura Rotegard, NPS; Mark Meyer, NPS; Carol McCoy, NPS

Modeling Recreation Dynamics and Capacity at Multiple Spatial Scales

5353

Recreational behaviors are complex and dynamic. This is particularly true when recreation areas are large, experiential opportunities are diverse, and demands for access are high. Freedom of movement and from the interference of others are key elements of high quality recreation. Influenced as much by site design and management as by the magnitude of use, these freedoms often underlie quality objectives for parks and protected areas. When seeking to manage large, complex and diverse areas in a holistic and systematic way, area-wide use patterns must be linked with site-specific crowding related impacts. This research presents an integrated approach to visitor use modeling at multiple spatial scales. Spatial models of recreation sites, including trails, roads, camps and attractions, provide a common basis for analysis and integration. GIS based network models identify locations within recreation areas where use concentrates, while micro-simulation models estimate individual and aggregated recreational freedom and crowding-related impacts.

Jeremy Wimpey - Applied Trails Research

Nathan Reigner, Jillian Spies, Robert Manning - Park Studies Laboratory, University of Vermont

Visitor Crowding in 3D! Linking Perception and Behavior for Research and Management

Visitor crowding and carrying capacity are perennial interests of recreation researchers and managers. Often, this interest focuses on the perceptions of visitors. Do they feel crowded? What are their expectations for use level? However, crowding can also manifest in behavior. Do visitors' behaviors change as use increases or concentrates? Both dimensions of crowding are important for parks and related areas seeking to protect resources and promote high quality visitor experiences. To effectively understand and manage perceptions and behavioral effects of visitor use, empirically robust, quantitative measures of crowding are needed. This understanding sets up a three dimensional (perception, behavior, management) model of visitor use and crowding. GIS serves as a platform to integrate and translate measures among these three dimensions. This research develops a new method for monitoring and evaluating visitor use that acknowledges and reflects simultaneously the managerial, perceptual and behavioral dimensions.

Nathan Reigner, Jillian Spies - Park Studies Laboratory, University of Vermont

Jeremy Wimpey - Applied Trails Research

Monitoring Group Distribution and Behavior in Open Landscapes of Yosemite National Park with Geospatial Technology

Recent geospatial applications in parks have highlighted the utility of spatial analysis in visitor management. These techniques often observe and analyze individual visitors. Previous research has documented the influence of group size and behavior on ecological and social impacts, suggesting a need to also document use patterns of groups. An unobtrusive observational study incorporating field GIS to document the characteristics, dispersal and behavior of visitor groups was applied in three high-use meadows of Yosemite National Park. Results from the 181 groups observed in the three meadows indicate limited to moderate group dispersal, with the majority of groups remaining within 5 m of the other members. Options available for visualizing patterns and additional spatial analysis will be discussed along with method benefits and limitations. Lessons learned from method application can aid managers to obtain spatial data on visitor groups and support visitor management strategies.

Chelsey Walden-Schreiner, Yu-Fai Leung - Dept. of Parks, Recreation, and Tourism Management, North Carolina State University

The Importance of Spatial Considerations in Understanding the Relationship between Visitor Use and Landscape Impacts

As managers and researchers continue to seek a balance and understanding of how visitors and the community interface with the landscape, spatial analysis may play a critical role. Specifically, spatial considerations are important for inventorying, monitoring, and managing the conditions of multiple-use trails. Newer technology such as GPS and GIS may allow for a unique assessment of the relationships between trail design, intensity of use, and recreational impacts. A combination of visitor GPS tracking (n=256) and traditional trail monitoring techniques were used to assess how visitor use distribution, activity type (hikers, runners, bikers, or horseback riders), amount of use, and trail design influence the impacts to trail conditions. Statistical issues related to spatial concerns are addressed. Results suggest that horseback riding routes and trail design are the best predictors of trail impacts when controlling for spatial autocorrelation, demonstrating GPS as a method for identifying trail monitoring priorities.

J. Adam Beeco, Jeffrey Hallo - Department of Parks, Recreation, and Tourism Management, Clemson University

Rockie English - Department of Forestry and Natural Resources, Clemson University

Your Cellphone Measures Far More than You Can: Smartphones as Pro-grade Park Monitoring Sensor Platforms

Recent advances in medical, robotics, and mobile technologies are signaling changes in how park managers can approach resource monitoring and facility management. Using a smartphone, for example, a researcher or manager can now quickly and easily "MRI" a trail, collecting measurements or monitoring conditions without needing prior intensive training or additional equipment. This presentation outlines the use of cellphones and similar devices to collect large sets of monitoring data faster and more reliably than with existing manual techniques. This approach transforms collecting data points from a manual one-by-one process to an automated process capable of collecting more than 62 million data points per second. The collected monitoring data are processed, analyzed, and output confidentially in flexible and highly visual formats using a process similar to video and image upload websites. Such a "big data" approach enables detailed spatial analysis and lends support to planning and management decision-making.

Logan Park - Forest Recreation and Park Management, Southern Illinois University

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Invited Papers Session

Vision of the National Park Service for Cultural Resources and Climate Change

5382

Cultural resources have a dual relationship with climate change: impacts of climate change on cultural resources and representation of the human past and long-term human interactions with the environment. The NPS Climate Change Response Strategy was published in 2010 and set out the "four pillars" of the NPS Climate Change Response Program: science, adaptation, mitigation, and communication. This paper introduces the session and lays out work now underway by NPS and partners to fully develop the cultural resources impacts and information translation and engagement components of these four pillars. Results of this work will include guidance on integration of cultural resources into climate science, identification of climate impacts and monitoring of at-risk resources, adaptation options and decision frameworks for cultural resource management, and examples of the stories cultural resources can tell about human adaptability to changing environments and the perspectives they provide in planning for future change.

Marcy Rockman, U.S. National Park Service

The Big Picture: GIS, NPS, and Climate Change Vulnerability Analysis for Cultural Resources

The U.S. National Park Service (NPS) system contains over 100,000 historic, archaeological, or ethnographically significant sites. Climate change is altering the environments of these resources, placing them at risk of destruction or accelerated deterioration. In order to maintain the NPS mission of cultural resource preservation, it is critical to determine what is at risk, in order to take appropriate action. Information science plays a fundamental role in meeting this need, through: providing methods for measuring change and establishing baselines, analyzing/ranking of risks and vulnerabilities, and engaging the public in climate change response. This presentation summarizes major steps in implementing useful tools for vulnerability analysis across the NPS, including integration of spatial data sets from various paradigms and technologies in GIS; finding and choosing threat models; representing uncertainty and confidence; and designing an interface to communicate risks at a multitude of extent and scales to consulting parties and the public.

Jay Flaming, U.S. National Park Service

Cultural Resources in Climate Change Scenario Planning

Planning is a fundamental aspect for the management of cultural resources within the National Park Service. Questions integral to the planning process include: what information is needed for different planning approaches? How can available data inform specific program objectives? How do these objectives intersect with those of other programs? Climate change adds the further element of uncertain changing future environments within which such planning must be designed to function in order to effectively protect park resources. This presentation outlines the importance of planning for the preservation of cultural resources in a changing climate by discussing how the climate change scenario planning incorporates cultural resource considerations. It includes a proposed framework for a cultural resource approach intended to better prepare for future planning efforts directed at managing resources impacted by climate change. Primary discussion points are drawn from recent Resource Stewardship Strategy planning workshops conducted in

Kirstie Haertel, U.S. National Park Service

Cultural Resources Vulnerability at Western Arctic National Parklands, Alaska: Responding to Rapid Environmental Change

The Western Arctic National Parklands (NPS) in northwest Alaska is conducting a large-scale inventory and vulnerability assessment of cultural resources at Bering Land Bridge National Preserve and Cape Krusenstern National Monument. The remote 1600 km-long coastal areas in these parks are experiencing rising sea levels, melting permafrost, and increased storm surges and erosion. Archaeological sites affected by these changes are some of the most significant in North America as information preserved within them is a unique record of the dynamics of human migrations into and interactions with Artic environments from the late Pleistocene onward. This presentation outlines a multi-year study designed to address basic inventory needs and complete a vulnerability assessment for these coastlines. Using a GIS-based predictive model, the study will identify areas most likely to contain significant and vulnerable archeological sites, information which in turn will be used to prioritize future archeological inventories and mitigation measures.

Frank Hays, U.S. National Park Service

Out of Thin Ice: The Unparalleled Archaeological and Paleobiological Record Melting Out of National Parks

Archaeological and paleobiological materials recovered from melting ice patches can provide unique insight into alpine paleoecology, including the use of high elevation environments by Native Americans. This paper shares the archaeological and paleobiological records preserved in ice patches in the Greater Yellowstone Ecosystem and other federal lands ranging from Colorado to Alaska. As revealed by divergent radiocarbon dates, repeated use of these features suggests ice patches were an important element of the sociocultural and geographic landscape for Native Americans in northwestern North America. Efforts have largely focused on the identification of archaeologically productive ice patches as "triage" in the face of global warming; however, the accumulated data can an also be articulated with other records of pre-contact hunter-gatherer lifeways. These articulations help to develop a more robust understanding of the human use of alpine landscapes.

Craig Lee, University of Colorado-Boulder, Institute of Arctic and Alpine Research

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Invited Papers Session

The Importance of Darkness and the Night Sky to National Park Visitors

5363

The National Park Service has recently extended the definition of the landscapes it protects to include the night sky, or lightscapes. However, visitor perceptions of and attitudes toward the night sky and darkness as resources are not fully understood. A survey was developed to explore the importance of darkness and the night sky to visitors and their recreation experiences. The survey was administered to visitors in two campgrounds in Acadia National Park, Maine. Respondents were asked to rate how the ability or inability to see objects in the sky or varying light sources added to or detracted from their experience. Results will be presented using a variation of Importance-Performance analysis to offer suggestions for management. Findings from this study will inform park managers about the quality of nighttime recreation experiences and the importance of the night sky and darkness as resources to be protected for current and future generations.

Ellen L. Rovelstad
Robert. E Manning

Night Recreation in the National Parks: Indicators, Standards, and Related Visitor Perceptions

Outdoor nighttime recreation is participated in and is of value to national park visitors – over 15 outdoor night recreation activities have been identified and darkness has been found to provide new or unique visitor experiences. However, little is known about visitor attitudes regarding night recreation or night resources, or what constitutes a high quality night recreation experience. To investigate this empirically, a visitor survey was conducted in 2012 at Yosemite, Grand Canyon, and Acadia National Parks, and Golden Gate National Recreation Area. This survey used attitudinal questions, photo simulations, and normative approaches to 1) refine and validate indicators for night recreation experiences, 2) gather data to help formulate standards for night sky viewing quality, using the Bortle Scale as a reference, and 3) understand visitors' perceptions of night recreation and night resources. These data may help parks manage nighttime environments to provide high quality night recreation experiences.

Brandi L. Smith

Jeffrey C. Hallo

Visitors' Perceptions of Good Lighting Practices at Acadia National Park

The nighttime environment has traditionally been characterized by darkness in outdoor settings, but human-caused lighting has increased in its intensity and use over the last several decades. Human-caused lighting may impact or enhance many different aspects of a park or protected area, including natural and historical resources, the visitor experience, and opportunities for outdoor recreation. A field-based lighting experiment, a survey, and interviews were conducted in 2012 to examine visitors' reaction to different lighting scenarios at Acadia National Park. Data were gathered on the 1) preferred brightness and color of lighting along walkways and at a bathhouse and amphitheater, 2) factors (e.g., safety, group characteristics) affecting lighting preferences, and 3) attitudes towards park lighting and its influences on the visitor experience. The study results are integrated with prior literature and expert opinion to suggest good lighting practices appropriate for the context of national parks and other similar protected areas.

Brandi Smith
Jeffrey Hallo
John Kelly

Quantifying Rock Fall Hazards in Yosemite National Park

5328

Our NPS-USGS collaboration applies state-of-the-art scientific expertise to a range of rock-fall hazards in Yosemite National Park. From rapid hazard assessments of rock falls, to the implementation of a Yosemite Valley-wide rock-fall hazard and risk assessment, we are using the highest level of scientific inquiry to inform Park managers and the public of the dangers posed by rock falls Our research has resulted in a number of new discoveries. These include: (1) the finding that crack propagation resulting from previous rock falls can be used to assess where additional rock falls might occur, and (2) that cyclic thermal expansion of exfoliation sheets within Yosemite's wide annual temperature range results in cumulative rock deformation of cliffs, and potential subsequent rock falls. We show how these findings, and others, are being used to advance Park science and management, resulting in safer visitor facilities and a better understanding of previously unquantified geologic phenomena.

Brian Collins, Geologist, U.S. Geological Survey, Landslide Hazards Program, Menlo Park, CA

Greg Stock, Geologist, National Park Service, Yosemite National Park, Resources Management and Science, El Portal, CA

Interagency Collaboration on an Active Volcano: A Case Study at Hawaii Volcanoes National Park

Hawai`i Volcanoes National Park (HAVO) includes most of the volcanically active areas of two volcanoes – Mauna Loa and Kilauea. HAVO's mission is to preserve these geologic features, unique ecologies, and cultural elements within the park, while keeping visitors educated and safe during their visits. The USGS Hawaiian Volcano Observatory (HVO), 100 years old this year, operates within the park and is Congressionally mandated to provide timely and accurate warnings of volcanic or earthquake activity. Providing a safe visitor experience for the 1.4 million visitors who come to the park annually requires an interagency approach and close working relationship between the two agencies. Since the park's establishment in 1916, HAVO and HVO have worked very closely in monitoring these volcanoes, assessing their hazards, and responding to eruptions and earthquakes. USGS science informs park management decisions relative to visitation, closed areas, research and permitting, and appropriate use of park wilderness areas.

Cindy Orlando, Superintendent, National Park Service, Hawaii Volcanoes National Park, HI

Jim Kauahikaua, Scientist-in-Charge, US Geological Survey, Hawaii Volcano Observatory, HI

New Dimensions in Understanding Great Sand Dunes Geology / Hydrology

Great Sand Dunes (GRSA) is the site of large, spectacular dunes in an unexpected setting. The dunes resulted from the complex interaction of aeolian (wind), biological, and hydrological processes. USGS-NPS cooperation has greatly enhanced NPS efforts to understand and manage GRSA resources. Examples include the installation of meteorological and seismic stations within the Park and research on the origin of the dunes, geologic mapping, and quantifying effects of ungulate grazing. The hydrology has been of particular interest to Park managers. Extensive magnetic, electrical resistivity, and gravity based geophysical surveys by the USGS have mapped faults, clay and sand beds, and bedrock beneath the park. This new dimension of understanding the geology and hydrology has aided in the effort to protect hydrological resources when nearby water development projects have been proposed. The USGS-NPS partnership at GRSA has benefited both agencies and park visitors.

Andrew Valdez, Geologist, National Park Service, Great Sand Dunes National Park & Preserve, CO;

V.J.S. (Tien) Grauch, Geophysicist, US Geological Survey, Lakewood, CO

Dyke Marsh: Observations on the Construction, Deconstruction, and Reconstruction of a Freshwater Tidal Wetland, GWMP

The USGS and NPS collaborated in a study of Dyke Marsh, an eroding freshwater tidal wetland on the Potomac River near Washington, D.C. that is scheduled for federal restoration. The study provided an accurate and up-to-date temporal and geological framework for the marsh, providing new information (plus a compilation of historical and recent information) that is directly relevant to the restoration effort and also is relevant to short-term and long-term land management decisions regarding this natural resource. Analysis of field evidence, aerial photography, and published maps has revealed an accelerating rate of erosion and marsh loss at Dyke Marsh, which now appears to put at risk the short term survivability. The destabilization of Dyke Marsh spanned an approximately 70-year time interval (1940–2010) during which it shifted from a net depositional environment (1864–1937) into a strongly erosional one due to a combination of manmade and natural causes.

R.J. Litwin, U.S. Geological Survey, National Center, Reston, VA

Smoot, J.P., U.S. Geological Survey, National Center, Reston, VA

USGS–NPS Collaborations in the Coastal & Ocean Parks

Researchers and resource managers at the USGS and NPS have designed and collaborated on projects in most of the 85 coastal units of the National Park System. The Coastal Vulnerability Index and Coastal Change Potential Studies were completed for 22 coastal parks (http://woodshole.er.usgs.gov/project-pages/nps-cvi/). The national Coastal Vulnerability Index is still the most comprehensive dataset to enable comparison of the vulnerability of assets and resources in coastal parks. Storm vulnerability assessments, coastal change monitoring and modeling, wetlands dynamics, and marine inventories are complete or underway at parks from Assateague Island National Seashore to National Park of American Samoa. These data from collaborative studies have been used to inform park, network, and national level plans and assessments.

Rebecca Beavers, National Park Service, Geologic Resource Division, Lakewood, CO

E. Robert Thieler, U. S. Geological Survey, Woods Hole, MA

From Ice to Sand: The Untold Story of the Great White Sands

5425

In the last several years, more than 1,000 fossilized prints have been found throughout the White Sands (WHSA). The fossilized track (ichnofossils) at WHSA are thought to represent one of the largest concentrations of Cenozoic-era tracks within the US. These tracks are preserved in Late Pleistocene playa lake and lake margin deposits. The tracks are associated with several Late Pleistocene megafauna including prints with morphologies interpreted as proboscidean (mammoth-like), camelid (camel like) and felid (cat-like). Because the tracks are composed of soft gypsum soils, once they become exposed they often disappear in only a few years. To rapidly acquire data many techniques have been implemented to gain precise measurements of this ephemeral resource. Techniques include: Milar traces of tracks, photogrammetry, laser scanning, ground penetrating radar, soil stratigraphy, electromagnetic induction, and time laps photography.

David Bustos, Resource Program Manager, White Sands National Monument, Alamogordo, NM
Bruce D. Allen, New Mexico Bureau of Geology and Mineral Resources, New Mexico Tech, Albuquerque, NM
David W. Love, New Mexico Bureau of Geology and Mineral Resources, New Mexico Tech, Socorro, NM

Paleontology of Shellabarger Pass, Denali National Park: Rosetta Stone to Southern Alaska's Accretionary History

The Shellabarger Pass area situated in the southwestern corner of Denali National Park and Preserve contains a remarkably well-preserved fossil fauna ranging in age from Ordovician through Early Jurassic. Being near the junction of several major accreted terranes, it is highly significant for characterizing the tectonic development and accretionary history of southern Alaska. The remoteness of the region resulted in little in-depth paleontological research until the 1970s. On-going study of the Early Devonian brachiopod fauna clearly demonstrate their closest affinities are with northeast Asia (Russia's Kolyma region), supporting the view that many of Alaska's accreted terranes originated as rifted portions of the Siberian Plate (Angarida). A recently completed paleontological inventory of the park points out areas for future concentrated paleontological research in Shellabarger Pass. We intend to focus on the richly diverse fossil fauna from Silurian, Early, Middle, and Late Devonian as well as Early Jurassic strata of this area.

Robert B. Blodgett, Geological Consultant, 2821 Kingfisher Drive, Anchorage
Denny Capps, Geologist, Denali National Park & Preserve, AK
Vincent L. Santucci, Senior Geologist, Geologic Resources Division, National Park Service, Washington, DC

Developing an In-house Paleontology Science Program with Strong Research Collaborations to Accomplish Significant Resource

In 2002 Petrified Forest National Park established a paleontology program to manage resources, coordinate research, and develop professional relationships with research partners. Program establishment resulted in the discovery of new paleontological sites, significant fossils, and generated more than 50 publications on the park geology and paleontology. This coordinated approach has attracted new research partners resulting in the completion of needed park projects including a revised geological map, revised stratigraphic and paleoecological work, detailed paleosol work, and a robust set of radioisotopic dates of park strata, all at minimal cost. Research at Petrified Forest helps drive global research and understanding of the Triassic Period. Integration of partner and in-house expertise has greatly fleshed out of the park's interpretive story, which encompasses nearly 20 million years of geological history, significantly enhancing visitor understanding. These results compliment the NPS "Call to Action" and the revised Leopold Report suggestions for improved

William G. Parker, Division of Resource Management, Petrified Forest National Park, Petrified Forest, AZ
Matthew E. Smith, Division of Resource Management, Petrified Forest National Park, Petrified Forest, AZ
Jeffrey W. Martz, Denver Museum of Nature and Science, Denver, CO

Using Digital GIS Geologic Maps to Reconstruct the Resources of Abolished Fossil Cycad National Monument

The NPS Geologic Resources Division recently digitized a 1957 USGS Mineral Investigations Field Studies Map MF-70 entitled Preliminary geologic map of the southwest part of the Minnekahta quadrangle, Fall River County, South Dakota that shows the location of Fossil Cycad National Monument and the corresponding geology. Coincidentally this is the same year that the monument was deauthorized. This map will be a useful tool in examining the former location of the deauthorized monument as well as for pinpointing the locations of the now lost paleontological resources. The map is now GIS based and can be used to overlay with Google Earth images of today's landscape as well as other historical imagery to better understand the science of the extinct Fossil Cycad National Monument.

National Park Service, Geologic Resources Division, Lakewood, CO
Vincent L. Santucci, National Park Service, Geologic Resources Division, Washington, DC
Stephanie O'Meara, Colorado State University, Fort Collins, CO

National Park Service Paleontology Synthesis Project

Between 2001 and 2011 a National Park System (NPS)-wide inventory for paleontological resources revealed that at least 237 parks contain fossils, from a variety of contexts (in situ, reworked from elsewhere, museum collections, building stone, material imported for other cultural purposes, and so on). In 2012 a comprehensive evaluation of the paleontological resource data accumulated for the NPS was undertaken, in a project named the "Paleontology Synthesis Project (PSP)". The PSP has compiled NPS paleontological resource data by geologic time, taxonomy, museum collections, research projects, theft / vandalism, and other themes. Additionally, several thousand holotype fossil specimens discovered in NPS areas or poorly constrained areas including NPS units have been identified. This information will be incorporated into the newly developed NPS Paleontology database and will be available to support future research and management of fossils of the NPS.

Justin Tweet, Tweet Paleo-Consulting, Cottage Grove, MN
Vincent L. Santucci, National Park Service, Geologic Resources Division, Washington, DC

Resource Advising in the Heat of Incident Management

5392

The Cow Creek fire in Rocky Mountain National Park stayed active through October 2010, waiting for the "season ending event" to quench a 1,000 acre high elevation Lodgepole and Spruce fir burn that ran out of fuel at the tundra. Having not burned since 1648, the West Creek drainage was ecologically evolved with fire at long >300 year return cycles. Issues of municipal water supplies, T&E amphibians and fish, and designated wilderness posed diplomatic challenges to hand-line and helispot creation and rehabilitation. Major fire runs spanned June 28-July 6, and two Resource Advisors (READS) were deployed under the chief of park resource management. Co-locating with Hotshot crew spike camps, active line discussions and collaborative solutions with the Division Group supervisor were keys to the success of fulfilling the READ role. Monitoring dip and pump sites, sediment and stream morphology, and line and helispot rehabilitation continued into the spring of 2011.

Karl E. Brown, NPS Natural Resource Stewardship and Science Directorate

Burned Area Emergency Response and Recovery from the 2011 Fires in Arizona Parks

In 2011, the Horseshoe II and Monument Fires burned Chiricahua National Monument and Coronado National Memorial, respectively. These parks are relatively similar in climate, location, and the timing and landscape scale of their fires. However, issues concerning the protection of park infrastructure and resources, as well as watershed recovery differ substantially between the two parks. This presentation will provide a comparative overview of the issues addressed through the Burned Area Emergency Response (BAER) program in these parks and offer lessons learned about the protection of life, property, and resources in these post-fire landscapes.

Adam Springer, Chiricahua National Monument & Coronado National Memorial

Jason Mateljak

Burned Area Emergency Response: Lassen Volcanic NP and Lassen National Forest Team Innovation

The Burned Area Emergency Response team assembled National Park Service and US Forest Service members after the Reading Fire in September 2012. Cultural resources, blue-ribbon fisheries, forest plantations, wilderness values, and public safety approaching Labor Day weekend posed a rich mix of challenges during recovery of this incident in Northern California. Resource Advisors checking archaeological sites, fireline rehabilitation efforts, and wilderness helicopter drop sites and spike camps all contributed to a seamless study and finding of no significant threats following the containment on August 22 at 28,079 acres. The world renowned Hat Creek fishery watershed received moderate and high intensity burns; however, gentle slopes and unburned zones prevented sediment from entering the stream, and a distributed burn mosaic increased the area's biodiversity. Joint agency briefings brought USFS and NPS leadership to understand the Values at Risk analysis and the specifications provided for restoration work.

Karl E. Brown, NPS Natural Resource Stewardship and Science Directorate

Creation and Management of Fire Records

Fires are a hectic time and taking the time to document the event is difficult to do and often lost. Fire records are managed by the Documentation Unit Leader (DOCL). There are set procedures and guidelines for managing these records, but getting a records manager on an incident, and cradle to grave management of the fire archives is a daunting task. Let us look at the existing system and expand it, as well as getting qualified records managers on the front line.

Patrick McKnight, Steamtown National Historic Site

Interagency and Interdisciplinary Approach to Managing the Aftermath of Disasters

Disasters come in many forms from wildfires and typhoons to floods, hazmat and oil spills. These disasters know no political boundaries and leave a path of destruction that is often times daunting. Since 1994, the Department of the Interior initiated the first Burned Area Emergency Response (BAER) Team to respond to complex wildfires. The following year another team was added. The teams from their inception have been both Interagency and interdisciplinary in composition. They have responded to over 100 wildfires. Their successful approach to using technology to speed their aerial and ground assessments has led the BAER Teams to be used as a template to respond to other disasters, such as typhoons, floods, hazmat and oil spills among others. This presentation will look into the benefits of an Interagency and interdisciplinary approach to assessing the damage caused by disasters as well as the technological tools used to speed the assessment.

Erv Gasser, NPS Pacific West Region, National BAER Team Leader
Chris Holbeck, NPS Midwest Region, National BAER Team Leader

Reducing Crown Fire Potential at Mount Rushmore National Memorial Using Mechanical Treatments

5470

Mount Rushmore National Memorial has an extensive ponderosa pine forest, much of it old-growth, that hasn't had a landscape-scale fire since 1893. The elimination of fire changed the historically open, heterogeneous forest structure to one that consisted primarily of closed stands with high densities of young trees. Higher tree density and lower crown base heights increased the risk of passive and active crown fire at the Memorial. To reduce the potential for crown fire, nearly all ponderosa pine trees less than 10 inches DBH were cut and chipped or piled in 43% of the Memorial in 2010. Forest structure data collected in sixty plots before and two years after thinning are being used to assess the treatment's effect on forest structure and to model the effectiveness of the thinning in reducing crown fire potential.

Dan Swanson, Fire Ecologist, NPS Northern Great Plains Fire Management
Cody Wienk, Fire Ecologist, Midwest Regional Office

An Innovative Approach for Landscape Treatment of Exotic Bromes

Washita Battlefield National Historic Site is located in Oklahoma. Resource management objectives for this unit are to restore the native grasslands to those that were present during the late 1800's. Exceptional drought conditions were present through 2011 which inhibited grassland growth. When moisture returned in the winter of 2012 the exotic bromes took advantage and exploded across the landscape. Fire and resource management have developed treatments to curtail exotics and restore natives. The plan consists of using prescribed fire in the spring, when the bromes are in seed development, thus eliminating the seed crop and preparing the native seedbed for warm season sprouting. In the following winter when the cool season bromes begin to grow the unit will be grazed with sheep. The sheep will be removed once the warm season grasses begin to emerge. Native wheatgrass will be planted along boundaries providing protective barriers to slow the future exotics.

Bruce Fields, Fire Management Officer, Lake Meredith National Recreation Area

Achieving Management Objectives with Prescribed Fire in Redwood National Park

Prescribed fire is a commonly used management tool in National Parks throughout the western United States. Burning objectives vary by context but often address native plant biodiversity, restoration or maintenance of fire-adapted ecosystems, and hazard fuels reduction. The success of prescribed burns may be assessed by monitoring specific objectives following treatments, but there are numerous challenges to putting beneficial fire—that which achieves management objectives—on the ground. Here we present an example from Redwood National Park in northwestern California, where a prescribed fire program has operated since the early 1980's. A number of operational and social constraints limit the ability of fire managers to put beneficial fire on the ground; some of these constraints are local, others are relevant to fire managers regionally or even nationally. Addressing these concerns will help fire managers maintain prescribed fire programs that focus not on achieving black acres, but achieving beneficial black acres.

Eamon Engber, Fire Ecologist, Redwood National Park

Determining Strategies for Efficient Early Detection of Invasive Plants after Prescribed Fire

Prescribed fire is an integral part of natural resource management in the Black Hills of South Dakota and Wyoming, but there are concerns that they may increase some invasive plant species. We investigated the response of 20 target invasives to prescribed fire in ponderosa pine forest at Jewel Cave National Monument and Wind Cave National Park. We also assessed the relationships between these target species' abundance and a variety of environmental and fire characteristics. In the second growing season after fall prescribed fires, target species cover remained quite low, with most plots having no target invasives. However, some areas had dramatically increased cover of common mullein and Canada thistle. Preliminary analyses suggest these increases occurred in areas of relatively open forest canopy and high fire severity. Further analyses aim to provide park natural resource managers with a strategy to efficiently search for post-fire invasive species infestations in this region.

Amy Symstad, Research Ecologist, USGS Northern Prairie Wildlife Research Center
Wesley Newton, USGS Northern Prairie Wildlife Research Center

Problem of Fire Regime Erratics: Centennial Fire Interval Communities Nested within Decadal Fire Return Landscapes

Cold air drainages in the montane Sierra Nevada harbor plant communities that are relict Pacific Northwest forest ecosystems nestled within conifer communities with the most frequent fires in the region. Because of the historic fire return interval of the prevailing plant community, these landscapes are treated frequently with prescribed fire. However, the species composition and decay processes of the cold air drainage communities within them suggest that they depend on much less frequent fire. Research on optimal fire management of these "erratics" within frequent-fire landscapes is lacking and fire managers need solid justification for treating them differently. We will present a case study of several Wildland Urban Interface (WUI) prescribed fire units in Yosemite that contain cold air drainages and discuss the difficulties of managing for both biodiversity and WUI protection. Lastly, we'll propose a conceptual model of how to manage these islands so they can persist into the future.

Gus Smith, PhD, Fire Ecologist, Yosemite National Park
Alison Colwell, Botanist, Yosemite National Park

Assessing Vulnerability of Soils and Plants to Illegal Border Activities in Organ Pipe Cactus NM

5350

Border parks face a wide variety of natural resource impacts stemming from illegal border related activities. There are networks of foot trails and vehicle routes created by large numbers of people entering Organ Pipe Cactus National Monument. To better understand the ecological impact of border-related activity on soil and plant communities we used plot-based field measurements. Soils form the basis for ecological communities and thus impacts to soils have the potential to affect ecosystem health. Therefore, we based our study design on soil types within the Monument. Soil types were categorized by vulnerability such that more information was collected from soils predicted to be most vulnerable to damage. Sampling points were randomly located to enable a solid basis for interpretation and generalization to the Monument. Our data suggest that vulnerable soils are frequently disturbed and that effects to ecological communities may not be confined to the immediate border zone.

Sarah Howard (1), Todd C. Esque(2), Kenneth E. Nussear(2), Robert H. Webb(3), Rich Inman(2), Peter Holm(1), Michele Girard(4), Kelly N. Petersen(1), Mark Sturm(1)

(1)National Park Service, Organ Pipe Cactus National Monument, Ajo, Arizona

An Assessment of Border-related Vehicle Routes in Endangered Sonoran Pronghorn Habitat

This paper presents the number and extent of Vehicle Routes in Sonoran pronghorn habitat on Cabeza Prieta National Wildlife Refuge (CPNWR), Organ Pipe Cactus National Monument (ORPI) and Bureau of Land Management (BLM) lands. This report was produced as part of a multi-year habitat restoration project. The report estimates route dimensions and severity as well as restoration potential and needs.

Ryan Tietjen, Sue Rutman, Sarah Howard, Paul Morley

All authors are from National Park Service – Organ Pipe Cactus National Monument, Ajo, Arizona

Soil Disruption in a Dry Sandy Loam: The FOB Experiment at Organ Pipe Cactus NM

The rates of soil disruption from hikers and vehicles are poorly known, particularly for arid landscapes. On a sandy loam within the Growler – Anthro complex in western Organ Pipe Cactus National Monument, we created tracks using walkers, an all-terrain vehicle, and a four-wheel drive vehicle. This soil is highly vulnerable to disturbance. The soil was dry (1% moisture content), and we measured bulk density, penetration resistance, and surface disruption in the treatment design. Foot traffic increased bulk density and strength up to 100 passes but caused minimal surface disruption; the data suggests that a minimum of 10 passes was required to overcome surface strength. Vehicles caused significant disruption with one pass. Despite considerable loosening, both density and strength increased in the vehicle trails. These results suggest that this soil, when dry, can sustain up to 10 passes of walkers but only one vehicle pass creates significant soil disruption.

Bob Webb (1), Todd Esque (2), Ken Nussear (2) and Mark Sturm (3)

(1) US Geological Survey – Hydrology, National Research Program, Tucson, Arizona

Evaluating and Developing Methods to Document Illegal Roads and Trails on National Park Service Lands

Efforts to monitor changes in illegal trails and roads are ongoing in border parks. This project had three objectives: 1) Compare the Rapid Assessment Transect (RAT) protocol to newly designed survey techniques; 2) determine how to quantify the spatial distribution of disturbances efficiently and accurately and 3) develop a protocol for park staff to conduct the work. Comparing previously collected RAT data with new transect data, we found that random surveys detected more trails and identified disturbances that were undetected by RAT surveys. The random surveys also indicated that the severity of disturbance may have increased since the last surveys. The most severe disturbances were encountered on soils ranked with higher vulnerability, and there was a tendency toward higher soil loss for this category. This was significantly different from low vulnerability soils, which were less impacted when trails were detected.

Todd Esque (1), Ken Nussear (1), Rich Inman (1), Bob Webb (2), Michele Girard (3), Jake Degayner (3)

The Influence of Particle Size, Sorting and Moisture on Soil Compaction

Soil disturbance vulnerability can be quantified using engineering tests. We hypothesized that poorly sorted soils with a wide range of particle sizes are more vulnerable than well-sorted soils, such as dune sand. As part of a larger effort to document the impacts of illegal immigration, 45 soil samples were collected over a range of Sonoran desert soils. We conducted Proctor soil tests using standard techniques to create maximum compaction at an average of 7 -8 moisture contents spanning dry-to-saturated conditions. In addition, we measured soil penetration resistance on the compacted samples. With notable exceptions, the analyses verified the hypothesis that soil vulnerability is related to poor particle sorting and revealed that maximum compaction occurs at or near field capacity, a near-saturated soil condition. Minimum compaction occurs at near dry conditions. Future research should focus on the role of large particles in reducing soil disruption.

Ken Nussear (1), Todd C. Esque (1), Robert H. Webb (2), Margaret A. Snyder (2), Shinji D. Carmichael (2)

A Multi-refuge Database for Lake Temperature Monitoring in Alaska

5734

Lake water temperature is a major driver of biotic processes and provides an index to the effects of climate change on lake productivity. In 2011, Kodiak, Togiak, and Alaska Peninsula/Becharof National Wildlife Refuges joined a large scale lake and lagoon thermal response monitoring network with the National Park Service, US Geological Survey, and Alaska Department of Fish & Game. Initially, each refuge complex was

Diane Granfors, Regional I&M Coordinator, Inventory and Monitoring Initiative, U.S. Fish & Wildlife Service
Michael Cunanan, Regional Data Manager, Inventory and Monitoring Initiative, U.S. Fish & Wildlife Service,

Albemarle Sound Pilot Study of the National Monitoring Network for U.S. Coastal Waters

The U.S. Geological Survey's (USGS) North Carolina Water Science Center has begun a four-year pilot project in the Albemarle Sound for the National Monitoring Network for U.S. coastal waters and their tributaries. The National Monitoring Network's goal is to provide information about the health of coastal ecosystems and inland influences on coastal waters for improved resource management. The Network

Michelle Moorman, Biologist, U.S. Geological Survey

Batch Processing for Water Resource Inventories

The Water Resource Inventory and Assessment (WRIA) Effort fact sheet, states "the inventory component of a WRIA will present a standardized set of existing baseline information—including geospatial data—on water rights, water quantity, water quality, water management, threats to water supplies (including potential climate change impacts), and other water resource issues for each field station". Currently, an individual

Michael Cunanan, Regional Data Manager, Inventory and Monitoring Initiative, U.S. Fish & Wildlife Service
Cathleen Flanagan, Inventory and Monitoring Initiative, U.S. Fish & Wildlife Service

Fish and Wildlife, ServCat, IRMA, and the Benefits of Collaboration

The U.S. Fish & Wildlife Service (USFWS) National Wildlife Refuge System's (NWRS) Inventory and Monitoring Initiative is collaborating with National Park Service (NPS) to create a centralized repository for compiling, organizing and serving USFWS information. This web repository is a clone of the Integrated Resource Management Applications (IRMA) Data Store application developed by the NPS, and has been

Richard Easterbrook, GIS Team Leader, Inventory and Monitoring Initiative, U.S. Fish & Wildlife Service

Centralized Database Solutions Using SharePoint

Many organizations routinely identify the need for a centralized database but may not have the resources required to contract or collaborate with their IT departments for developing a web-based database application. However, many IT departments are now providing Sharepoint 2010 to their organizations. Sharepoint 2010 can easily be leveraged with existing Microsoft Office software desktop packages to create centralized

Todd Sutherland, National Data Manager, Inventory and Monitoring Initiative, U.S. Fish & Wildlife Service

○ Accepted ◉ Accepted w/changes ○ Redirected to Poster ○ Poster/Exhibit

Invited Papers Session

Opportunities and Challenges for Canada's first National Urban Park: the Rouge National Urban Park

5189

The idea of a People's Park is the underlying vision and concept for Canada's first national urban park. The park is already a popular venue for thousands of visitors every year; in the future it will be a gathering place that offers tremendous opportunities for people to connect with nature and history.

The park is also a remarkable entry-point to connect youth to the wonderment of the outdoors and to the stories of our collective past. Rouge National Urban Park will protect and present diverse environments— freshwater marsh, rivers, forest, wetlands, rolling hills and valleys, farm land—as well as the stories associated with its wide range of past and present human uses.

Pam Veinotte, Field Unit Superintendent, Rouge National Urban Park Field Unit

Louis Lavoie, Community and Business Relations Manager, Rouge National Urban Park Field Unit

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Improving Global Management for Parks and Protected Areas: The IUCN WCPA Initiative on Capacity Development

5602

To address the problem of a large proportion of the world's protected areas losing resources as a result of inadequate management, IUCN's Global Protected Areas Program and WCPA are working in association with CBD, regional training centers and other partners to increase the effective and equitable management of protected areas through a comprehensive capacity development program. The IUCN Protected Areas Capacity Development Program has three components:1) management effectiveness, including the IUCN Green List of Well Managed Protected Areas Initiative; 2) education and training to develop competent protected area professionals, including the new Global Partnership for Professionalizing Protected Area Management, and; 3) production of resource materials. By the time of the 2014 World Parks Congress, the Program will be fully launched. This talk will build understanding of the Program and describe ways for participants to provide input and to become involved.

David W. Reynolds,
Senior Program Advisor, Protected Areas Capacity Development

Capacity Building to Enhance Protected Area Management and Wildlife Conservation in India

The heavily populated Indian subcontinent exemplifies the difficult interplay between human and natural systems that continually tests the abilities of today's protected area managers. To foster development of the interdisciplinary and leadership competencies necessary to address this situation, the Indian government has initiated a Mid-Career Training (MCT) program for its Forest Service Officers. Colorado State University and the Wildlife Institute of India have partnered to implement an international component of this program in the U.S. to complement existing MCT modules. The goal of this effort is to aid in enhancing protected area management, mitigation of human-wildlife conflict in and around protected areas, and the integration of social considerations in conservation planning and decision-making. Our presentation will highlight key elements of course design and lessons learned from an evaluation this initiative which offers a model framework for collaborative partnerships to build conservation capacity.

Tara Teel, Associate Professor, Human Dimensions of Natural Resources, Colorado State University
Andrew Don Carlos, Research Associate, Human Dimensions of Natural Resources, Colorado State University
Michael Manfredo, Professor & Dept. Head, Human Dimensions of Natural Resources, Colorado State University

Facilitating Place-based Climate Change Engagement on America's Public Lands

We will discuss the NSF-funded, Place-based Climate Change Education Partnership and introduce our theoretical framework and research findings that suggest climate change engagement resonates when it: 1) is situated in a local context; 2) is meaningful to that audience; and 3) empowers action. The framework is based on place attachment, place-based education, free-choice learning and norm activation theories. We tested the framework with staff and audience surveys, focus groups and interviews at 16 national parks and wildlife refuges. Results reveal a population of visitors who care deeply about the landscape and differ significantly from the broader American public in regards to climate change knowledge, opinions, willingness to mitigate, and desire for climate education. Visitor concern about climate change differs greatly form staff perception of the visitors' concern. These insights can inform the development of climate change communication and engagement strategies on America's public lands.

Jessica L. Thompson
Northern Michigan University

Capacity Development for Marine Protected Area Networks: Supporting Effective Management at the Seascape Scale

Marine protected areas and networks can safeguard natural and cultural resources and foster collaborative learning to address a number of conservation-related goals. To be effective, each enterprise requires appropriate knowledge, skills, and abilities, and institutional arrangements to define and solve problems and employ legitimate participatory processes. Targeting coastal and marine resource management professionals from protected areas, provincial agencies, and nongovernmental conservation organizations, the International MPA Management Capacity Building Program works with partners at a regional "seascape" scale to develop capacity for MPA networks. The diverse curricula emphasize the challenge and necessity of balancing competing goals – biodiversity protection and sustainable use. The instructional framework helps managers develop capacity to engage stakeholders, identify conservation targets, define potential threats and impacts, establish objectives, and select appropriate management applications. Ongoing evaluation actions

Thomas E. Fish

National Coordinator

Internationalizing Academic Training in Parks and Protected Area Management through the EU's ERASMUS Programme

5603

The complex field of managing protected areas requires planning frameworks and management approaches that include a human dimensions perspective in order to be successful. As the majority of natural resource managers in Europe is mainly trained to address ecological or biological issues, it is crucial to prepare future managers for the human dimensions perspective, too. This includes providing for a profound knowledge of ecological and sociological methodological skills in their academic training, but also the ability to work in multi- and interdisciplinary environments.

Based on a needs assessment, a two-week training course was developed and is now being funded by the European Unions's ERASMUS Programme. The presentation will focus on the overall objective of the course which is to help students develop an understanding for the complexity of protected area

Eick von Ruschkowski, Leibniz Universität Hannover
Arne Arnberger, Universität für Bodenkultur, Vienna (Austria)
Robert C. Burns, West Virginia University

Fostering Internationalization through Student Exchanges in Nature-based Recreation Education

The presentation will discuss an on-going, sustained international educational exchange program with European faculty colleagues in central Europe. The exchange program has focused on an exchange of European and American students, focusing on teaching and research, at both a formal and informal level. The exchange is funded by a National Institute of Food and Agriculture (NIFA) grant to expose WVU students to European natural resource management practices. Prior to receiving the NIFA grant, the PI and German/Austrian faculty colleagues designed and implemented an informal teaching and research program that allowed for an annual exchange of students. To date, nearly 100 students have participated in this exchange program, with numerous co-authored peer-review journal articles and research presentations, co-advised graduate students dissertations and theses, undergraduate honor theses, and internships. The NIFA grant was awarded, in part, because of the high level of existing cooperation over a sustained period of time.

Robert C. Burns, West Virginia University

Perspectives on Online Teaching and Learning in a Master Program

Frostburg State University provides the opportunity for students to receive a Master of Science degree in Recreation and Parks Management through a totally online program. The program is available for students far beyond the Maryland state line and the new cohort of 18 students represent 10 states and British Columbia. Two, 6-week intensive courses are offered online every semester in order for students to complete the program in two and a half years. From the perspective of a faculty in the graduate program at Frostburg State University, and a first time teacher of an online research methods course, this presentation will discuss the steps followed to prepare for a first online course and the lessons learned from this experience. Furthermore, this session will identify the major benefits of teaching online and also the learning limitations of online environments. Online teaching provides an innovative forum for international education.

Natalia Buta, Ph.D., Assistant Professor, Frostburg State University, Frostburg, MD, USA

The State of Human Dimensions Capacity: Informing Capacity Building Efforts

This presentation will report on the efforts of a multi-agency working group that organized a workshop in September 2012 aimed at state, federal, and NGO human dimensions researchers and practitioners. The goal of the workshop was to explore the current state of human dimensions capacity among natural resource agencies and professionals and identify important needs for future initiatives to strengthen that capacity. By presenting on this effort we hope to identify specific needs and issues that should be addressed in order to facilitate effective human dimensions capacity development. This presentation will also report on the results of a multi-agency human dimensions capacity needs assessment with the goal of providing information as to where and how to most effectively develop capacity within natural resource management agencies by recognizing current barriers and opportunities for growth.

Brad Milley, Social Scientist, Policy Analysis & Science Assistance Branch, U.S. Geological Survey
Kirsten Leong, National Park Service, Human Dimensions of Biological Resource Management, Program Manager
Natalie Sexton, U.S. Fish and Wildlife Service, Human Dimensions Branch, Chief

Citizen Science or PPSR at Mammoth Cave National Park: An Important Scientific and Educational Tool

5384

Mammoth Cave National Park has a long history of engaging the public in scientific research. These research projects span the spectrum of contributory, collaborative, and co-created projects. This talk will highlight two of Mammoth Cave National Park's PPSR or citizen science projects. The first is a contributory project that supplements ongoing research conducted by a USGS scientist and students from Tennessee State University. The primary citizen scientists working on the project are middle school, high school, and college classes participating in educational experiences at Mammoth Cave National Park. The second is a long-term, co-created project conducted in conjunction with the Cave Research Foundation. Through the Cave Research Foundation, adults from across the country survey and map the park's caves and their resources. Mammoth Cave National Park actively uses data collected from each of its citizen science projects as part of its science-informed decision making process.

Shannon Trimboli, Mammoth Cave International Center for Science and Learning

Creating Curriculum-based Citizen Science Programs

The Appalachian Highlands Science Learning Center in Great Smoky Mountains National Park has a series of citizen science projects that are designed with the dual purpose of helping middle and high school teachers meet classroom science goals while monitoring the effects of air borne pollutants on park resources such as salamanders, snails, sensitive plants, lichens, and aquatic and terrestrial invertebrates. Data collected is stored on internet databases hosted by Hands on the Land, a non-profit partner representing several federal land agencies. Pre and post field lessons guide students through the scientific method as they ask and answer their own questions of the data. With over 8 years worth of data collected, we are finding other uses for the dataset, such as looking at changes in phenology and monitoring for impacts from the presence of invasive species.

Susan Sachs, Appalachian Highlands Science Learning Center

PPSR Projects in Southern California Coastal Parks: Lessons Learned about Recruiting Participants

The benefits of public participation in scientific research (PPSR) are wide and deep. They help to leverage resources in order to expand and enhance the possible scope of research projects, foster a feeling of ownership and scientific literacy among participants and provide an excellent platform for dialogue between professional scientists and the interested public. The creation of PPSR projects is often challenged by the recruitment of qualified, reliable citizen scientists. This paper address this challenge in the form of a case study using list serve of multidisciplinary undergraduate students and a complementary matrix of available opportunities within the Southern California Research Center (SCRLC) stratified by discipline, location and time commitment. This approach has generated a steady stream of motivated and reliable citizen scientists and has helped the SCRLC increase in both quality and quantity its PPSR driven data output.

Kevin Schallert, Southern California Research Learning Center

The California Phenology Project at Santa Monica Mountains N.R.A.: A Case Study of PPSR

The California Phenology Project is a partnership between the National Phenology Network, the University of California Santa Barbara Phenology Stewardship Program, and the National Park Service. Santa Monica Mountains National Recreation Area is a pilot park for the project which is in its third year of implementation. We will discuss the broad goals and products of the CPP as they relate to public participation in scientific research and specifically address project implementation at SAMO. We have learned many important lessons regarding involvement of the public in research that may be useful to other protected area managers interested in engaging the public as participants in a research project. Specifically, we will discuss the importance of correctly identifying a target audience for your project, developing training materials, developing adequate quality assessment and quality control measures to ensure data quality and developing tools for data entry and analysis that match your target audience.

Christy Brigham, Santa Monica Mountains NRA
Angie Evenden, California Cooperative Ecosystem Studies Unit

Fostering Citizen Science at NPS Research Learning Centers in Two Regions of the U.S.

The Murie Science and Learning Center, based in Denali National Park, conducts a lake-ice monitoring citizen science project with local elementary school students every winter. The students ski or snowshoe to the lake, thus promoting both science and physical fitness. The program is currently lacking a principal investigator, leaving the students, teachers and park staff to draw the scientific conclusions. The program serves a model for Research Learning Centers promoting science among local youth. The Great Lakes Research and Education Center, located in Indiana Dunes National Lakeshore, partnered with the USGS National Wetlands Research Center to develop a website for anyone to enter cattail population data. The goal is to understand the role that cattail hybridization plays in aggressive spread of the taxa in wetlands of North America and foster citizen science contributions to research. The website is located at http://nwrcwebapps.cr.usgs.gov/cattail/.

Sierra McLane, Murie Science and Learning Center
Joy Marburger, Great Lakes Research and Education Center

The Joint Fire Science Program: Research Supporting Sound Decisions

5376

The Joint Fire Science Program (JFSP) was created by Congress as an interagency research, development and applications partnership between U.S Departments of the Interior and Agriculture. JFSP's emphasis is on (1) providing credible research and science delivery tailored to the needs of the fire, fuels, and the resource management communities; (2) developing strategic lines of research that meet both fire and resource manager's needs. This talk will provide a brief overview of JFSP, highlighting research and science delivery. Specifically, the presentation will focus on JFSP's integrated approach to science delivery, i.e., synthesis, website, regional knowledge exchange consortia, social media, briefs, digests, and eNewsletters. This talk will also discuss JFSP's strategic approach for research investments and highlight a few areas of JFSP research of particular interest to the resource management community, for example, Threatened and Endangered Species, invasive species, climate change, smoke and air quality, and cultural resources.

Nate Benson, NPS Fire Management Program Center

Accessing Fire Science through Regional Knowledge Exchange Consortia

The Joint Fire Science Program's national network of fire science consortia enhances knowledge exchange to increase awareness, understanding, and use of science for wildfire and prescribed fire management. Fourteen regional consortia foster knowledge exchange among scientists, fire managers, and natural and cultural resource managers within ecologically similar areas across the United States. The term "knowledge exchange" emphasizes bidirectional communication and relationship-building between managers and scientists, including communication about management issues and priorities, research needs, and scientific resources for managers. This paper will detail needs assessment results on obstacles to using research, preferred methods of accessing research, and preferred consortium activities. It will provide examples of activities, including regionally-relevant websites, online newsletters, regional workshops, local fieldtrips, and science synthesis. Finally, it will describe an ongoing evaluation effort to ensure that consortia effectively serve a wide

Vita Wright, NPS Fire Management Program Center

FFI: A Monitoring Application Linking Science and Management

FFI (FEAT/FIREMON Integrated) is an interagency-supported application designed to help meet the monitoring needs of government and non-government agencies and encourage data sharing and analysis. While primarily developed for fire effects monitoring, the application and data are valuable for helping to strengthen the connection between science and resources management. Since the initial FFI application release in 2007, over 300 vegetation and fuels databases and spreadsheets have been converted to FFI from federal and non-federal agencies (e.g., BLM, USFS, USFWS, BIA, NPS, Texas State Parks, California State Parks, and TNC). Examples of some of the ways that the FFI application and data are used include: integrating NPS fire effects monitoring and Inventory and Monitoring programs, supporting an interagency, nation-wide vegetation, fire, and fuels mapping program (Landfire), and contributing to regional-scale research questions.

MaryBeth Keifer, NPS Fire Management Program Center
Duncan Lutes

Innovative Uses of Monitoring Trends in Burn Severity (MTBS) Data at Grand Canyon National Park

Grand Canyon National Park has an active fire program. The current 10 year average annual fire activity is 11,200 acres per year. A critical part of the fire program has been using Monitoring Trends in Burn Severity (MTBS) data to assist with fire management decisions. To date, the MTBS program and Grand Canyon National Park staff have mapped severity for 50 fires, totaling over 116,000 acres. The park uses this severity data in a number of interesting ways, including pre fire planning, at the inception of fires, during protracted events, and post fire analysis. Examples of each of these uses will be covered during this talk.

Eric Gdula, Grand Canyon National Park

Fire and Future Forests: Fuels, Frequency, and Facilitation

We used MC1, a dynamic vegetation model, to investigate changes in vegetation type and fire frequency at Wind Cave National Park (WICA) under three future climate scenarios. The park lies at a grassland-forest ecotone where fire plays a critical role in determining the extent and structure of ponderosa pine forest. Although MC1 simulations suggest forest can be maintained at WICA until 2100 with a careful prescribed fire program, a climate envelope model predicts climate conditions at WICA will be unsuitable for ponderosa pine by 2040. Together, these results suggest future prescribed fire objectives must facilitate pine recruitment more so than at present. Fire management will become more difficult, though, as higher temperatures will affect fuel moisture and cause the frequency of high fire danger to increase from an average of 12 days per year in the 20th century to 20-60 days per year at the end of the 21st century.

Amy Symstad, USGS Northern Prairie Wildlife Research Center

David King, Oregon State University

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Invited Papers Session

Managing Marine Fishing Use

5553

Gathering fishery information to inform management of marine fishing is an expanding challenge for coastal parks. Sources and quality of some existing marine fishing information are described. State agency records, RECFIN and MRIP-MRFSS summaries will be shown. Information about where to look for regional stock assessments, fishery status indicators, rebuilding populations and logbook programs will be included. The needs and techniques to collect new-current fishing use information are also reviewed. Examples of Summer 2012 results and equipment from NRSS WRD pilot projects to gather fishing information with GPS units will be presented. Handheld GPS units will be available for examination and testing in exchange for a business card after the presentation. Discussion and questions are encouraged

Karl Brookins

Assessing Efficacy of a Recently Established Network of Marine Reserves in Channel Islands National Park

The Kelp Forest Monitoring program at Channel Islands National Park was one of the first "vital signs" Inventory and Monitoring programs implemented by the National Park Service. The program has collected baseline population data on over 70 species of algae, invertebrates and fish for 31 years. In addition to providing basic information regarding the health of the nearshore marine ecosystem, the data demonstrate impacts of fishery harvests and have supported the efforts California and others to establish a Marine Reserves network at the Channel Islands. The program was expanded to assess the effectiveness of this marine reserve network in 2005. Recent data demonstrate that nearly all species of harvested fish and invertebrates are more abundant and larger inside than outside of the reserves.

David Kushner

Anglers Count: A Technology-based Approach to Aid Fisheries Management at Canaveral National Seashore

Accurate angler-based catch data are an underutilized source of information that can supplement data by traditional methods. Real-time, spatially-explicit data from recreational anglers is the missing element in fisheries stock assessments. Individual anglers are the only ones who know what fish they caught (and possibly released) by size and location. Catch and release fishing is becoming more prevalent and many fish species are being released more often than they are being harvested, there is a need to acquire angler reports of released as well as harvested fish and their sizes to fully understand population dynamics. The National Park Service has recently begun using the Angler Action Program (AAP) at Canaveral National Seashore, and the approach could be useful in managing fisheries on waters near you.

Jeff Duncan
Rick Roberts
Linda Roberts

Conservation of Marine Fishes: Challenges and Assessment in the South Florida/Caribbean Network

Many reef fish species throughout Florida and the Caribbean, specifically the snapper-grouper complex, have been overfished due to slow maturation rates and tendency to form spawning aggregations. National Park Service units are generally not created to specifically conserve fish populations, yet can function as a valuable management tool to help create sustainable fisheries. Parks must first attempt to balance the ecological needs of their natural resources with the political realities of creating marine reserves however. Thus, the fishing regulations within four South Florida/Caribbean Network marine parks vary significantly between units. Fisheries independent monitoring protocols have been developed to provide spatially explicit population metrics such as abundance and size structure to resource managers. Monitoring of reserve dynamics and reef fish populations in Tortugas, Florida indicate no-take marine reserves are an effective tool for the enhancement of coral reef fisheries.

Michael Feeley

Social Science Information Deficit in Ocean Parks: Perception is Reality

From coral reefs to the Great Lakes, the National Park System attracts over 86 million recreational visits per year to 85 ocean and coastal parks. With so much geographic and demographic diversity and competing visitor uses, managers find themselves on the horns of a dilemma. How do you win over skeptical stakeholders without understanding visitor attitudes and perceptions toward your park resources? In some areas, visitors may not even know they are in a National Park. Managing boating and angling can be highly contentious - changing traditional uses provokes strong reactions where the public has enjoyed unfettered use of the marine environment. This session will explore the importance of social science research and monitoring and civic engagement in decision-making. Case studies from parks will illustrate where information or the lack of it, created variable approaches and outcomes in marine management.

Cliff McCreedy

Asian Carp Management in the Great Lakes and Upper Mississippi River Basin

5574

The term Asian Carp refers to four carp species that have been introduced to waters of the United States. These fish have voracious appetites and may outcompete or displace native populations within aquatic ecosystems of National Parks. International management has focused largely on carp in the Great Lakes basin; however, aquatic programs in parks of the upper Mississippi River basin have actively demonstrated the need to expand control efforts. Through research and work with partners, the NPS is contributing to Asian Carp management in the Saint Croix and Mississippi Rivers in addition to supporting efforts to exclude these invasive fish from the Great Lakes.

Alan Ellsworth

Bright Angel Creek Trout Reduction Project in Grand Canyon National Park

Beginning in 2010, Grand Canyon National Park (GRCA) reinitiated the Bright Angel Creek Trout Reduction project to enhance native fish populations and contribute towards the fulfillment of humpback chub (Gila cypha) conservation measures (USFWS 2008) by reducing the population of non-native brown (Salmo trutta) and rainbow trout (Oncorhynchus mykiss) (NPS 2006). This project was first initiated in 2006-07 (Sponholtz et al. 2010) following a 2002-03 Feasibility Study (Leibfried et al. 2005). The weir was operated by GRCA in 2010-11 (Omana Smith et al. 2012a), 2011-12 (Omana Smith et al. 2012b), and 2012-13 (Nelson et al. in prep). Additionally, backpack electrofishing trips were conducted to estimate fish populations and to remove trout. Trophic studies (2010-11) examined the diets and interactions of native and non-native fishes in the creek.

Clay Nelson, Emily Omana Smith, and Brian Healy

Adaptive Management in the Long-term Conservation of Endangered Fish in Grand Canyon National Park

Only four of eight fish species that were native to Grand Canyon National Park (GCNP) are still found there and two are federally listed as Endangered. These species are threatened by non-native fish and parasites and altered temperatures and flows related to operation of Glen Canyon Dam. GCNP is developing a fisheries management plan for restoration. Analysis of monitoring data and population modeling were used to establish long-term objectives and an adaptive management framework for plan implementation. Activities to meet conservation goals include non-native fish control, translocations of endangered fish, and long-term monitoring.

Brian Healy, Emily Omana Smith, Melissa Trammell, and Clay Nelson

Lionfish Invasion: Hold on to Your Habitat

The invasive Indo-Pacific Red lionfish (Pterois volitans) is a voracious predator that consumes native fish and invertebrates and can seriously injure park visitors with its venomous spines.. Biscayne National Park observed the first lionfish in 2009 and established a lionfish monitoring and removal program. However, little was known of their biology and control prior to the recent invasion of several parks, only that their rapid reproduction and range makes control of lionfish extremely challenging. In 2012, the National Park Service adopted a service-wide Lionfish Response Plan, based on a multi-disciplinary workshop held with park managers, biologists, interpreters and safety experts, as well as NGOs and universities. This presentation will share experiences from several parks and recent knowledge gained in solving problems posed by this aquatic invader.

Cliff McCreedy

Assessing Thermal Sensitivity of Brook Trout Streams to Climate Change

As part of a larger brook trout study, we assessed the thermal sensitivity of streams to climate change in Delaware Water Gap National Recreational Area and considered potential management options. We modeled linear regression slopes from air and water temperature data collected from 104 wadeable stream sites during summer of 2010. Streams exhibited considerable variability, and cluster analysis identified groups of high sensitivity sites (mean slope = 0.60), moderate sensitivity sites (mean slope = 0.45), and low sensitivity sites (mean slope = 0.20). ANOVA models indicated a dominant effect of headwater impoundments on increasing sensitivity of stream temperatures to air temperatures. We suggest that management of headwater impoundments may have the greatest potential to decrease the sensitivity of brook trout streams to climate change in the study area.

Nathaniel Hitt, John Young, Craig Snyder and Richard Evans

The Challenges of Repairing Paradise

5479

The National Park Service attempts to manage, preserve, and restore America's most precious lands. In pursuing restoration, the agency often needs to change existing, long-standing policies that have negatively impacted the parks. Changing policies is challenging. This paper argues that successfully doing so depends on expanding the sphere of conflict over the policy to engage the larger American public. This is more likely if the agency is able to frame the changes in a positive light, justify potential outcomes scientifically, provide solid economic arguments for altering the status quo, and gain commitment from other relevant institutional actors. The paper examines this argument in the context of efforts to reintroduce wolves to Yellowstone, restore fresh water flows to the Everglades, simulate seasonal river flows in the Grand Canyon, and reduce automobile traffic in Yosemite.

William R. Lowry

Protecting Yellowstone: Science and the Politics of National Park Management

Through a controlled comparison of all major contemporary controversies from Yellowstone National Park, this talk discerns the prominent influences on modern NPS policymaking. Six major influences largely determine policymaking outcome. Science and politics are the two primary determinants, with science most helpful for NPS policymaking when it is robust, easy to understand, and supportive of park manager's intentions. Both elected and appointed federal politicians are the other most significant influence; they especially become involved when public access or regional economies are threatened. Coalitions with supportive interest groups, compelling framing of the issue for public discussion, and public perceptions about the implications of NPS policy proposals on the regional economies and on public access are the other four major determinants. Park managers usually need all six of these determinants aiding their cause for successful policy-making.

Michael J. Yochim

The National Park Service in a Changing World: Challenges and Opportunities

The National Park Service exists in a world changing rapidly in both biophysical and social dimensions (e.g., climate and biodiversity as well as public demands, socioeconomics, governance). These dynamics pose complex management and policy challenges—well illustrated in Yellowstone National Park and its environs—at three levels (ordinary things, governance or decision making, and constitutive processes). In terms of broad policy processes the NPS's challenges are: (1) to meet and interpret its goals—that is, to monitor, learn, and adapt, given its changing operational context; (2) to stay abreast of its full operating context (both biophysical and human aspects) on a continuous basis—in other words, acquire a realistic "map;" and (3) to manage its own internal operations effectively given the context. The NPS could benefit from a more practice-based approach to its diverse challenges (especially governance and cultural issues), with details and examples provided.

Susan G. Clark

Public Opinion for Sale, Revisited

In 2004, McBeth and Shanahan published "Public Opinion for Sale," an article outlining a research agenda to study policy narratives as a way to understand policy conflict in the Greater Yellowstone Area (GYA). GYA public policy debates tend to revolve around value differences, articulated in the form of policy narratives. Such value conflict increases polarization and makes it difficult for NPS policy makers to use science to facilitate the consensus needed for GYA policy issues. The original article proposed that policy narratives and the new policy environment is based on societal trends of consumerism and marketing. Nine years later, this research trajectory has developed into Narrative Policy Framework (NPF), the only framework in public policy employing quantitative methods to study narratives. In this article, we revisit the fundamental assumptions in our 2004 article and reexamine our GYA policy data to empirically develop a macro-level NPF analysis of GYA policy.

Elizabeth A. Shanahan and Mark K. McBeth

University of Northern Colorado and BLM Heritage Studies in the North Park Valley, Colorado

5153

Between 2007 and 2012, University of Northern Colorado archaeologists, funded by the Bureau of Land Management and Colorado State Historic Fund, conducted field investigations at a small, tributary stream valley, Ballinger Draw. Nearly 40% of the valley's surface was covered by archaeological remains within a half dozen sites, including more than 110 projectile points ranging from Paleoindian (ca. 9,000 years before present) to historic (ca. 175 years before present) times. Extensive excavations one site uncovered buried occupations of successive, seasonally used prehistoric Ute hunting camps radiocarbon dated between 800 and 550 before present. The site has provided the most significant body of evidence yet for an early prehistoric Ute presence in what was later historically documented as traditional Ute territory in Colorado's Southern Rockies. Notably, the Ballinger Draw investigations featured participation and key contributions from BLM personnel, university faculty and students, public volunteers, and Native American consultants.

Bob Brunswig, Department of Anthropology, University of Northern Colorado
Frederic Sellet, Department of Anthropology, University of Kansas

Cultural Landscape Documentation Using Modern Technologies: Capturing a Story of Place

Native Americans, trappers, traders, soldiers, cowboys and homesteaders, amongst others, have left their mark on a cultural landscape that ultimately defines the American West. These sites hold many "layers," including structures, site features, trees and plantings, circulation systems, archaeological information, and unique histories. Case studies presented will show that high-tech digital scanning and modeled reconstructions form narratives of the past, capture the present, and inform decision making for the future. The high quality of the documentation and research reveals traces in the land, allows for in-depth interpretations, and provides the base data necessary for constructing the story over time and space, and visually through digital imaging and modeling. These projects focus on telling a narrative—a story of place—to reveal the traces of the past, to make the place resonate in the present, and to give consideration for the future of cultural landscapes.

Ekaterini Vlahos, Associate Professor, Director, Center of Preservation Research, University of Colorado – Denver

Environmental History as the Foundation for Park Management Strategies

Environmental history provides the intellectual foundation for understanding National Park Service sites as complex resources contained within permeable physical boundaries. Cooperative research projects between park managers and university researchers provide opportunities for both groups to synthesize academic insights and field-based knowledge. Professors and students at the Public Lands History Center at Colorado State University have used knowledge gained from environmental history projects at Pecos National Historical Park, Rocky Mountain National Park, and Little Bighorn Battlefield National Monument to inform and develop subsequent management planning documents for those sites in an innovative fashion that promotes integrated resource management.

Maren Thompson Bzdek, Public Lands History Center, Colorado State University

For the Public Good: The Benefits of Cooperative Projects

Cooperative Ecosystem Studies Units (CESUs) partners extend resource management capabilities by conducting applied research and providing technical assistance on prehistoric and historic sites, structures, cultural landscapes, and ethnographic resources. The "substantial involvement" of all partners allows nimble collaboration, technologically-advanced methodologies, and creative solutions to resource management needs. Students gain real world experience through internships, field studies, and interdisciplinary teams.

Karen E. Waddell, Cultural Resource Specialist, Rocky Mountain National Park
Cheri Yost, Program Assistant, Cooperative Ecosystem Studies Units Network

○ Accepted ◉ Accepted w/changes ○ Redirected to Poster ○ Poster/Exhibit

Invited Papers Session

Telling Stories of Nature and Humans in National Parks

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U.S. national parks have traditionally approached the relationship between nature and humans in dualist terms: wilderness excludes people, and civilization excludes nature. Wilderness theorists have profoundly challenged such views in the last thirty years. The large national park units generally continue this tradition of interpretation - - apparently, monumental natural scenery encourages dualist views among both interpreters and visitors. However, some newer interpretive programs that represent the complexity of humans, human relationships with nature, and different natural settings, including Effigy Mounds National Monument (Iowa) and Homestead National Monument of America (Nebraska). Partnerships with affiliated tribes have helped the process of change at Effigy. Other sites mix innovative and problematic elements, such as Tallgrass Prairie National Preserve (Kansas). While recognizing the complexity of human relationships with "natural" landscapes, Tallgrass exists in a political environment that has been resistant to recognizing the full

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'The Illusion of Wilderness' in America's Automobile Campgrounds

By the mid-1920s, America's park and forest campgrounds were overcrowded generators of water pollution, soil erosion and vegetation loss. The solution came in the form of a landscape plan with common water spigots, restrooms, one-way loop roads and designated campsites. E.P. Meinecke's 1932 design, which is in wide use today, tamed the worst of autocamping's damage even as it reduced congestion and clarified when a campground was full. Meinecke, however, was not simply concerned about infrastructure. He also admonished anyone adopting his plan to retain existing campground vegetation wherever possible and to plant whenever necessary. But, he cautioned, "Landscaping in the usual sense . . . has no place in the mountain camp where the visitor seeks the illusion of wilderness." This presentation explores how Meinecke came to his enduring design and details his lasting concern for preserving and creating what is a fundamental element of the motor camping experience.

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Memory and Legacy: Viewing New Deal-era State Park Landscapes in the Jim Crow South

The National Park Service played a vital role in the design and construction of state parks during the New Deal, working to make scenic parks accessible to all citizens. In the South, however, the agency's effort was constrained by the system of racial exclusion and segregation called Jim Crow. The Park Service accommodated these regional demands by designing a relative few parks (state parks as well as Recreational Demonstration Areas (RDAs)) that allowed segregated African American access. Despite a Park Service effort to expand access to such facilities, the parks remained limited in number and were located in just a handful of Southern states by the end of the New Deal. After reviewing the history and geography of these design outcomes, this paper focuses on the contemporary landscapes of these once-segregated parks, demonstrating how legacies of the Jim Crow past remain visible, though largely uninterpreted, in features of these spaces.

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