

The George Wright

FORUM

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**Cooperative
Ecosystem
Studies Units
Network**



**The
State
of the
CESU
Network**



Origins

Founded in 1980, the George Wright Society is organized for the purposes of promoting the application of knowledge, fostering communication, improving resource management, and providing information to improve public understanding and appreciation of the basic purposes of natural and cultural parks and equivalent reserves. The Society is dedicated to the protection, preservation, and management of cultural and natural parks and reserves through research and education.

Mission

The George Wright Society advances the scientific and heritage values of parks and protected areas. The Society promotes professional research and resource stewardship across natural and cultural disciplines, provides avenues of communication, and encourages public policies that embrace these values.

Our Goal

The Society strives to be the premier organization connecting people, places, knowledge, and ideas to foster excellence in natural and cultural resource management, research, protection, and interpretation in parks and equivalent reserves.

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On the cover: A montage of parks flanks the CESU logo. From top to bottom:
Saugus Iron Works National Historic Site (l), Bighorn Canyon National Recreation Area (r),
Devils Postpile National Monument, Virgin Islands National Park. *Photos courtesy of*
National Park Service, except for Virgin Islands National Park (courtesy of Dorothy A. Davis)

SOCIETY NEWS, NOTES & MAIL

Abstract Deadline for GWS2005 Nears

The program for “People, Places, and Parks: Preservation for Future Generations,” the 2005 George Wright Society Biennial Conference on Parks, Protected Areas, and Cultural Sites, is taking form. GWS2005 will be a week of reflection, reconnection, and renewal set against the incomparable historic backdrop of Philadelphia. There are four focus areas for the program: Science, Scholarship, and Understanding; Preservation and Management; Environmental Justice / Civic Engagement; and Education / Appreciation. Abstracts are being accepted through October 8 for sessions, papers, workshops, posters, side meetings, computer demos, and exhibits. Full details are on-line at www.georgewright.org/2005.html.

World Database on Protected Areas

A consortium of groups, led by IUCN and UNEP’s World Conservation Monitoring Centre, has produced WDPA 2004, the newest World Database on Protected Areas. It is the core database of the world’s protected natural areas, and is available on a single CD-ROM. WDPA builds on the many editions (since 1962) of the paper-based *United Nations List of Protected Areas*. Future editions of the *U.N. List* will be compiled from the WDPA. A major advance is that GIS-compatible point and boundary files are included wherever possible; the CD includes a GIS visualization program and a tutorial on how to use it. Data are presented as a series of GIS layers that enable users to focus on any region and then create and print maps of protected areas, including topography, hydrology, roads, and cities. Of the 111,000 protected areas in the database, 41,000 have GIS information. The WDPA will be an important tool in carrying out IUCN’s Durban Action Plan from the 2003 World Parks Congress, and for the protected areas work program under the Convention on Biological Diversity. For more information, contact Silvio Olivieri, chair of the WDPA consortium, at s.olivieri@conservation.org.

News from Parks Canada

Parks Canada’s mandate is to protect and present nationally significant examples of Canada’s natural and cultural heritage in three major programs: national parks, national historic sites, and national marine conservation areas. Ecological integrity and commemorative integrity are the key management goals for the agency, enshrined in law and policy. To ensure the protection, maintenance, and restoration of ecological and commemorative integrity, Parks Canada is developing its science capacity for all its program areas, building on larger government-wide initiatives. It has also continued to create new national parks that serve as ecological benchmarks for the study of natural environments and their components in a relatively undisturbed state. Over the last year, a range of activities have been carried out by Parks Canada in pursuance of its national mandate. Here are some highlights:

A new research and collection permit system. Parks Canada Agency has revised, revamped, and modernized its Research and Collection Permit System to enable researchers to make on-line applications for permits to conduct natural or social science research in the protected areas. This replaces the earlier cumbersome, paper-based application process in which research permits were issued by park superintendents. The revised web-based sys-

tem provides an on-line permit application that is supported by a comprehensive, on-line researcher information package that consists of a researcher's guide, listings of research priorities, and an electronic feedback mechanism. The on-line researcher's guide includes a policy on research in national parks, application procedures, answers to frequently asked questions, a list of park research coordinators, factors that may facilitate a favorable decision, and a summary of national permit conditions. To help researchers know Parks Canada's research needs, the new system allows the parks to post their research priorities each year and provide additional information unique to each park that might help researchers prepare their applications. It also allows investigators to provide Parks Canada with feedback on their experiences and to provide suggestions for improvement. The system has been upgraded to handle multi-park and multi-year permit applications to meet the needs of researchers wanting to work in different parks and those who want to undertake research for more than one year. For more information, go to www.pc.gc.ca/apps/RPS/.

Establishment of the Conservation Areas Reporting and Tracking System initiative.

The Conservation Areas Reporting and Tracking System (CARTS) is a web-based application that has been developed by Canadian agencies with jurisdiction on conservation area data. CARTS aims at enabling the discovery of and access to geospatial data for all Canadian public conservation areas, which are owned and managed by a diverse number of agencies. Currently there are dozens of public agencies across Canada responsible for a portion of the protected areas agenda. These include agencies responsible for parks and ecological reserves, wilderness areas, wildlife areas, conservation sites, archeological sites, community pastures, and many other types of areas. The CARTS initiative is responding to a long-standing need to track and report on the status of Canada's protected conservation areas in a consistent and authoritative manner. As a single body with the authority and approval of the entire protected areas community, CARTS will compile data and reports on protected areas with accuracy, authority, and regularity. These data will be available on-line for consultations, reports, and decision support. This facility will connect to an existing distributed network of servers being established in various jurisdictions by the National Forest Information System (NFIS), through a three-year-old Canadian Forest Service–Geoconnections partnership project. CARTS will provide standardization to national protected areas data and facilitate access through one national window, while ensuring source agency control of the data.

CARTS products and services will serve numerous national and international reporting and assessment requirements. Within Canada, protected area-planning agencies will access accurate and standardized data on protected areas held by other agencies and neighboring jurisdictions. At the national level, Canada will use this comprehensive information to report on progress on protected area establishment and sustainable development, and to develop natural resource accounts. With more information, better-quality syntheses of the overall picture can be obtained, and better decisions are made. CARTS will also be used to report to international agencies that require standardized data such as the World Commission on Protected Areas and Convention on Biological Diversity. All of these will draw information from CARTS rather than from numerous individual protected area agencies across Canada. The initiative will be fully operational by mid-2005 and the web portal will be accessed through the Canadian Council on Ecological Areas' (CCEA) website.

New national parks created. In October 2002, the Canadian government announced its

Action Plan to Protect Canada's Natural Heritage, with an ambitious agenda to create 10 new national parks, expand three existing ones, and establish five new national marine conservation areas (NMCAs) over five years. Funding was announced in March 2003, and Parks Canada has just completed its first full year of implementation. Great strides were made, including creating Gulf Islands National Park Reserve in British Columbia on May 9, 2003, and Nunavut's Ukkusiksalik National Park at Wager Bay on August 23, 2003. Feasibility studies were announced for three new NMCAs: in Quebec's Magdalen Islands and in the Queen Charlotte Islands and the Gulf Islands of British Columbia. Work also began on a feasibility study for a national park in the South Okanagan-Lower Similkameen region of interior B.C. Progress was made towards expanding Nahanni National Park Reserve, and concluding agreements to establish an NMCA on Lake Superior, a national park reserve in Labrador's Torngats Mountains, and a national park in the Manitoba Lowlands region.

Ocean Park Task Force Formed

Recognizing a long-standing need to improve conservation of ocean resources in the National Park System, NPS Deputy Director Randy Jones recently formed a task force of ten field managers to implement the 2004 NPS Ocean Park Stewardship Strategy. Chaired by Visiting Chief Scientist Gary Davis, the Ocean Park Task Force is addressing 27 action items identified in the strategy. For example, the task force seeks partners in USGS, NOAA, TNC, and other organizations to compile underwater habitat maps, analyze the efficacy of NPS legal authorities in the ocean, and use modern technology to mark park boundaries in the ocean. Task force members include Dennis Burnett, WASO Ranger Activities; Constantine Dillon, superintendent of Albright Training Center; Russell Galipeau, superintendent of Channel Islands National Park; Billy Garrett, superintendent of Gateway National Recreation Area; Phyllis Green, superintendent of Isle Royale National Park; Mike Hill, superintendent of Assateague Island National Seashore; Tomie Lee, superintendent of Glacier Bay National Park and Preserve; Larry Murphy, chief of the Submerged Resources Center; and Joel Tutien, superintendent of Buck Island Reef National Monument. Molly Ross of the DOI Solicitor's Office will also assist with issues involving jurisdiction and authorities. The Ocean Park Strategy will be posted on nps.gov soon, and also will be published in the December issue of *The George Wright Forum*.

New Guidelines for Mountain Protected Areas

Of practical use to those engaged in managing mountain protected areas of various kinds is a new booklet/manual from the World Commission on Protected Areas of IUCN (the World Conservation Union). Entitled *Guidelines for Planning and Managing Mountain Protected Areas*, it is the synthesized product of the thinking of 59 managers and scientists gathered in a mountain field workshop associated with the World Parks Congress of September 2003. Several George Wright Society members were participants, and 23 countries were represented. This 83-page publication covers such theme topics as: biodiversity, cultural and spiritual values, meeting threats (fire, pests, alien species, etc.), soil and water, tourism and visitor management, transborder parks, and planning. The output was synthesized and edited by Larry Hamilton (WCPA vice-chair for Mountains) and Linda McMillan (American Alpine Club and UIAA). Available from IUCN Publication Services Unit, Cambridge, U.K.; info@books.iucn.org or www.iucn.org/bookstore.

Charles E. Peterson, 1906–2004

Charles E. Peterson, a major figure in American historic preservation, died in August at the age of 97. In a long career with the National Park Service, Peterson's achievements included establishing the Historic American Buildings Survey (HABS) in 1933. HABS was the first nationwide program of the National Park Service to document and preserve historic structures. Peterson also helped design Independence National Historical Park, and was instrumental in many other restoration and preservation products in Philadelphia, including the rehabilitation of the Society Hill neighborhood. He received many awards, among them the highest honors from the National Trust for Historic Preservation. After leaving NPS in 1962, Peterson worked as a consulting architect and author, and continued his activities up until his death.

New and Noteworthy

- ***Mapping the Future of America's National Parks: Stewardship through Geographic Information Systems.*** This new book from ESRI Press was edited by Leslie Armstrong and Mark Henry. It's a collection of stories demonstrating innovative applications of geographic information systems in over 80 parks, from the tidewater glaciers of Alaska to the Florida Everglades. *Mapping the Future of America's National Parks* documents the spread of GIS into every corner of the National Park System, and gives readers a behind-the-scenes look at how GIS is called upon to help repair trails and roads, locate artifacts, restore American battlefields, guide development, understand wildfires, and protect fragile lands. Order on-line at www.esri.com/esripress, or call 1-800-447-9778.
- **Research permits part of e-authentication pilot project.** The NPS Research Permit and Reporting System (RPRS), a web-based system used to issue permits to scientists and to manage and document research, will be part of an "e-authentication" pilot project run by the General Services Administration. NPS will use the pilot project to determine whether e-authentication supports the electronic-signature goal for RPRS, and whether it serves the needs of the parks and scientific community in a reasonably user-friendly manner.
- ***Research Links* ceases publication.** In July Parks Canada announced that it has discontinued *Research Links*, its newsletter on natural, cultural, and social studies in the Canadian parks system. It was decided that the newsletter was falling between the cracks: not versatile enough for a general information newsletter, but also not qualifying as a scientific journal because of its lack of peer review. Parks Canada has formed a committee to look at alternatives.

Errata

- Joanna Kafarowski, author of "How Attitudes and Values Shape Access to National Parks" (volume 20, number 4), would like to acknowledge the creative input and valuable contributions of Dr. Alex Hawley, Jennifer Psyllakis, Nancy Elliot, Robert Higgins, and Brian Milakovic, all of the University of Northern British Columbia, to her paper. These acknowledgments were inadvertently omitted from the original paper.
- In David Harmon's paper "Intangible Values of Protected Areas: What Are They? Why Do They Matter?" (volume 21, number 2), a number of references went missing at the end of the bibliography. A corrected PDF version of the paper has been prepared and can be downloaded at www.georgewright.org/212harmon.pdf.

MISSION STATEMENTS

Celebrating Wilderness in 2004

Roderick Frazier Nash

WILDERNESS PRESERVATION IS AN AMERICAN INVENTION—a unique contribution of our nation to world civilization. As we approach the 40th anniversary of the Wilderness Act (September 3, 1964), Americans should renew their pride in and commitment to the National Wilderness Preservation System. It is one of the best ideas our country ever had.

One place to start the celebration is with the recognition that wilderness is the basic component of American culture. From its raw materials we built a civilization. With the idea of wilderness we sought to give that civilization identity and meaning. Our early environmental history is inextricably tied to wild country. Hate it or love it, if you want to understand American history there is no escaping the need to come to terms with our wilderness past. From this perspective, designated wilderness areas are historical documents; destroying them is comparable to tearing pages from our books and laws. We cannot teach our children what is special about our history on freeways or in shopping malls. As a professional historian I deeply believe that the present owes the future a chance to know its wilderness past. Protecting the remnants of wild country left today is an action that defines our nation. Take away wilderness and you diminish the opportunity to be American.

Of course our nation changed its initial wilderness environment. Early on we eliminated a lot of wild places along with the wild people who were there before us. But in this process of pioneering we also changed ourselves. In time Americans began to understand that the conquest of

the wilderness could go too far for our own good. Now, many think, it is time to conquer a civilization notorious for its excesses. Unrestrained growth can be ironic; bigger is not better if the support systems are compromised. Wilderness is an anchor to windward in the seas of increasingly frightening environmental change.

The intellectual revolution that changed our attitude toward wilderness from a liability to an asset is one of the most profound in environmental history. In the beginning of the American experience wilderness was “howling”: feared and hated by European colonists who longed to bring order and security to uncontrolled nature. Their religious heritage taught them that god cursed wild places; the civilizing process was a blessing. Only gradually and incompletely did these old conquer-and-dominate biases give way first to wilderness appreciation and then to preservation.

Romanticism, with its delight in awesome scenery and noble savages, underlay changing attitudes. So did the concept that wilderness was the source of a unique American art, character, and culture. The Adirondacks and the Grand Canyon were the American equivalent of the Acropolis and Buckingham Palace. By the 1850s

Henry David Thoreau could celebrate the physical and intellectual vigor of the wild as a necessary counterpoint to an effete and stale civilization. He called for people and landscapes that were “half cultivated.” He realized that saving some wilderness from development would help keep the New World new.

Granted, few paused to read Thoreau’s essays at the height of westward expansion, but a half-century brought significant physical and intellectual changes in the United States. Discontent with urban environments, and the perception that the frontier was vanishing, brought new popularity to wilderness. National parks (notably Yellowstone, the world’s first in 1872, and Yosemite, 1890) began a policy of protecting unmodified public land for its scientific, scenic, and recreational values. John Muir organized the Sierra Club in 1892 to defend the parks and rallied the nation around the idea that wilderness was a valuable component of a diverse and strong civilization. In the early 20th century, Theodore Roosevelt’s conservation movement included concern for protection of big wild country in which pioneer skills, such as hunting and camping, had meaning. By the 1920s the United States Forest Service was giving administrative recognition to large roadless areas of the national forests. Simultaneously, the growing science of ecology called attention to the importance to wildernesses as reservoirs of basic biological and physical processes. Understandably, Aldo Leopold, a forest ecologist, led the way in calling for wilderness preservation and defining an ethical, not merely an economic, relationship to land.

What was new about the Wilderness Act of 1964 was the way it gave specific, systematic, and secure protection to wilderness qualities and the wilderness experience. The law spoke about the importance

of securing “an enduring resource of wilderness” for the American people. The language itself was revolutionary. Traditionally, Americans reserved the term “resource” or “natural resource” for hard-core economic stuff like lumber, oil, soil, minerals, and hydropower. In describing wilderness as a “resource,” Howard Zahniser, who wrote most of the act, and Congress enlarged the definition of that term to include space, beauty, solitude, silence, and biodiversity. They created a framework for understanding wilderness protection as just a legitimate use of the public lands as the extractive industries. As a professor I sometimes used a literary metaphor to explain the evolution of American wilderness policy. Think about individual national parks and forests as books. In time they were “shelved” in libraries such as the National Park System and the National Wilderness Preservation System. Rangers, who might be thought of as “librarians,” provided protective and custodial services. By the 21st century the task of collecting and cataloguing was largely over. Most of the wilderness we will ever have is identified and at least nominally protected. The challenge now, to continue the metaphor, is to improve our ability to read the books we have reserved. We need to become more environmentally literate. This task calls for a new generation of educators and interpreters who will help people realize the full value of the preserved wilderness resource. Scientists are important, but so are poets, theologians, historians, and philosophers. With their help we may realize the highest potential of our preserved wilderness: using it for instruction and inspiration in how to live responsibly and sustainably on this planet. In 1964 the American public understood the Wilderness Act to be anthropocentric. Wilderness was protected as a scenic outdoor playground. Recreation

and the economic gains that came from tourism justified the policy of preservation, and they served the cause well. But, as the Endangered Species Act of 1972 suggested, there were higher horizons for wilderness valuation. New philosophies called *environmental ethics* or *ecocentrism* gained credibility. If, as the ecologists claimed, nature was a community to which people belonged, didn't we have a responsibility to recognize the intrinsic value of its other non-human members and of natural processes? Wasn't it plausible to assume that nature had rights humans ought to respect? Wilderness figured importantly in this new ecocentric philosophy because it was uncontrolled environment. We didn't make it; we don't own it; and our use of it is not in the old utilitarian style. Indeed designated wilderness could be understood as not for people at all. As the act states, humans are "visitors" who do not remain. Wilderness, then, was someone else's home. It was an environment in which to learn that we are members and not masters of the community of life. An environmental ethic, rules establishing fair play in nature, is the logical next step. Why not do for other species what we have tried to do for oppressed minorities within our species?

Restraint is at the core of the new valuation of wilderness as a moral resource. When we protect wilderness we deliberate-

ly withhold our power to change the landscape. We put limits on the civilizing process. Because we have not conquered and do not dominate wild nature, we demonstrate understanding of the basic ethical concept of sharing and fair play. In this case it's the rest of life on the planet that's involved! Thoreau realized that "wilderness is a civilization other than our own." Respecting it by restraining our impact is the key to effective global environmentalism. The kind of ecocentrism wilderness teaches is not *against* humans at all; it transcends them and recognizes that their best interest is ultimately that of the larger whole.

The Wilderness System, then, is still a place to recreate; but it is also evidence of our capacity for badly needed self-restraint in our relationship to nature. Wildernesses are places to learn gratitude, humility, and dependency; to put our species' needs and wants into balance with those of the rest of the natural world. Even if we never visit them, wilderness areas have value as a symbol of unselfishness. Wilderness preservation is a gesture of planetary modesty by the most dangerous animal on Earth! On its 40th anniversary, let's celebrate the Wilderness Act as the dawn of a kinder, gentler, and more sustainable relationship with our planet. Can anything really be more important?

Roderick Frazier Nash is Professor Emeritus of History, University of California–Santa Barbara, and author of *Wilderness and the American Mind*.

"Mission Statements" is an occasional column that presents compelling statements of values and ideals that are important to the people, places, and professions that the Society serves. We are looking for inspirational and insightful writings that touch on close-to-the-heart issues that motivate us to do what we do as park professionals. We invite readers to submit their own Mission Statements, or suggest previously published essays that we might reprint in this column. Contact GWS executive director Dave Harmon at dharmon@georgewright.org.

An Evaluation of the National Park Service's Wilderness Program on the 40th Anniversary of the Wilderness Act

THE YEAR 2004 MARKS THE ANNIVERSARY FOR TWO SIGNIFICANT EVENTS in the environmental history of the United States. Two hundred years ago, the Lewis and Clark Corps of Discovery expedition began its exploration of the western territory acquired by the Louisiana Purchase. Forty years ago, Public Law 88-577, the Wilderness Act, was signed into law by President Johnson. These two events serve as historic markers on how quickly the "endless" expanse of the American wilderness disappeared.

In fact, the Lewis and Clark expedition was already encountering the vanguard of traders, trappers, and settlers moving into the West even before its return to St. Louis in 1806. In less than one hundred years, most of the lands traversed by the Corps were occupied by European settlers and ranchers, and the vast herds of wildlife that fed and clothed Native Americans, and the Lewis and Clark expedition itself, were almost gone. By the late 1800s, many Americans were expressing alarm about how rapidly the resources within the wilderness, as well as the wilderness itself, were vanishing. This alarm translated into a Golden Era of wilderness advocacy by the likes of Henry David Thoreau, George Perkins Marsh, John Muir, Sigurd Olson, Bob Marshall, Gifford Pinchot, and Aldo Leopold, among others. After years of effort by people such as Howard Zahniser and David Brower, this advocacy was translated into law with the passage of the Wilderness Act on September 3, 1964—in spite of the

objections of the National Park Service (NPS) in being included under its authority.

While the Park Service objected to several administrative aspects of early drafts of the Wilderness Act, its primary objection, formally expressed at several congressional hearings, was the contention that NPS lands were "already wilderness" and, therefore, did not need to be included under any "additional, burdensome regulations" (Sellars 1997). But after years of observing NPS's propensity to provide visitor facilities and developments throughout the National Park System, sometimes through the coercion of local politicians but often through its own initiatives, the environmental community and Congress disagreed with the Park Service that it was doing an adequate job of preserving undisturbed areas within national parks. Congress specifically, and pointedly, included the Park Service within the Wilderness Act as one of the three federal agencies responsi-

ble for administering the National Wilderness Preservation System. (Subsequent legislation added the Bureau of Land Management as a wilderness management agency.)

Implicit in being identified within the Wilderness Act was the requirement for NPS to preserve wilderness lands in keeping with the supplemental definitions, standards, and prohibitions of uses described within the act itself. The basic requirement for managing wilderness lands differently from other NPS lands has never been fully accepted, or implemented, by the agency.

Since that inauspicious start 40 years ago, and in spite of the fact that it administers the nation's (and the world's) largest inventory of wilderness, the Park Service has actually accomplished relatively little in implementing either the letter, or the spirit, of the 1964 Wilderness

Act. While the NPS directorate has constantly claimed a commitment to wilderness, and often states that it is doing a good job in managing wilderness, there is very little evidence available to demonstrate that the agency has made more than token efforts to distinguish wilderness (including areas identified as "designated," "proposed," "potential," "recommended," and "study areas") from other NPS backcountry areas and provide wilderness with the supplemental protection required by the act and its own management policies.

This is not to say that, in the years since the Wilderness Act was passed, the agency has not generated considerable paperwork, formed several special task forces and committees, held countless meetings, attended dozens of public forums, created workbooks, proposed budgets, written white papers, sent numerous people to training, and developed policies and directives addressing the issue of wilderness management. While these products provide an image that the Park Service is actually "managing" wilderness, the reality is that



Figure 1. Camp at Pingo Lake, Gates of the Arctic National Park and Preserve, Alaska. (photo courtesy of National Park Service)

the agency would find it difficult to provide any real evidence that the basic requirements of the Wilderness Act are actually being applied in the day-to-day and long-term management of wilderness areas within national parks. Generally, the current NPS wilderness program reflects the historic reluctance the NPS directorate has had towards the Wilderness Act (Sellars 1997) and calls into question the agency's commitment and capacity to preserve wilderness.

After four decades, the public should

reasonably expect that a resource stewardship agency such as the National Park Service would be able to easily demonstrate (prove) that it has made at least minimal efforts toward providing the supplemental management standards for wilderness that would differentiate it from other backcountry resources. In fact, NPS would be hard pressed to offer proof that it has actually taken administrative steps to protect wilderness within the National Park System beyond the original ten-year initiative it started in the mid-1960s to develop the presidential recommendations (required by the Wilderness Act) that resulted in the current inventory of “designated” and “recommended” wilderness. That effort ended in the 1970s and, even then, did not include a complete inventory of all the natural area parks in existence at the time the Wilderness Act was passed. Since that time, the NPS wilderness program has basically consisted of ignoring the requirements of wilderness, a reluctance in enforcing established policies, and, in some cases, an open hostility by upper-level managers towards wilderness.



Figure 2. Big Bend National Park, Texas. (photo courtesy of National Park Service)

While it is recognized that some slow progress has been made within the Park Service, and several park managers and many more lower-echelon staff deserve high marks for their wilderness program efforts, NPS’s overall wilderness program over the past several decades has been driven only by the periodic energy of a few interested individuals rather than being accepted as a vested, permanent responsibility of the agency. While the NPS leadership may present an inventory of paper and electronic products referencing the word “wilderness” as a testimony to the agency’s commitment to wilderness, the instructions of the Wilderness Act itself, and the Park Service’s own wilderness policies, currently exist as voluntary guidelines that a park manager may, or may not, choose to apply.

The impact of the Park Service’s less-than-enthusiastic attitude towards wilderness reflects itself in the day-to-day management of wilderness both at the park level and on a national scale. Forty years after the Wilderness Act, most NPS wilderness parks do not have even a simple wilderness management plan (which have been required by NPS management policies since 1988). Such plans should at least identify where the park wilderness is located and who within the park staff is responsible and accountable for wilderness, and include statements as to how these resources are to be managed and preserved. While not having an adequate wilderness planning document is problematic in its entirety, management of wilderness resources is directly affected by the lack of one particular requirement of these plans: the element that addresses section

4(c) of the Wilderness Act, entitled “Prohibitions of Certain Uses,” i.e., the “minimum requirement” provision of the law. The appropriate application of minimum requirement is considered by many to be the heart of the Wilderness Act, and continues to represent one of the greatest sources of contention within the NPS wilderness program through the agency’s misuse of motorized equipment, aircraft, structures, and installations.

Since most national parks have neither wilderness management plans nor suitable minimum requirement procedures to assess whether or not projects, and the tools or techniques needed to complete them, are actually needed “for the purposes of this Act,” park managers continue to do essentially whatever they want or need to do within wilderness regardless of potential violations of the Wilderness Act and NPS policies. Historically, the Park Service has deferred to whatever methods and equipment are easiest, quickest, and cheapest to use. Invariably this has meant the routine use of motorized equipment and helicopters within wilderness. Decisions to use prohibited equipment are usually made without an adequate consideration of alternatives, including environmental compliance documentation and public involvement. This situation has meant that NPS, when compared with the other wilderness agencies, has a reputation for generally “allowing” the use of motorized equipment, helicopters, and developments within wilderness when other, less-intrusive, methods are available.

On a national level, the Park Service’s inability, or unwillingness, to implement an effective wilderness management program has generated growing criticism, and lawsuits, from the national environmental organizations. Sadly, the historic reluctance of NPS to implement an effective wilder-

ness program within individual parks has been a contributing factor in current legislative efforts to de-authorize designated wilderness at Cumberland Island National Seashore and remove the Colorado River corridor from the wilderness proposal for Grand Canyon National Park (Ingram 2003).

What does the NPS need to do to implement a more effective wilderness program? While there will always be reasonable discussion about exactly what is needed for an adequate wilderness program, at a minimum the Park Service should strive to have the following actions implemented prior to the celebration of the Wilderness Act’s 50th anniversary in 2014:

- Parks should have at least a basic wilderness management plan that distinguishes wilderness resources from other backcountry resources, establishes who is responsible for the management of wilderness within the park organization, establishes how minimum requirement will be determined for all activities affecting wilderness, and provides an opportunity for the public to become involved in the wilderness planning process.
- Parks should be responsible and accountable for full documentation of, and providing for appropriate public involvement in, decisions on all activities involving any of the section 4(c) prohibitions.
- Persons selected for positions having wilderness responsibilities should have a basic understanding of the ramifications of the Wilderness Act on the NPS Organic Act and other appropriate laws. Knowledge of wilderness issues should be included in the selection criteria for all positions having specific responsibilities for the management and

preservation of wilderness.

- If they haven't done so already, all managers having direct responsibilities for wilderness should complete an Arthur Carhart National Wilderness Training Center course for line officers within a year of being selected for the position.
- NPS should complete the required inventory of lands considered suitable for inclusion within the National Wilderness Preservation System, including wilderness suitability studies, and forward the required recommendation as to suitability or non-suitability to the president.

While all of these suggestions have been recommended before in one form or another, the prospects of implementing them in order to significantly improve the Park Service's wilderness program will depend upon the NPS directorate being willing to hold itself, and the parks, more accountable for wilderness than it has for the past four decades. This will involve the adoption of a system which ensures that the wilderness parks and the directorate are staffed by individuals who support the concepts of the Wilderness Act and are aware of their responsibilities in seeing that the requirements of wilderness are effectively applied in all appropriate NPS operations and programs. The capacity of the agency to actually make these improvements remains a

question.

The state of the NPS wilderness program is certainly not just the result of the current administration. Past administrations advocating a strong commitment to wilderness have been equally unsuccessful in their efforts to improve wilderness preservation within the Park Service. In 1997, Director Roger Kennedy issued a memorandum to regional directors and wilderness park superintendents entitled "Strengthening the NPS Wilderness Accountability System." Director Robert Stanton re-issued a similar memo in 1998. These memos instructed NPS staff to ensure that wilderness was included in (1) annual performance plans for wilderness park superintendents, (2) the position



Figure 3. Two coastal barrier islands in the Mississippi portion of Gulf Islands National Seashore are designated wilderness areas. (photo courtesy of National Park Service)

descriptions for critical management positions, (3) the knowledge, skills, and abilities (KSAs) statements for pertinent job announcements, and (4) the each park's Government Performance and Results Act (GPRA) strategy plans.

A report summarizing the relative lack of response to the directors' accountability memorandums was submitted to the Washington Office's associate director for operations in the fall of 1998. Because of resistance from individuals in the Washington Office, this report was never forwarded to the director and the elements of the original initiative were essentially abandoned. In short, the effort to ensure that NPS wilderness resources are being managed by individuals knowledgeable about their responsibilities under the Wilderness Act, or even to implement standards for monitoring this issue, has never been implemented.

While the National Wilderness Steering Committee has generated a significant inventory of documents and projects (Henry and Ulvi 2003) designed to improve the NPS wilderness program, there appears to be little evidence to indicate that the NPS directorate is going to use this material to overcome its historic reluctance to implement, and enforce, a truly effective wilderness program within the agency. The steering committee itself is limited in its assertiveness for wilderness, ironically, by virtue of its being sanctioned and administered by the NPS directorate. The Washington Office associate director for visitor and resource protection maintains an oversight authority for the group, regardless of who happens to be chairperson. Thus, the steering committee has remained silent on significant issues, such as the unexpected termination of the Grand Canyon National Park wilderness planning process by the park superintendent.

Similarly, in 2002 the steering committee "approved" (without real debate or review) a Washington Office-generated wilderness directive that would have pro-

vided an "authority" for individual park superintendents to usurp Congress in determining what is, or is not, wilderness by allowing them to make individual decisions as to what lands needed to be formally studied for wilderness suitability, thus avoiding the required formal study process and subsequent recommendation to the president. This directive was withdrawn only after 21 environmental groups protested to the secretary of the interior about the precedent established by the directive and the lack of public involvement in its issuance.

In summary, after 40 years the National Park Service has made relatively little progress in implementing the requirements of the Wilderness Act. While some progress and the efforts of individual managers need to be recognized, the agency's overall wilderness program falls far short of what should be expected from a resource stewardship agency as prestigious as the U.S. National Park Service. This situation appears to reflect the historic reluctance the NPS directorate has had in accepting the restrictions imposed by wilderness and the objection the agency has had in being included under the authority of the Wilderness Act.

Without better leadership, it is unlikely that the National Park Service wilderness program will lift itself out of the state of lethargy in which it has existed since the passage of the Wilderness Act in 1964, and will probably never achieve the level of professionalism envisioned by Regional Director Roger Contor when he wrote: "Wilderness within a national park should be championed as the very best of the very best remnants of America's original landscape" (Contor 1992).

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A Conservation Agenda in an Era of Poverty

[Ed. note: Steven E. Sanderson, president and chief executive officer of the Wildlife Conservation Society, delivered these remarks last October in a keynote address to the 2003 Biennial Scientific Conference on the Greater Yellowstone Ecosystem. The address has been published in *Yellowstone Science* (vol. 12, no.1, 2004, pp. 5–12), and will also appear in the conference proceedings, *Beyond the Arch: Community and Conservation in Greater Yellowstone and East Africa: Proceedings of the 7th Biennial Scientific Conference on the Greater Yellowstone Ecosystem*, A. Wondrak Biel, ed. (Yellowstone Center for Resources, 2004, pp. 276–284). We thank the author and the Yellowstone Center for Resources for permission to republish the address here.]

IT IS A DELIGHT TO BE INCLUDED IN THE AMBITIOUS AND IMPORTANT PROGRAM of this conference, in such a beautiful part of the world. I am not an expert in the specific subjects of this conference, but I do represent an organization that is devoted to the protection of great landscapes such as the Serengeti and Yellowstone systems, as well as the sustenance of the wildlife they support. I also grew up on the western slope of the Rockies in Colorado, and I lived my first 13 years in and around the Gunnison–Crested Butte area and in Montana during the late 1940s to 1960. During that time I experienced the transformation of Crested Butte from a sleepy mining and ranching community to one that boasted a tourist economy, and then ecotourism.

I should also add that the bison restoration in the West was sponsored by the New York Zoological Society, our founding organization, and began at the Bronx Zoo. My office is there, and directly across the great court is the historic Lion House where Theodore Roosevelt and William Hornaday, our founding director, created the American Bison Society to repopulate the American West with Bronx Zoo bison. Incidentally, the bison exhibit at the Bronx Zoo was one of the first naturalistic exhibits in any zoo in the world—a 20-acre prairie in a temperate woodland, which hosted the

genetic bison stock that populated a lot of this country. So, when you see bison in Yellowstone or the Flathead country, you are looking at the descendants of proud New Yorkers.

I am filled with admiration for the principal speakers at this meeting, from whom I have learned so much. Dan Flores, Richard Leakey, Tony Sinclair, and Lee Talbot, as well as others on the program represent the very best in natural history, science, and conservation action. Whatever our individual strengths and weaknesses, our work together in coming years is extremely

important to the future of life on Earth.

My message to the conference is partly a pessimistic one. From the standpoint of conservation, which is at the intersection of science and public purpose, the temper of the times is not very good. The public commitment to conservation is a muddled one, and it has real implications for our work together as scientists, scholars, and public servants. In Johannesburg last year at the World Summit on Sustainable Development, the world appeared very publicly to walk away from the commitments it had made at the Earth Summit in Rio in 1992, and which had begun at the path-breaking summit in Stockholm in 1972. By the end of the Johannesburg Summit, conservation had been almost completely obliterated from the public consciousness of the multilateral system in favor of yet another rendition of sustainable development.

This year, the World Parks Congress in Durban, South Africa, was a troubling and difficult exercise, in which conservation was hardly invoked with pride. The chosen theme, "Benefits Beyond Boundaries," should have reiterated a commitment to extend the impact of protected areas to their surrounds. Instead, the discussion turned into a confused, rambling discussion that focused on the elimination of the hard edges of protected areas, which we have strived to create over decades of time, and which we should be proud to have achieved: 10% of the world's terrestrial surface under some kind of protection. Somehow, credible international conservationists who had worked hard to create those protected areas now positioned themselves more conservatively, to support a much more restricted notion of protected areas that would have "no net negative impact on local peoples"—without so much as a definition of what a "local people" was, much less what "no net negative

impact" might mean. Conservationists know well that when there is a publicly contested question of the allocation of natural resources, stakeholders claiming to be local spring up all over the place, with varying degrees of legitimacy. So, for the conservation community to make such arbitrary and unspecified stipulations was disturbing. Additionally, some advocates for indigenous peoples argued—without so much as a word of opposition—that protected areas had been the worst thing ever to have happened to them. The Congress, apparently acquiescing to such categorical statements, conceded that protected areas had to be justified by economic and social criteria, not conservation or ecological integrity. There was very little mention of the achievements of the conservation community or its historic goals. And, in fact, there was a great deal of homage paid to the rural development community, despite the fact that the broad concepts of development offered in the post-World War II era have failed to prove their sustainability or their value to the truly poor.

These issues have been almost uncontested in the rush to promote poverty alleviation in the new millennium. The United Nations (UN) and the multilateral development community goals for the new millennium barely mention conservation. In fact, in the millennium development goals of the UN and the World Bank, sustainable resources with respect to human development have actually taken the place of conservation. The World Bank's new forestry sector policy has shifted from conservation to human poverty alleviation, after a decade of staying out of financing projects in tropical moist forests because the bank itself (along with its many critics) became concerned with the negative impact such projects might have on the all-too-rapid process of tropical deforestation. The argument for

returning to forestry sector loans appears to be that somehow, ten years later, the world knows enough about achieving sustainable forestry practices throughout the world. The evidence for this claim is missing.

The desire to relieve the world of extreme poverty is a laudable social goal. It is implicitly valuable to human life on Earth, and close to the hearts of those of us who work in developing countries, but also in the American South and West. Poverty is a difficult, degrading human condition that needs attention of the kind that the millennium development goals are paying. And it bears directly on who we are as conservationists. Conservation, like poverty, is a cultural concept, and our culture is concerned with human social progress. As the eminent conservationist Richard Leakey has said in his writing, he is not sure he would be so conservation-minded if he were hungry and cold.

However, something or some force in the global community has led the world to believe that conservation of protected areas should be responsible for bearing a great deal of the burden of economic development and local poverty alleviation in the world. How we came to that is a matter of great mystery, especially since the economic growth and development of much of the world has led to a protected areas system that is a tiny fraction of the terrestrial biosphere. The remainder, for better or worse, has been open to development and has been rapidly transformed in the last century, with increasing speed in the post-World War II period. Now, in Equatorial Africa and South and Southeast Asia, where much of the world's rural poverty is concentrated, plans for poverty alleviation depend on increasing agricultural productivity in existing land, using more energy and water, and intensifying livestock husbandry in fragile lands.

The goals of hunger alleviation require that such improvements must accrue to local peoples as well, but the history of agricultural productivity and the Green revolution during the post-World War II era do not inspire confidence. After all, in 2003, 75% of the world's poorest populations are in the countryside after 50 years of agricultural development. Even in the greater Yellowstone area, we can find evidence of local peoples being crowded out or hurt by what appear on the surface to be good ideas for development.

I believe this process around the world is the product of shortsighted economic development ideas, a continuing emphasis on sectoral economics in the face of decades of environmental failure, and a reading of past and future that is more convenient than true. In the American West, much of the so-called local protest against environmental restrictions actually is a stalking horse for large-scale energy, mining, agricultural, and more recently, tourist endeavors that often displace people to less attractive areas where they now staff the service sector for the rich interloper. The issues are posed as local, but they are often national (in the case of energy) or global and corporate, in the case of subsidies or mineral permits.

In any case, wild nature in our time has been converted into a contested area that is debated, not in terms of nature itself, but purely in terms of economic potential. It is my hope that our work together in the future will be controversial in the best sense, pushing flaccid and poorly argued concepts out of the way in favor of sharper ideas, good science, and plans for conservation. And the first way to do that is to ask how all this happened, and how current forces are arrayed, so that we assess how we act most appropriately. When one looks at the history of any natural system that is

human-impacted—and that certainly applies to the focus of this conference—one has to grant a big swath of ground to politically infused memory. History as we know it is quite often the political use of facts or phenomena in the past to create myths and opportunities for the future.

In the case of natural resource systems, quite often there is a direct political use of natural phenomena, so that a flood on the Mississippi River produces greater effort to engineer flood control. Likewise, in the aftermath of the degradation of the Everglades, the federal government and the state of Florida are investing billions of dollars to recreate the Everglades, restore it, and re-engineer it, and, in fact, re-plumb it. Whether in the Everglades or the Mississippi, history becomes the reinvention of failure as success.

Similarly, in the international community, rural development and human poverty alleviation are reinvented failures now parading as successes. The ostensibly new tools, mechanisms, and models for rural development in the world today go back to the 1940s and 1950s. The only thing that is missing is the intellectual leadership of the post-war economic development theorists, who really led the way to a new way of looking at human progress. Missing also is a serious self-conscious critique of the failures of rural development in our time. River basin development of the kind now in play in the Mekong River Basin is, in fact, similar to projects from the 1960s and 1970s that were emblems of environmental disaster. Integrated rural development projects, increased inputs, credit availability, and agricultural intensification, the integration of agriculture into commercial markets and livestock production—these are all old, old ideas, dogged by as much failure as success. The community-based development ideas bandied about today are not much different

than those in practice in Vietnam under the French.

Turning to the landscapes under consideration in this meeting, wilderness and preservation in Yellowstone and Serengeti were invented concepts, invented for specific political purposes. In both places, wilderness and preservation were concepts that did not take into account aboriginal presence. And so they have been, as we have learned over the last hundred years, demonstrably false as explanations of the natural systems of the Rocky Mountain West and East Africa. There has also been a reinvention of the explanation for our current condition, in which the extirpation of wildlife in wild systems has been blamed on the poor. Maurice Hornocker will tell you that cougars were shot out of the American Southwest by 1925, and it was not by the poor.

But conversation today in the global community insists that poverty leads to degradation and species extinction. Conservation, as the argument goes, stands in the way of economic development and so must be pushed aside in favor of sustainability. Conservation has been reinvented not as a promise for the future, but an obstacle to economic success, and so instead of building on the 10% of global lands under some kind of protection, they and their protectors are indicted for keeping people out and keeping people poor. And in landscapes like Yellowstone or Serengeti, or the Mekong or Congo basins, there is proposed what Dan Flores has referred to as a leap from extractivism to ecotourism without the intervening steps. So that in the Congo Basin, one of the most demanding and difficult deliverables that the conservation community is charged with over the next dozen years is to transform what is essentially a logging economy into an ecotourist economy in which there

will be no disadvantage to the tropical forested countries of the Congo Basin and, in fact, there will be a clean, sustainable future based on European, American, and South African tourism.

The conservation community may welcome the opportunity to make this historic shift, but it requires a standard never demanded of other, less conservation-minded economic agents. To go from logging directly to ecotourism is extremely difficult, just as it was extremely difficult in Crested Butte, Colorado, to go from coal mining to ecotourism without asking about the income gap or the dislocation of local peoples. I can promise you, you cannot find many of the people who lived in Crested Butte when I was born living there today, and I don't mean just that they've all died. Their families are not there. And it was because of the income gap. Likewise, the residents of Aspen today are not those of past generations. To the extent they remain, they are dotted along the valley road to Glenwood Springs. And so on.

There is not a given socio-economic benefit to changing an economy from an extractive base to an ecotourist base. The potential conservation benefit is much clearer. If conservation actually does have to do with human landscapes as well as natural landscapes, someone has to develop viable, realistic human benefits from the economic changes being proposed. And it must be done "on the run," as an ersatz model of economic development with putative ecotourism carving up the landscape.

It is worth noting, too, that conservation has become derivative of human use because the public agencies charged with conservation are also charged with satisfying the public. Nowhere in this world is it harder to satisfy the public than in the United States. The public agencies charged with protecting national forests, public

lands—the Forest Service, the Park Service, Bureau of Land Management, all of the public agencies—have to respond to what people want, as expressed through organized civil society and the political process. So, conservation goals become derivative of human use practices. Perhaps no better case exists than the ongoing controversy over winter use rules for snowmobiles in Yellowstone. Twenty years ago it was not an issue; but now, more than 100,000 people use Yellowstone Park in the winter every year. The impact of that use is a fundamental issue for Yellowstone and for the National Park Service.

Similarly, in the early 1990s a survey was conducted of visitors to Yellowstone. People asked to rank what they liked about Yellowstone mentioned most often walking outside, going to the visitor center, and shopping. One imagines that in 1872, there must have been something else on people's minds when Yellowstone was created. While one might approve or disapprove of the hierarchy of consumer demand, national parks cannot be divorced from public satisfaction. That fact is etched on the Roosevelt Arch. The Park Service is not charged with telling the American people what they should insist upon in the parks. But the consumer is a new stakeholder in protected areas, in a way that might not necessarily serve the interests of conservation.

This confusing and distressing place in the history of conservation has come to us thanks to a lack of leadership on all sides. By that I mean that no organization or political consensus has emerged to seize the agenda for conservation in these great landscapes in the way that there must be. In the absence of such convincing hegemonic leadership, society risks a catastrophic compromise in which no one would be satisfied, in which all of the belligerents would

butt heads for a period of time, and in which no public policy solutions would be stable.

In conservation today we may be witnessing a convergence of weakness on all sides, development, economic growth, and conservation—from the multilateral to the local political forces in conservation that pull at the complex issues under consideration at this conference and beyond. Wildlife biology is in a tragically weak position, though getting stronger. It is of enormous importance to conservation, but only about a half-century old. The monographic studies and continuous databases on wildlife rarely stretch beyond the life of an individual animal, eight to ten years, and some of the longest continuous observations are twenty years. That shallowness in chronological time means that wildlife biology does not have explanations for many of the long-term consequences of different conservation strategies.

Wildlife biology also suffers from the skepticism of public authority. Public authorities view science with a jaundiced eye. Sometimes science plays a positive role in helping define the terms of reference for a public ecosystem restoration. In the Everglades, National Park Service biologists and independent scientists are looking at snail kites and crocodilians, and the hydrologists at salinity and sheet flow, all of which contributes to the creation of models that will drive that restoration. Unfortunately, the role of science is circumscribed in the Everglades, too. When those models cross the political or public policy line, they are pretty readily kicked back across the line or discarded. For example, the restoration of a truly natural Everglades ecosystem by definition of the restoration plan cannot prejudice water availability or flood control for the populations of Floridians outside the Everglades boundaries. The restoration is

delimited politically by the very human impacts that degraded the system in the first place. It is not censorship or bad faith, necessarily, but science with a complicated political value assigned to it is often unwelcome. Far better than the Everglades is the case of the Intergovernmental Panel on Climate Change, where despite the scientific consensus and the moderate tone of the panel, the political use of science in public discourse is problematic.

Beyond the uneven experience with domestic public authority, conservation biology does not articulate well with the multilateral development assistance community. Conservation does benefit in some ways from official development assistance, or multilateral development strategies. But it is not an exaggeration to say that conservation has little role in setting their institutional agendas. Conservationists understand little and have even less of a role in multilateral trade, structural adjustment, and international finance. We simply are not at the table.

Some of this arranged irrelevance is the fault of applied science itself, especially its truncated scope. Wildlife biology has been very confused historically about people. Protected areas have been demarcated without regard to local people. Indigenous peoples and frontier folk alike have been demeaned by some protectionist strategies or dislocated by well-meaning conservationists. In the United States and in pre-independence Africa, wilderness and preservation were concepts that were developed without regard to people.

Conservation science has little reputation in the social science community, which itself understands little about natural systems. Social science invests little in knowing anything about wildlife or wild lands. Social scientists tend to spend very short field stints and to fix economic or social

equilibrium rather than explore its dynamics. Social scientists in the academy—like their life science counterparts—have no management accountability, which conservation organizations and public agencies do. And they have generally failed to acknowledge or write up successfully the failures of rural development.

Public agencies are burdened by uneven levels of capacity and discretion, and extremely political environments in which to work. The multilateral community does not appear to have any accountability for the projects it supports. While criticism abounds, it is difficult to imagine a circumstance in which the multilateral development banking system will actually be held to account for its loans and project ideas. The same can be said of the World Trade Organization, the International Monetary Fund, and numberless regional development authorities. Combine that lack of accountability with the endless infatuation with hopeful rhetoric and a recipe for adventurous experiments is ready. One might readily include the quest to eliminate half of the world's poverty by the year 2015 in that category.

Non-governmental organizations, for their part, completely lack political legitimacy. However important the work of NGOs, they are always in the position of never having been elected or legitimated by any political process. NGOs are able to work only as long as they are convenient to those in power.

What is to be done? It is an important question, because conservationists have failed to produce a positive agenda that the world can accept and be enthusiastic about. Conservationists can cleave to their core mission by creating models of the kind that are being discussed at this conference, models that integrate human social variability into natural system models. That

requires an integrative science that does not yet exist. It does not make sense to talk about the human side of the question separately from the natural side of the question, nor to hold meetings about conservation priorities without a joined social and natural science community.

The community that gathers around these questions has to work at multiple scales, to think about distal drivers, not just local drivers. That also means understanding globalization more seriously. Recently, Montana cattle prices spiked because of BSE [bovine spongiform encephalopathy] in Canada, and the embargo on the imports of cattle from Canada. Since that time, prices have reversed again, thanks to the appearance of BSE in the American West. Forces like that have impact on natural and social systems all the time. And yet conservation does not consider multiple scales for research. Yellowstone is not simply a park, but a linked landscape from the Elk Refuge all the way up into Canada.

In addition to working in an integrative fashion, conservationists must keep their boots muddy. Many organizations in this world do conservation by proclamation. Real conservation must be ground-truthed, and conservation actors must create a contingent model for conservation action as well as scientific observation along the lines of strong, adaptive management principles.

In the end, the community of conservation science, and the science of protected areas and these great landscapes, must cleave to the mission of conservation: the sustenance of wildlife and wildlands in changing human circumstances. As Clifford Geertz would say, that has to be “lit by the lamp of local knowledge.” But it always has to refer back to larger objectives. This community I am addressing must be the best, but with a clear set of outcomes in mind. The positive alternative is a science

for conservation in small, out-of-the-way places that is associated with human betterment. It can be done, but it's not easy. Conservation can inspire people to care about wild nature, people who are alienated from wild nature in every facet of their modern life. Conservation can educate young people to science in an applied way that excites them, rather than in the classroom with principles of science. Conservation can create a positive concept of wildlife health, addressing everything from how prey densities may affect populations of lions in the Serengeti to the sources of chronic wasting disease in the American West.

Finally, conservation can represent two-track diplomacy, working in systems where it is very difficult to work politically. By linking science and community develop-

ment to positive outcomes, conservation can create alternative pathways to formal diplomacy. Does the proclamation of Iran as part of the Axis of Evil make the conservation of the remaining populations of Persian cheetah less important?

Above all, conservation has to represent the integrity of mission, of conservation, knowledge creation, and stewardship, and a vision of a future in which people and nature can co-exist. That's a very bright promise, a very demanding agenda. But it's one that I believe all of us at this meeting share. It crosses from academic to applied organizations, and from private NGOs to public agencies like the National Park Service. I congratulate you on being a part of it, and look forward to your deliberations, which undoubtedly will help us all.

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The State of the CESU Network

Introduction

THE COOPERATIVE ECOSYSTEM STUDIES UNITS (CESU) NETWORK was founded on 22 June 1999. Six federal agencies and 20 universities were founding partners, organized into four of an envisioned national network of 17 CESUs. Five years later, in July of 2004, the seventeenth and final CESU was established. The CESU Network now includes 13 federal agencies, 181 universities and other partners, and full national coverage from Puerto Rico to Guam, from northern Alaska to southern Florida. Hence, an assessment of the “state of the Network” may be both timely and useful.

Even by contemporary standards, it is a young network, and young networks emerge with a distinct history. The Internet is an extraordinary example. In early 1969, the first ARPANET link was established between computers at the University of California–Los Angeles and Stanford University (RAND 2004). A month later the University of California–Santa Barbara and the University of Utah became additional nodes, followed by the RAND Corporation. By late 1972, there were only 37 nodes on ARPANET, and its future was unclear. In 1983, the network split into separate civilian and military components, and the term “Internet” was soon applied to the civilian sector. By 1999, the estimated size of the Internet was close to 1 billion documents (Barabási 2002). By 2002, the network had linked over 100 million computers in 250 countries, and had annually doubled in size for ten consecutive years (Buchanan 2002).

In part due to the importance and ubiquity of the Internet, as well as to advances in physics, systems ecology, molecular biology, organizational sociology, information technology, geographic information systems, and other fields, the study of networks has grown considerably in recent years. One way of addressing the state of the CESU Network is to learn and borrow from the insights emerging from this research. What can network science tell us about CESUs? And which characteristics of networks—including their growth, maturation, adaptation, and trajectory—are relevant to the CESU Network?

The purpose of this article is to provide one assessment of the state of the CESU Network. First, a primer on CESUs is presented, outlining their key features. Second, several network science concepts are described and applied to the CESU Network. Third, the growth and maturation (key network science concepts) of

CESUs are discussed. Finally, a set of future challenges facing the CESA Network are identified.

A Primer on CESUs and the CESA Network

Federal resource management, environmental, and research agencies, along with the nation's universities, share several science-related goals: high-quality research and scholarship, usable knowledge for managers, responsive technical assistance, continuing education, and cost-effective research programs. Cooperative Ecosystem Studies Units represent an innovative approach to achieving these goals. *Cooperative* emphasizes that multiple federal agencies, universities, and other institutions are collaborative partners with substantial involvement in CESUs and their activities. *Ecosystem studies* include the full range of biological, physical, social, and cultural sciences and fields of applied scholarship needed to address important resource issues and support science-based decision-making. *Resources* include both natural and cultural resources associated with federal lands and waters.

Each CESU is established through a formal competition, and implemented through a unified cooperative/joint venture agreement between the federal agencies and the nonfederal partners. Importantly, there is *no* lead federal agency for an individual CESU or the overall CESA Network. Each CESU functions as a "virtual" organization, with agencies and partners linked together through the formal CESU agreement. All CESU agreements follow a similar template reviewed and approved by the Department of the Interior (DOI) Solicitor's Office, other federal agencies, and university administrations and legal counsels. A consistent, reduced overhead rate is applied across the CESA Network, except for agen-

cies that have specific statutory limitations.

A host university is the primary contact for each CESU. Partner universities and other institutions (such as non-governmental organizations, state agencies, and others) add breadth and depth in expertise and resources. At least one, and often more, of these partners must be a minority institution. The host and partners provide space, access to facilities, basic administrative support, and the skills and expertise of their faculty, staff, and students. Federal agencies contribute scientific staff as appropriate to their agency mission—some may be research scientists, while others may be science administrators or resource/environmental management professionals.

Federal agencies also contribute additional administrative support, and provide funds for specific research, technical assistance, and education projects. Projects are undertaken with substantial involvement of (and benefits to) both federal and nonfederal partners. A federal managers committee provides field-based advice and guidance to the CESU. Each federal agency follows its own appropriate laws, regulations, and policies regarding participation in CESU projects and activities. Local option, flexibility, and decision-making are encouraged. At the same time, participation in a common agreement provides new opportunities to identify shared needs and priorities, leverage funding, and improve efficiency through collaboration. Figure 1 highlights the key elements of each CESU.

CESUs are organized around a series of general biogeographic regions. A map is provided as a special insert in this issue of *The George Wright Forum*. The map shows the full complement of CESUs, host universities, and partners as of September 2004. Each CESU has local and regional responsibilities, as well as opportunities to participate in projects at a national level. Together,

Multiple Federal Agencies	<ul style="list-style-type: none"> ● each CESU includes more than one federal agency
Host University	<ul style="list-style-type: none"> ● each CESU has a lead institution ● host provides leadership, administrative support, and space
Partner Institutions	<ul style="list-style-type: none"> ● each CESU includes other universities, state agencies, and NGOs ● each CESU includes at least one or more minority institutions ● partners expand expertise and skills of a CESU
Role and Mission Statement	<ul style="list-style-type: none"> ● describes the research, technical assistance, education, and other expertise the CESU is especially qualified to provide for region and nation
Managers Committee	<ul style="list-style-type: none"> ● committee of local and regional managers from participating federal agencies provides advice and guidance on CESU priorities and activities
Strategic and Annual Work Plans	<ul style="list-style-type: none"> ● each CESU develops plans for improved research, more usable knowledge for managers, and reduced costs

Figure 1. Key elements of CESUs.

the individual CESUs form the CESU Network. The Network is guided by a CESU Council, authorized through a memorandum of understanding amongst the participating federal agencies. The CESU Council includes representatives of each of the participating federal agencies. The Network is led by a national coordinator appointed by the Council.

The CESU Council establishes the mission, scope, and broad policy objectives of the CESU Network. The mission of the CESU Network is

to promote, conduct, and provide research, technical assistance, and education services nationwide in support of the missions of participating federal agencies and their partners concerning natural and cultural resource management on federal lands and waters (CESU Network 2003b: 5–6).

In this mission, *research* is defined as the creation of new knowledge, *technical assistance* is the application of existing

knowledge, and *education* is the transfer of knowledge. In many cases, these activities may be combined in a single program or project.

Research activities of the CESU Network are both disciplinary and interdisciplinary, combining the skills and expertise of university faculty and other experts with those of federal managers and scientists in ways that create high-quality science and scholarship and deliver usable knowledge. Both long- and short-term research projects, appropriate to each agency's mission, are conducted through the CESU Network. Multi-agency projects are encouraged. For example, a series of related projects has been completed through the Rocky Mountains CESU to assess the impacts of heavy metals contamination of soils at Grant-Kohrs National Historic Site and nearby Bureau of Land Management (BLM) lands.

Technical assistance by the CESU Network is essential to meeting the missions of participating federal agencies and their partners. Technical assistance applies existing theories, techniques, and research results to solving (or mitigating) specific resource management problems. For example, a project of the North Atlantic Coast CESU is being conducted with the National Park Service (NPS) to create a GIS-based automated coastal change analysis "toolbox" for managers and researchers to use in analyzing coastal geomorphologic data.

Education through the CESU Network includes the professional development of federal resource managers and other employees through workshops, conferences, training sessions, and degree programs, as appropriate. It also includes the training of graduate and undergraduate students through their participation in CESU projects, and educational programs de-

signed for citizens (including, but not limited to, environmental education, resource interpretation, and public science education). For example, a project with the Pacific Northwest CESU is being conducted with Nez Perce National Historical Park to develop a "parks as classroom" curriculum module related to ethnogeography.

Research, technical assistance, and education are the primary tasks of each CESU. Importantly, the scope of CESUs includes both natural and cultural resources, all of the relevant disciplines, and the delivery of services to both natural and cultural resource managers. Hence, the mission of the CESU Network is both ambitious and practical, expansive in scope while specific in purpose, and reflective of the skill and expertise residing in federal agencies, the nation's universities, and other partners.

The Science of Networks

As Albert-László Barabási describes in his book *Linked: The New Science of Networks* (2002), the emerging science of networks owes much to a branch of mathematics called "graph theory." Whatever the identity and nature of nodes and links, for a mathematician they form the same thing: a graph or a network. Computers linked by phone lines, molecules in our body linked by biochemical reactions, companies linked by trade, islands linked by bridges, and organizations linked by cooperative agreements are all examples of networks. The CESU Network is built of nodes (federal agencies, universities, and other partners) as well as linkages (membership, participation, and ongoing projects in one or more CESUs).

Research into the behavior of networks has discovered several unusual characteristics. There are three distinct kinds of network architecture, and these structural kinds ("topologies," in mathematics) apply

to a wide range of networks. Figure 2 is taken from Paul Baran's classic 1966 paper on distributed communication networks (Baran 1966). Baran, a RAND researcher, was investigating the capacity of communication networks to survive nuclear attack. (The paper begins simply with "Let us consider the synthesis of a communication network which will allow several hundred major communications stations to talk with one another after an enemy attack.") Baran argued that a centralized network was more vulnerable than a decentralized or distributed network, and that each type of network had unique structural properties.

One of these properties, shared by complex decentralized or distributed networks, has been labeled "small-world" behavior (Watts and Strogatz 1998; Buchanan 2002). These networks allow for individual nodes that are seemingly far removed to be linked together through only a few other nodes (each being a "degree of separation"—as in the Internet game *The Oracle*

of Kevin Bacon, or the Erdős number phenomenon among mathematicians, or the interconnectedness of ecosystem food webs; see Barabási 2002; Solé and Montoya 2000). Another property is that many of these complex networks exhibit "scale-free" structures—with most nodes connected to just one or a few other nodes, and a few nodes connected to many other nodes (it is called "scale-free" due to the shape of distribution of links per node).

Figure 3 shows the current network architecture for three western CESUs, with the host universities as highly connected nodes. The CESU Network is clearly a decentralized, scale-free network, with benefits of "small-world" degrees of separation—i.e., a large number of agencies and universities linked together through minimal bureaucratic layers (degrees of separation). An example is the ability of federal agencies at the local or regional level to send funds for collaborative projects directly to any partner in a CESU.

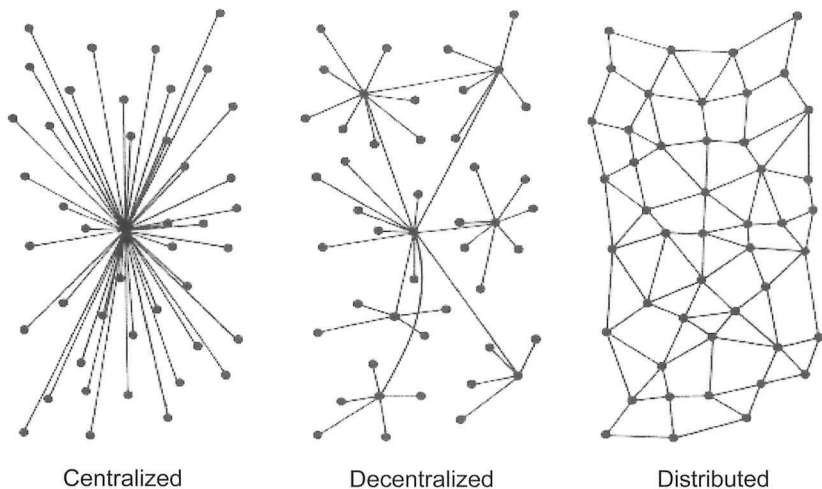


Figure 2. Centralized, decentralized, and distributed networks (adapted from RAND 2004).

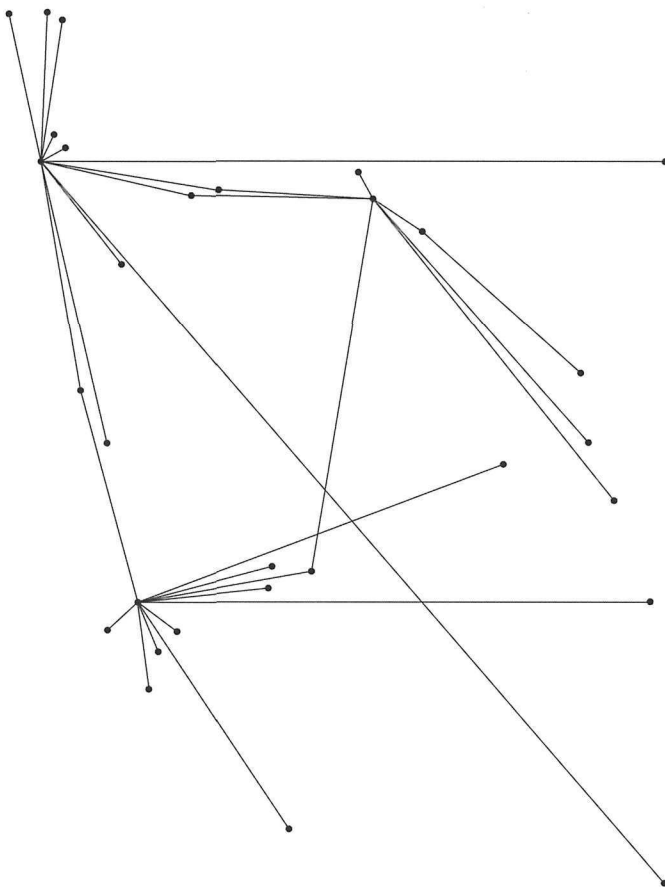


Figure 3. Network architecture for three Western CESUs.

These structural properties change as networks grow and develop. Hence, the emergent growth history of networks is important. Most networks grow one node (with resulting new links) at a time. For example, if only a few connections are randomly added, the nodes continue to pair up steadily. If links continue to be added, the nodes will eventually connect in pairs to each other, forming clusters of several nodes. (A CESU could be conceived in graph theory as a cluster of nodes, with each university and partner organization

considered a node.) But when enough links are added (“enough” varies by kind of network), something dramatic happens—one can quickly navigate from one node to any and all others along the links between the nodes.

Mathematicians call this maturing phenomenon the emergence of a *giant component*. Physicists call it *percolation* and describe the change as a *phase transition*, as in the moment in which water freezes. Sociologists will explain that the subjects have formed a *community*. Regardless of

terminology, the disciplines agree that at some point in network development something special happens. Before, there were isolated, disparate clusters of nodes; after, the clusters are joined, integrated, and functioning in new ways.

Perhaps the completion of the CESU Network's basic structure signals a phase transition in the CESU Network. As such, an assessment should touch on at least three network characteristics: growth, maturation, and trajectory (future prospects).

Growth (A CESU History)

As described earlier, the historical development of an emergent network is important to understanding current network structure and properties. A formal administrative history of the CESU Network by a professional historian has not been written, though it has been proposed (O'Brien, personal communication, 2003). What follows is a recollection by ourselves as participants, with all the strengths and weaknesses such participant observations provide.

In early 1996, considerable reinvention of park-related science within the Department of the Interior was underway. NPS, U.S. Fish and Wildlife Service (USFWS), and other DOI agency scientists were transferred to help staff the new National Biological Service (NBS, later to become the Biological Resources Division of the U.S. Geological Survey). The future of Cooperative Park Studies Units (CPSUs), initiated in the 1970s, was unclear. The need for expanded partnerships between NPS and the nation's universities was increasing in response to the complexity of resource problems faced by the agency and the need for access to a broad range of scientific expertise. Informal and formal proposals for action were developed; an example was the formal proposal

to restructure the CPSU system into a series of multi-agency, multi-university cooperative study units (each with a host and partner structure) included in the NPS plan for its social science program (NPS 1996). A stand-alone proposal entitled "A Conceptual Proposal for Restructuring CPSUs—Cooperative Protected Area Study Units" included both NPS and NBS participation, and expanded the idea to all relevant disciplines.

By August 1996, the concept had been further developed in a more formal proposal entitled "Science for Management in the 21st Century: A Proposal." It was in this document that the term "Cooperative Ecosystem Studies Units" was first used. The proposal was presented to the DOI secretary and DOI Science Board in September 1996; it had been expanded to include science support for other DOI bureaus and selected federal agencies outside of the department. At the direction of the secretary and assistant secretary for water and science, a formal CESU Implementation Working Group was formed in February 1997. The initial working group included representatives of the NPS, USGS, USFWS, BLM, U.S. Bureau of Reclamation (USBR), U.S. Department of Agriculture Forest Service (USDA FS) and Environmental Protection Agency (EPA). The working group met throughout 1997, refining the CESU concept; by November 1997 both the plan for a CESU Network and a strategy for its construction were in place.

A key element of this strategy was to build the CESU Network in a series of phases (called "rounds of competition"), following the principles of adoption and diffusion of innovations. The study of adoption and diffusion has a long tradition in sociology, and it has been applied to a wide range of innovations, from agricultur-

al practices, to the acceptance of new pharmaceuticals by doctors, to new industrial processes. E. M. Rogers' *Diffusion of Innovations* (1983) provided the group a useful framework for building the CESU Network. As Rogers noted, there are several characteristics of an innovation that will significantly influence its adoption. These include:

- *Relative advantage*: the degree to which an innovation is perceived as better than the idea it supersedes.
- *Compatibility*: the degree to which an innovation is perceived as being consistent with existing values, past experiences, and needs of potential adopters.
- *Complexity*: the degree to which an innovation is perceived as not difficult to understand and use.

- *Trialability*: the degree to which an innovation may be experimented with on a trial basis.
- *Observability*: the degree to which the results of the innovation are visible to others.

Rogers suggested that there are different classes of adopters—from “innovators” to “late-adopters”—and each class may have a different set of reasons to adopt an innovation. Figure 4 shows that typical diffusion patterns follow an “s-curve,” with change agents attempting to influence innovators and opinion leaders, and later adopters joining in as the uncertainty of the innovation declines and the rate of adoption slows. While current research suggests that the innovation process is even more complex than Rogers described, the basic prin-

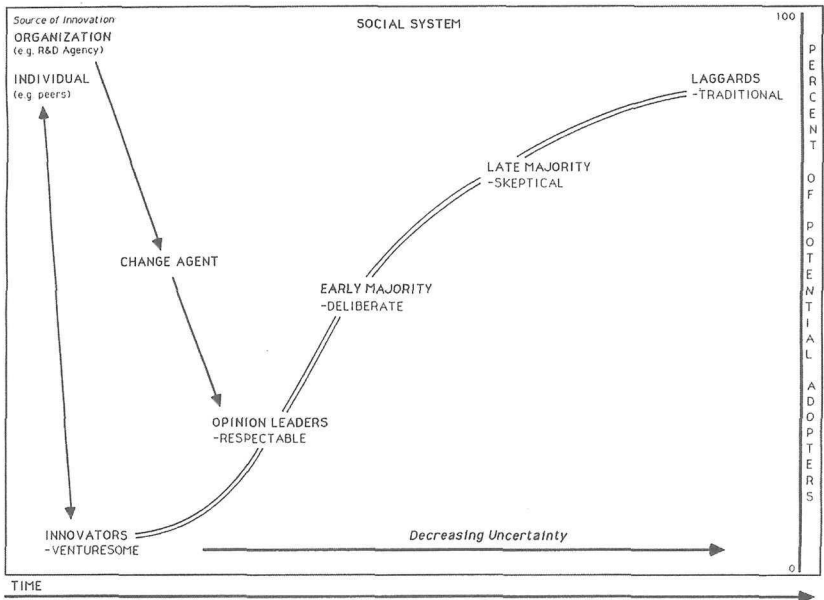


Figure 4. The typical adoption-diffusion curve (adapted from Rogers 1983).

ciples were helpful in organizing (and communicating) the strategy for constructing the CESU Network.

The working group focused on developing an overall network plan and four pilot CESUs, targeting early adopters within interested agencies. A detailed introduction to the CESU Network (“CESUs: An Introduction”) was prepared, closely adhering to Rogers’ principles. Figure 5 highlights the features of the proposed CESU Network linked to Rogers’ charac-

teristics of successful innovations. By November 1997, agency and solicitor review of the first request for proposals (authorized under each agency’s authorities to enter into cooperative agreements) had been completed and the request for proposals distributed. Four bioregions were targeted: Colorado Plateau, North Atlantic Coast, Rocky Mountains, and Southern Appalachian regions. Proposals were due in February 1998.

As the proposals were being reviewed,

Relative Advantage

- delivery of research, technical assistance, and education in full range of disciplines
- expansion of science-related expertise available to federal agencies

Compatibility

- evolution of successful strategies
- complement to existing research programs

Complexity

- established under common, unified cooperative agreements
- organized as decentralized network architecture
- independent initiative encouraged—“local option”

Trialability

- network established over five-year period, with early pilot efforts
- control over project funds and personnel maintained by agencies

Observability

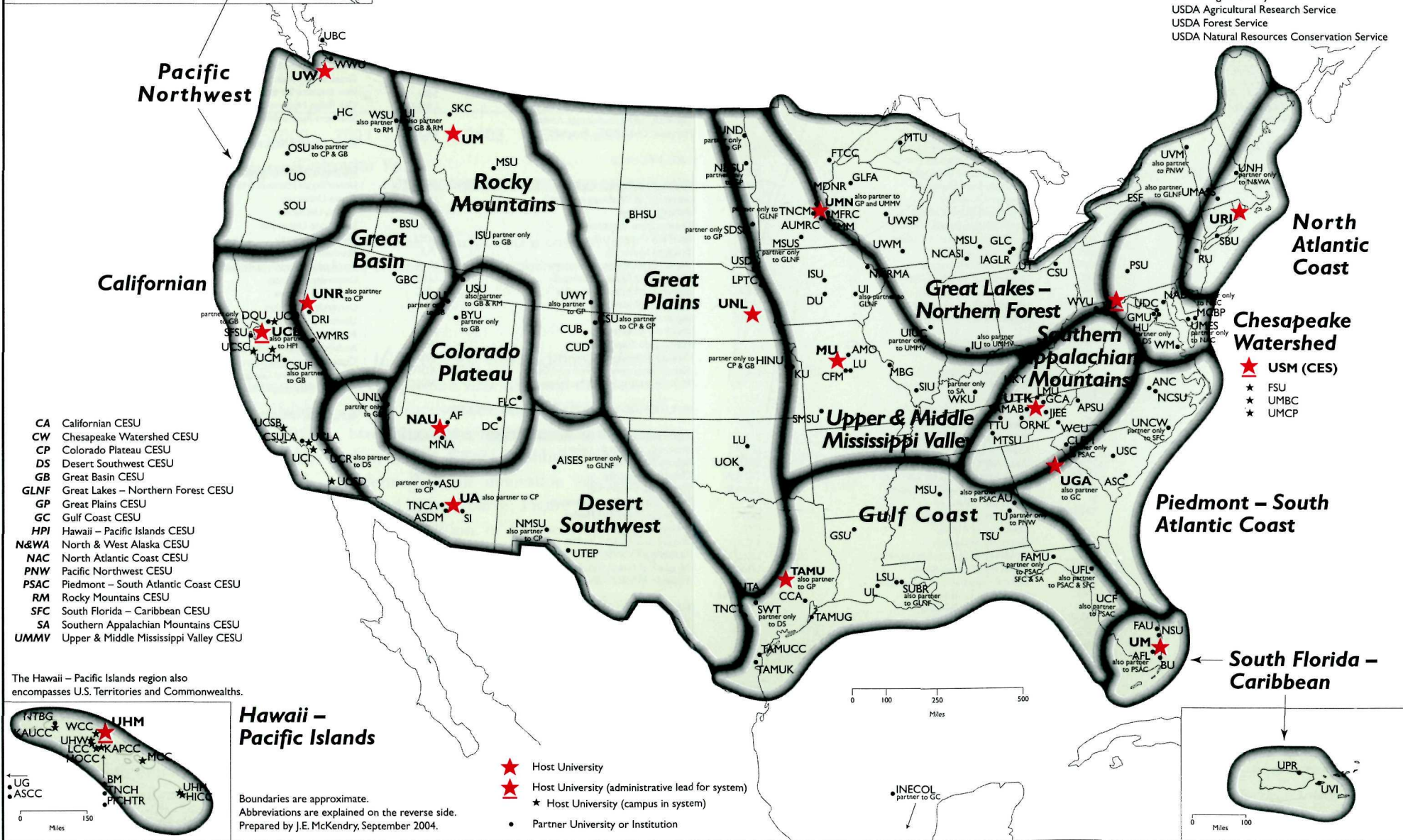
- agreements, other information available on CESU websites
- Biennial Network Meetings share best practices

Figure 5. Selected characteristics of CESUs as innovations.



The Cooperative Ecosystem Studies Units Network

Participating Federal Agencies:
Bureau of Land Management
Bureau of Reclamation
Department of Defense
Department of Energy
Environmental Protection Agency
National Aeronautics and Space Administration
National Marine Fisheries Service
National Park Service
US Fish and Wildlife Service
US Geological Survey
USDA Agricultural Research Service
USDA Forest Service
USDA Natural Resources Conservation Service



Californian CESU	CA
University of California (Host)	
University of California, Berkeley	UCB
University of California, Davis	UCD
University of California, Irvine	UCI
University of California, Los Angeles	UCLA
University of California, Merced	UCM
University of California, Riverside	UCR
University of California, San Diego	UCSD
University of California, Santa Barbara	UCSB
University of California, Santa Cruz	UCSC
California State University, Fresno	CSUF
California State University, Los Angeles	CSULA
San Francisco State University	SFSU

BLM, USBR, USGS, NPS, USDA FS, NRCS, NASA

Chesapeake Watershed CESU	CW
The University System of Maryland (Host)	
Center for Environmental Science	CES
Frostburg State University	FSU
University of Maryland, Baltimore County	UMBC
University of Maryland, College Park	UMCP
College of William and Mary	WM
George Mason University	GMU
Pennsylvania State University	PSU
University of the District of Columbia	UDC
National Aquarium in Baltimore	NAB

BLM, USGS, NPS, USDA FS, NRCS, DOD

Colorado Plateau CESU	CP
Northern Arizona University (Host)	NAU
Arizona State University	ASU
Colorado State University	CSU
Diné College	DC
Fort Lewis College	FLC
Haskell Indian Nations University	HINU
New Mexico State University	NMSU
Oregon State University	OSU
University of Arizona	UA
University of Nevada	UNR
Utah State University	USU
The Arboretum at Flagstaff	AF
Museum of Northern Arizona	MNA

BLM, USBR, USGS, NPS, USDA FS, NRCS

Desert Southwest CESU	DS
University of Arizona (Host)	UA
Howard University	HU
New Mexico State University	NMSU
Southwest Texas State University	SWT
University of California, Riverside	UCR
University of Texas, El Paso	UTEP
Arizona-Sonoran Desert Museum	ASDM
Sonoran Institute	SI
The Nature Conservancy	TNCA

BLM, USGS, NPS, USDA FS, NRCS, DOD

Great Basin CESU	GB
University of Nevada (Host)	UNR
Boise State University	BSU
Brigham Young University	BYU
California State University, Fresno	CSUF
D-Q University	DQU
Desert Research Institute	DRI
Great Basin College	GBC
Haskell Indian Nations University	HINU
Idaho State University	ISU
Oregon State University	OSU
University of Idaho	UI
University of Nevada, Las Vegas	UNLV
University of Utah	UOU
Utah State University	USU
White Mountain Research Station	WMRS

BLM, USGS, NPS, USDA FS, ARS, NRCS

Great Lakes – Northern Forest CESU	GLNF
University of Minnesota (Host)	UMN
Cleveland State University	CSU
Fond du Lac Tribal and Community College	FTCC
Indiana University	IU
Michigan State University	MSU
Michigan Technological University	MTU
Minnesota State University, Mankato	MSUS
Southern University and A&M College	SUBR
SUNY College of Environmental Science and Forestry	ESF
University of Iowa	UI
University of Massachusetts, Amherst	UMASS
University of Toledo	UT
University of Vermont	UVM
University of Wisconsin, Madison	UWM
University of Wisconsin, Stevens Point	UWSP
West Virginia University	WVU
American Indian Science and Engineering Society	AISES
Great Lakes Commission	GLC
The Great Lakes Forest Alliance	GLFA
International Association for Great Lakes Research	IAGLR
Minnesota Department of Natural Resources	MDNR
Minnesota Forest Resources Council	MFRC
National Council for Air and Stream Improvement	NCASI
The Nature Conservancy	TNCM
The Science Museum of Minnesota	SMM

BLM, USGS, NPS, USDA FS, NRCS, NASA

Great Plains CESU	GP
University of Nebraska (Host)	UNL
Black Hills State University	BHSU
Colorado State University	CSU
Langston University	LU
Little Priest Tribal College	LPTC
North Dakota State University	NDSU
South Dakota State University	SDSU
Texas A&M University	TAMU
University of Minnesota	UMN
University of North Dakota	UND
University of Oklahoma	UOK
University of South Dakota	USD
University of Wyoming	UWY

BLM, USBR, USGS, NPS, USDA FS, NRCS

Gulf Coast CESU	GC
Texas A&M University (Host)	TAMU
Auburn University	AU
Grambling State University	GSU
Louisiana State University	LSU
Mississippi State University	MSU
Southern University and A&M College	SUBR
Texas A&M University, Corpus Christi	TAMUCC
Texas A&M University, Galveston	TAMUG
Texas A&M University, Kingsville	TAMUK
Troy State University	TSU
University of Central Florida	UCF
University of Florida	UFL
University of Georgia	UGA
University of Louisiana at Lafayette	UL
University of Texas, Austin	UTA
Coastal Conservation Association	CCA
Instituto de Ecología, A.C.	INECOL
The Nature Conservancy	TNCT

BLM, USGS, NPS, USDA FS, NRCS, DOD, NASA

Hawaii – Pacific Islands CESU	HPI
University of Hawaii (Host)	
University of Hawaii, Manoa	UHM
University of Hawaii, Hilo	UHH
University of Hawaii, West Oahu	UHW
Hawaii Community College	HICC
Honolulu Community College	HOCC
Kapiolani Community College	KAPCC
Kauai Community College	KAUCC
Leeward Community College	LCC
Maui Community College	MCC
Windward Community College	WCC

Hawaii – Pacific Islands CESU (cont.)	HPI
University of California, Berkeley	UCB
University of Guam	UG
American Samoa Community College	ASCC
Bishop Museum	BM
National Tropical Botanical Garden	NTBG
The Nature Conservancy	TNCH
Pacific International Center for High Technology Research	PICHTR
BLM, USFWS, USGS, NPS, USDA FS, NRCS, DOD	

North & West Alaska CESU	N&WA
University of Alaska (Host)	
University of Alaska, Anchorage	UAA
University of Alaska, Fairbanks	UAF
University of Alaska, Southeast	UAS
University of New Hampshire	UNH
Alaska SeaLife Center	ASC

BLM, USGS, NPS, USDA FS, NRCS

North Atlantic Coast CESU	NAC
University of Rhode Island (Host)	URI
Rutgers University	RU
Stony Brook University	SBU
University of Maryland, Eastern Shore	UMES
University of Massachusetts, Amherst	UMASS
Maryland Coastal Bays Program	MCBP

USGS, NPS, NRCS

Pacific Northwest CESU	PNW
University of Washington (Host)	UW
Heritage College	HC
Oregon State University	OSU
Southern Oregon University	SOU
Tuskegee University	TU
University of Alaska, Anchorage	UAA
University of Alaska, Southeast	UAS
University of British Columbia	UBC
University of Idaho	UI
University of Oregon	UO
University of Vermont	UVM
Washington State University	WSU
Western Washington University	WWU
Alaska Department of Fish and Game	ADFG
Alaska Native Science Commission	ANSC

BLM, USBR, USFWS, USGS, NPS, USDA FS, NRCS, EPA

Piedmont – South Atlantic Coast CESU	PSAC
University of Georgia (Host)	UGA
Auburn University	AU
Clemson University	CLEM
Florida A&M University	FAMU
North Carolina State University	NCSU
University of Central Florida	UCF
University of Florida	UFL
University of South Carolina	USC
Audubon of Florida	AFL
Audubon of North Carolina	ANC
Audubon of South Carolina	ASC

BLM, USFWS, USGS, NPS, USDA FS, ARS, NRCS

Rocky Mountains CESU	RM
University of Montana (Host)	UM
Colorado State University	CSU
Montana State University	MSU
Salish Kootenai College	SKC
University of Colorado at Boulder	CUB
University of Colorado Health Sciences Center	CUD
University of Idaho	UI
University of Wyoming	UWY
Utah State University	USU
Washington State University	WSU

BLM, USBR, USGS, NPS, USDA FS, NRCS

South Florida – Caribbean CESU	SFC
University of Miami (Host)	UM
Barry University	BU
Florida A&M University	FAMU
Florida Atlantic University	FAU
Nova Southeastern University	NSU
University of Florida	UFL
University of North Carolina, Wilmington	UNCW
University of Puerto Rico	UPR
University of the Virgin Islands	UVI
Audubon of Florida	AFL

BLM, USFWS, USGS, NPS, NRCS

Southern Appalachian Mountains CESU	SA
University of Tennessee (Host)	UTK
Appalachian State University	APSU
Florida A&M University	FAMU
Lincoln Memorial University	LMU
Middle Tennessee State University	MTSU
Tennessee Technological University	TTU
University of Kentucky	UKY
Western Carolina University	WCU
Western Kentucky University	WKU
Great Smoky Mountains Conservation Association	GCA
Joint Institute for Energy and the Environment	JIEE
Oak Ridge National Laboratory	ORNL
Southern Appalachian Man and Biosphere	SAMAB

BLM, USFWS, USGS, NPS, USDA FS, NRCS, DOE

Upper & Middle Mississippi Valley CESU	UMMV
University of Missouri (Host)	MU
Drake University	DW
Indiana University	IU
Iowa State University	ISU
Lincoln University	LU
Southern Illinois University	SIU
Southwest Missouri State University	SMSU
University of Illinois	UIUC
University of Iowa	UI
University of Kansas	KU
University of Minnesota	UMN
Audubon of Missouri	AMO
Audubon Upper Mississippi River Campaign	AUMRC
Conservation Federation of Missouri	CFM
Missouri Botanical Garden	MBG
National Mississippi River Museum and Aquarium	NMRMA

BLM, USGS, NPS, NRCS, DOD

Participating Federal Agencies:

Bureau of Land Management	BLM
Bureau of Reclamation	USBR
Department of Defense	DOD
Department of Energy	DOE
Environmental Protection Agency	EPA
National Aeronautics and Space Administration	NASA
National Marine Fisheries Service	NMFS
National Park Service	NPS
US Fish and Wildlife Service	USFWS
US Geological Survey	USGS
USDA Agricultural Research Service	ARS
USDA Forest Service	USDA FS
USDA Natural Resources Conservation Service	NRCS

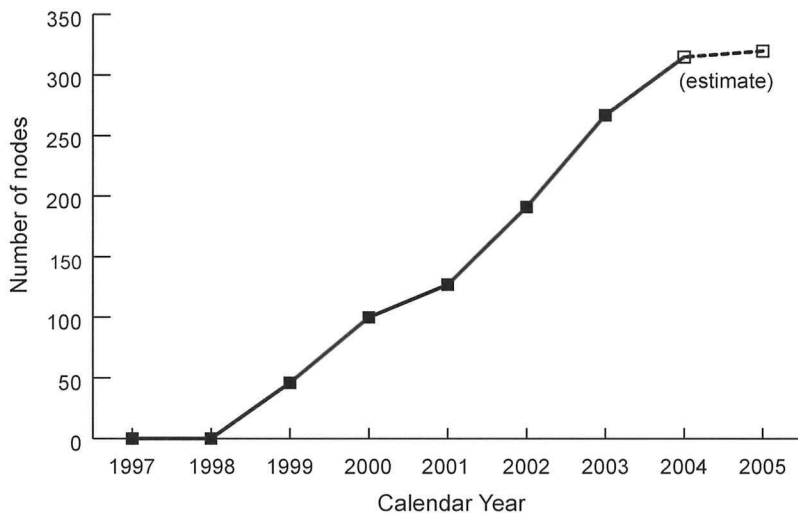


Figure 6. Growth curve of CESU Network. Each organization in each CESU is counted as a node and linkage; hence the cumulative total includes organizations participating in more than one CESU as multiple nodes.

the National Parks Omnibus Management Act of 1998 was nearing completion in Congress. It included language clarifying the NPS mandate for research (Sec. 202) and specific authority to enter into the CESU cooperative agreements along with other federal agencies (Sec. 203). The act passed in November 1998. By early 1999, the first elements of the CESU Network were ready for establishment. In June 1999, a founding meeting was held in Washington, D.C., to establish both the Network and the first pilot CESUs. A memorandum of understanding between the federal agencies (at that time the USGS, NPS, USBR, BLM, USDA FS, and Department of Energy (DOE) was signed, establishing the CESU Council to oversee Network policy and leadership. The four pilot CESUs were also established.

In succeeding years, additional rounds of competition were held and the Network grew steadily (four new CESUs in 2000, two in 2001, two in 2002, four in 2003, and then a final CESU established in 2004). Adoption of the innovation followed the general growth curve; Figure 6 shows the annual addition of partners to existing CESUs (“nodes” in network terminology) as a cumulative growth curve. Additional federal agencies joined the CESU Network: the EPA, Department of Defense (DOD), and USFWS in 2000, National Aeronautics and Space Administration (NASA) in 2001, Natural Resources Conservation Service (NRCS) and Agricultural Research Service (ARS) in 2002, and National Marine Fisheries Service (NMFS) in 2003. Biennial national meetings were held in 2001 and 2003, bringing together the rep-

representatives of the federal agencies, universities, and other partners to the Network. A CESU Network website (www.cesu.org/cesu) was established, and individual CESUs formed their managers committees, prepared strategic plans, and established websites and operating procedures.

Most importantly, the individual CESUs began to conduct research, technical assistance, and education projects—the purpose for which the Network was established. Projects varied by type (research, technical assistance, education, or a combination thereof), agency sponsor, size (measured in funding level), and discipline (natural, physical, social and cultural sciences). By 2002, a “First Inventory” of projects was available, covering the calendar years 1999–2001 (CESU Network 2003a). In those first few years, over 500 projects were completed or underway. Examples included:

- Understanding the effects of river otter reintroduction on muskrat and mussel populations at Mammoth Cave National Park, a combined NPS/USGS project of the Southern Appalachian Mountains CESU;
- Developing a methodology for preparing Voyageurs National Park’s visitor experience and resource protection plan, a project of the Great Plains CESU;
- Assessing the relative distribution, abundance, and demographic structure of the American alligator in relation to habitat, water levels, and salinities, a combined NPS/USGS/USFWS project in the South Florida–Caribbean CESU; and
- Describing traditional uses of Aniakchak National Monument and Preserve, a project of the Pacific Northwest CESU.

As the CESU Network grew—in participating federal agencies, university and other partners, and in projects completed and underway—the federal government and universities gained experience in developing administrative procedures, common vocabularies, and organizational structures and mechanisms to support the CESU mission. The Network moved closer to completion. By July 2004, all seventeen of the proposed CESUs had been established, providing full national coverage. Simultaneously, the Network began a process of maturation.

Maturation

In network science, maturation of networks occurs when critical missing nodes are added and some nodes are dropped, new functional links are established or improved, and new clusters are formed. For the CESU Network, this maturation process is well underway. By fall 2004, each of the 17 CESUs will have added new partners (or have additions underway); the current number of nonfederal partners is 181. Six partners have withdrawn (one because it ceased to exist; others as they found participation was not in their interest). As new nonfederal partners join, the expertise available through each CESU is broadened. As additional federal agencies join, agency coordination is enhanced and opportunities for collaborative projects increase.

Several CESUs have begun joint meetings and sharing functions with each other—the linking of clusters identified as a phase transition in network science. For example, the Rocky Mountains, Great Basin, and Colorado Plateau CESUs held a joint managers meeting in February 2004 at Utah State University, which is a partner (“node” in network terms) in all three of these CESUs. At the meeting, examples of projects in progress through each of these

agreements were presented. There was also an in-depth discussion of the educational needs of the federal agencies and how the academic partners can help fill those needs.

Multi-agency, multi-partner, and multi-CESU projects are beginning to emerge. For example the Desert Southwest CESU has developed the concept of “banner project”—a single project that involves *all* CESU partners. The Chesapeake Watershed CESU and Southern Appalachian Mountains CESU, in collaboration with The Pennsylvania State University, hosted a workshop on “Restoration of American Chestnuts within National Parks” in Asheville, North Carolina, in May 2004. Participants were from the NPS, USDA FS, USFWS, American Chestnut Foundation, several state agencies, and approximately 15 universities. Another example of a multi-CESU project was the production of a video broadcast by the Discovery Channel in May 2004 called “The Desert Speaks: Monumental Dunes.” The project described in the broadcast involved both the Desert Southwest and Rocky Mountains CESUs.

Program managers and contracting officials from the federal agencies and universities have gained experience and applied their skills to building the CESU Network. For example, after the Colorado Plateau CESU was established, BLM hosted two workshops to design effective administrative protocols for developing, initiating, and tracking task orders and modifications to the CESU agreement. The CESUs that were created early in the development of the Network have advised more recently established CESUs on matters related to organizational structure, strategic planning, project protocols and management, and other tasks.

Agencies have made progress in staffing CESUs. As described earlier, federal agen-

cies can contribute scientific and/or professional staff to support and promote agency participation in CESUs. In some cases, these federal personnel are located and working at CESU host universities. Federal personnel are supervised and supported by their respective agencies through existing administrative systems. For example, NPS, as part of its Natural Resource Challenge, has funded an NPS coordinator for 12 of the 17 CESUs. For the remaining five CESUs, coordinator positions are currently being supported through other funding sources, or existing coordinators cover responsibilities at a second CESU. In addition, several NPS regional offices are now supporting cultural resource specialist staff positions, also duty-stationed at CESU host universities, to help meet the multidisciplinary needs of the NPS. BLM has also begun to place coordinators at CESUs in regions where the agency has significant management responsibilities. For example, BLM has a coordinator assigned to the Great Basin CESU, located at the University of Nevada-Reno. Other agencies, such as USDA FS and USGS, already have personnel based at universities in the CESU Network who assist their agency’s participation in CESUs.

Maturation also requires review and renewal. Each CESU agreement has a five-year term, subject to renewal. The renewal process for each CESU includes an important and formal review of CESU activities over the previous five years, following steps and criteria approved by the CESU Council. The review has three key parts: (1) a self-assessment prepared by the host university, working with its other nonfederal partner institutions; (2) a review and recommendation by the CESU’s managers committee; and (3) an independent review prepared by up to three external reviewers identified by the CESU’s managers com-

mittee. The reviews also provide an opportunity for all partners to consider improvements to the CESU.

The Council uses the information from each review to decide on whether to renew a CESU. If the decision is favorable, a renewed agreement is prepared that continues the existing agreement for the operation and maintenance of the CESU. The first four CESUs (established in 1999) were renewed in spring 2004, with renewed agreements now in effect for another five years (until 2009). These were the Colorado Plateau, North Atlantic Coast, Rocky Mountains, and Southern Appalachian Mountains CESUs.

The reviews reveal the scale and scope of individual CESUs. The Rocky Moun-

tains CESU is an example. During its start-up period of FY1999–2004, the Rocky Mountains CESU facilitated 299 research, technical assistance, and education projects, with funding of just over \$16.2 million. Of the total number, 164 (55%) were research, 113 (38%) were technical assistance, and 22 (7%) were education projects. The University of Montana (the host university) was engaged in 40% of these projects; the other partners in 60%, and all partners were involved in at least some CESU projects. All of the Rocky Mountains CESU federal agency partners were active in projects; the most active agencies were BLM, USDA FS, and NPS. Figure 7 shows the total project funding by federal agency.

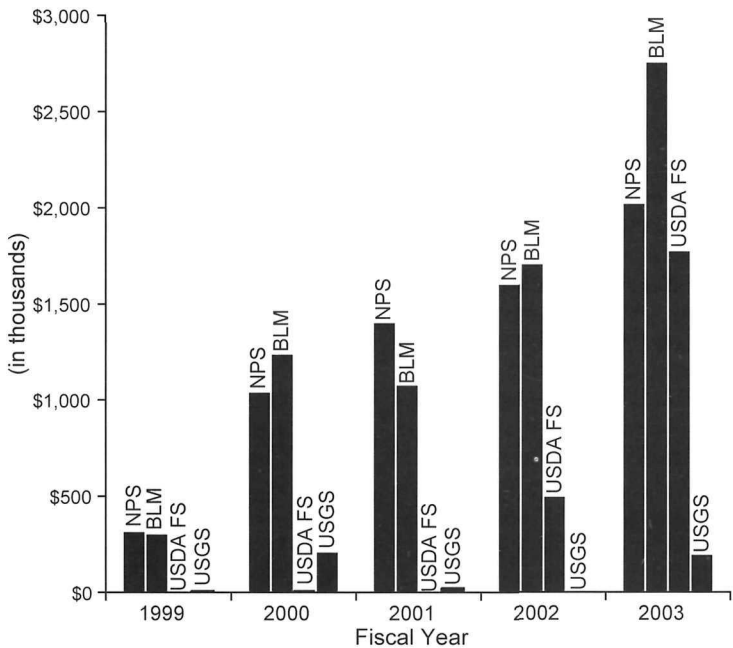


Figure 7. Rocky Mountains CESU project funding, by agency, FY99–03 (source: Rocky Mountains CESU Self-Assessment Report, University of Montana, 2004).

The other three CESUs with completed five-year reviews also reported information about projects and participation. The scope and scale of participation varied as a function of the number of federal partners, geographic extent of the CESU region, and involvement in national-level collaborative projects with the federal agencies. The review and renewal process for the four CESUs established in 2000 (the Desert Southwest, Great Plains, Pacific Northwest, and South Florida–Caribbean CESUs), will begin in fall 2004.

Maturation also includes adapting to new conditions. One key example is the CESU Council's recent decision to increase the overhead rate for CESU projects across the Network from 15% to 17.5%, effective 1 May 2004. This increase reflects the general percentage increase in the cognizant overhead rate accepted by federal agencies based on detailed surveys by the Office of Management and Budget and the Office of Naval Research. At some CESUs, administrators at the host institution have agreed to use this 2.5% increase in overhead costs to help support the coordination and administration of the CESU. The 2.5% increase adapts to the economic challenges facing the nation's universities, and maintains the low overhead rate that is a core commitment (and substantial contribution) of the Network's nonfederal partners.

There are other, more subtle (although no less important) examples of adaptations underway. A large number of practical (and tractable) problems related to projects, equipment, reports, student assistants, and budgets are being solved locally, and with local options—the preferred choice in such a decentralized network. CESUs are largely self-organizing, creating new linkages, new clusters, and expanding the capability and capacity of the Network—and adaptation occurs most effectively at the local level.

Maturation includes creating a long-term strategy for the CESU Network. In 2003, the *CESU Network Strategic Plan* for 2004–2008 (CESU Network 2003b) was published after considerable work by the Council, input from the agencies, and a public comment period. This strategic plan describes the CESU mission and strategic goals for the Network. To achieve these strategic goals, specific activities and actions are proposed, including three key Network initiatives. The initiatives focus on (1) making existing information available and useful, (2) encouraging agency collaboration and coordination, and (3) creating professional development opportunities for federal resource managers and university faculty. The first step in implementing these initiatives is to secure support through a mix of federal and nonfederal funding sources.

Maturation also means increased awareness by the media, Congress, and interest groups. CESUs have been reported on in the local, regional, and national press (see for example, DeWeerd 2002). Briefings of congressional staff have occurred, and there is increased awareness in Congress as to the potential and value of CESUs. Several organizations (an example is the National Association of State Universities and Land-Grant Colleges) have made their views known to the administration and Congress. All of these efforts are part of the adoption and diffusion of the CESU Network, and signal its maturation as an organization and network.

Trajectory: Future Challenges of the CESU Network

While growth and maturation may characterize the CESU Network currently, what does its near-term future hold? The Network's trajectory presents several col-

laborative challenges. Five seem most central.

The first challenge is funding—providing the resources needed for CESUs to reach their full potential. At the individual CESU level, such funding is perhaps best (and most likely) when provided through a diversity of sources. These include adequate administrative support, overhead consistent with cooperative ventures such as CESUs, and sound project budgeting that ensures each and every project pays all of the direct and allowable costs associated with that project. At the Network level, funding of the CESU Council's initiatives (particularly the information initiative that provides infrastructure support to individual CESUs) would make the Network more responsive and expand awareness of, access to, and availability of CESU project results. Rather than costs, these expenditures are reasoned investments—adding value and reducing overall government expenditures by helping the Network to “work smarter” and take advantage of its “small-world” network architecture.

The second challenge is accountability. Making sure that the activities, expertise, projects, and (most importantly) outcomes of CESUs are accounted for is essential in the current and foreseeable management and political climate. Accountability is best monitored by the individual agencies and universities, rather than creating a central CESU office oversight function. Performance measures may vary by agency, kind of project, and level of funding. Yet some “roll-up” capability is useful, and the challenge is to balance the need for information about CESU activities and expertise with the very real cost of assembling such information. Again, the relatively few degrees of separation amongst the nodes make information-sharing within the Network plausible and practical.

The third challenge is quality—the need for sound science and scholarship, for timely delivery of completed efforts, and for the consistent delivery of usable knowledge. Quality in science has, of course, multiple dimensions. Basic research may be measured by publication in scientific journals; technical assistance, in the success of management actions based on provided advice and counsel. By linking federal agencies to university investigators, CESUs combine the science cultures of academe (with its “publish or perish” peer review, and tenure and promotion standards) and that of the federal scientific community. How CESUs—as well as other federally supported science programs—respond to the challenge of quality will be essential to their future.

The fourth challenge is inclusion. CESUs were conceived as “virtual” organizations that bring together the expertise of universities, other organizations, and the federal government, and focus that expertise on solving problems for federal resource, environmental, and research agencies. Such networks are successful to the extent that most nodes are active. The CESU Network needs to continually ensure that federal agencies, host universities, and partner institutions all participate—through individual projects and in the general activities of each CESU. In particular, the commitment to engage minority institutions needs to be continually reinforced, and the minority institutions encouraged (through inclusion in funded projects) to be “at the CESU table” as full and enthused participants.

The fifth challenge is the challenge of bureaucracy. Policies, rules, regulations, and guidelines all have their place and purpose. They are based on statutory requirements and help to ensure common understanding and fairness. But when the

demands of bureaucracy overtake government's ability to conduct public service, and the struggle for agency "turf" discourages (or prevents) collaborative effort, then a balance between administrative "gate-keeping" and good sense must be re-achieved. Like other maturing organizations (particularly in the business sector), the CESU Network will need to continually strive to remain lean, responsive, innovative, and willing to experiment. It must remain a "learning organization"—and adopt new best practices as they develop. To accomplish this, the technical representatives and other officials of participating agencies and universities need to work together and be supported by agency leadership in their efforts. The CESU Council's philosophy of maximizing local option will need to be continually reinforced.

Conclusion

There are other challenges, of course. But the future trajectory of CESUs will also include some important successes. The recent completion of the Network, and its national coverage from the Caribbean to the Pacific Ocean, will lead to an increasing awareness of CESUs. The renewal of the first-round CESUs has shown the viability

of the pilot efforts, and the value of a rigorous evaluation process. Federal agencies such as NRCS and ARS—with traditional emphases on intramural research—are finding the CESU Network a valued complement to their existing programs, and joining several (in the case of NRCS, all) CESUs. Nonfederal partners will be added to existing CESUs. New and innovative uses for the CESU Network will be discovered by federal agencies, universities, and other partners to better support their objectives and improve collaboration. The issues of funding, accountability, quality, inclusion, and bureaucracy will be imaginatively managed for public benefit.

The state of the CESU Network is, in network science terms, that of a robust, decentralized network undergoing an important phase transition. Literally hundreds of individuals have been involved—faculty and students at universities; federal resource managers in the nation's parks, refuges, forests, and rangelands; contracting officials and university administrators; the CESU Council; agency leaders; and others. All deserve credit for their hard work and creative actions to build this emergent and important network.

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Learning from World Heritage: Lessons from 'International Preservation & Stewardship of Cultural & Ecological Landscapes of Global Significance,' the 7th US/ICOMOS International Symposium

Introduction

THE UNITED STATES COMMITTEE of the International Council on Monuments and Sites (US/ICOMOS) hosted its 7th annual symposium, titled "Learning from World Heritage: Lessons from International Preservation & Stewardship of Cultural & Ecological Landscapes of Global Significance," from 25 to 27 March 2004 in Natchitoches, Louisiana. Gathering professional papers through a widespread call, sixteen presentations addressing a breadth of cultural and natural resources in many nations were selected from the eighty proposals received.

The 7th US/ICOMOS Symposium focused on lessons from the preservation and conservation of cultural landscapes, protected areas, heritage areas, biosphere reserves, and mixed resources of national and global significance. The symposium sought to explore the challenges of preserving landscapes of ecological and cultural significance, using the framework of World Heritage experience. This is a rapidly emerging field that has redefined conceptual as well as managerial approaches and principles in conservation and preservation and has begun to thrust the natural and cultural heritage professions into unprecedented cooperation. Thus, for the first time in the US/ICOMOS symposium's history, culture preservationists joined with nature conservationists in a fruitful discussion. A

multi-disciplinary group of 123 professionals from twelve nations met to share experience, draw lessons, and address issues surrounding the interface of nature and culture in the landscape. Drawing upon work concerning cultural and natural landscapes in recent years, and the inscription of 35 cultural landscapes on the World Heritage List from 1993 to 2003, complex presentations and discussions explored a wide range of landscape preservation and conservation issues.

Opening session papers presented an overview and context for the symposium, including cultural and natural landscape categories and status, current World Heritage status and progress in heritage landscape protection, and approaches to protection and stewardship from Australia and

Argentina. Papers addressing the planning and development of pilgrims' paths in Ireland, history and plans for the Champner Pavagadh Sanctuary in India, and a recommendation for Iraqi heritage identification and preservation presented a range of issues related to complex landscapes. Issues in the designation of worldwide inspirational landscapes were explored. Chinese World Heritage natural landscapes, the Chinese conception of nature, and landscape and cross-cultural misconceptions leading to unexpected results were presented. The unique character, scenery, and cultural and biological diversity of productive lands and challenges facing agricultural landscapes were highlighted, with presentations on the rice terraces of the Philippine Cordilleras, the Japanese farmer as gardener, and the multiple resources of the Agave and Tequila agricultural and production landscapes of Mexico. Preserving, revitalizing, and shaping heritage communities into the future was the topic of a USA national heritage areas paper and one addressing the rebuilding of tribal lands and community at the Blackfeet Indian Land Trust. The range of reciprocal benefits resulting from student service learning in Czech Republic heritage landscapes addressed further issues.

At the closing session the *Natchitoches Declaration on Heritage Landscapes*, 27 March 2004, was ratified by the assembly. This important declaration states: "There is a convergence of natural and cultural values in the landscape, and a growing recognition that the traditional separation of nature and culture is a hindrance to protection and is no longer sustainable. Further heritage landscape protection is required at the local, national and global levels in order to transmit these universally valuable heritage landscapes to future generations." The term "heritage landscapes" was used in this

declaration to embrace the combined natural and cultural resources inherent in the landscape recognizing that either or both may be of outstanding universal value. The declaration urges national and local authorities, as well as institutions and international organizations, but especially ICOMOS and its partners, the World Conservation Union (IUCN) and the International Center for Conservation and Restoration of Cultural Property (ICCROM), to press forward a series of initiatives around the protection of heritage landscapes using a holistic approach, interdisciplinary collaboration, response to threats, community engagement, and national and international cooperation to address the multiple values inherent in heritage landscapes and the multiple voices to be included in their protection and management.¹

World Heritage Overview

As background for readers with varying degrees of familiarity with the UNESCO (United Nations Educational, Scientific, and Cultural Organization) World Heritage structure, the Convention Concerning the Protection of World Cultural and Natural Heritage was adopted by the General Conference of UNESCO in 1972. The purpose of the convention is to recognize properties of outstanding and universal value. As of 2004 there are 176 states parties adhering to the convention and 134 nations have properties inscribed on the World Heritage List. This degree of recognition and cooperation makes the World Heritage Convention the most universal international legal instrument for global protection of cultural and natural heritage. It is an important vehicle for global understanding and peace.

UNESCO consults with three World Heritage advisory bodies: for natural properties, IUCN, based in Gland, Switzerland;

for cultural properties, ICOMOS, based in Paris; and for cultural properties restoration and training, ICCROM, based in Rome. Even the structure of these advisory bodies expresses the traditional separation of nature and culture in the consideration of globally important resources.

Globally, 788 properties are listed as World Heritage sites that have been deemed to be of universal value. Addressing a series of criteria that have evolved over the past 32 years, there are 611 properties listed principally for their cultural values, 154 natural properties, and 23 mixed or combined natural and cultural property listings. In 1973, the first inscription was of the Galapagos Islands, based on natural values. The inclusion of only 23 mixed sites, embodying both natural and cultural values, in 30 years of application indicates that the confluence of natural and cultural values was not well understood, widely accepted, or specifically targeted for inscription under the original criteria. The densest concentration of inscribed properties is in the European nations, while Central American countries demonstrate a significant cluster, as do the African Gold Coast nations.²

A natural property nominated for inclusion in the World Heritage List will be considered to be of “outstanding universal value” if it meets one or more of the following criteria³ and fulfills the conditions of integrity laid out by the convention. The property must represent:

- (i) Major stages in the earth’s history, record of life, geology, landforms, or physiography;
- (ii) Ongoing ecological and biological processes in evolution, in either terrestrial and aquatic communities;
- (iii) Superlative natural phenomena, exceptional natural beauty, or aesthetic

importance;

- (iv) *In situ* natural habitats significant for conservation of biological diversity.

A cultural property nominated for inclusion in the World Heritage List will be considered to be of “outstanding universal value” if it meets one or more the following criteria⁴ and the test of authenticity. The property must:

- (i) Represent a masterpiece of human creative genius;
- (ii) Exhibit an important interchange of human values, over time or within a cultural area, on developments in architecture or technology, monumental arts, town planning, or landscape design;
- (iii) Bear a unique or exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared;
- (iv) Be an outstanding example of a type of building or architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history;
- (v) Be an outstanding example of a traditional human settlement or land use which is representative of a culture (or cultures), especially when it has become vulnerable under the impact of irreversible change;
- (vi) Be directly or tangibly associated with events or living traditions, ideas or beliefs, or artistic and literary works of outstanding universal significance.

These criteria, or earlier versions of them, have been applied to the analysis of nominations put forward by state parties for inscription. In 2004, the criteria were substantially revised to address all properties, both cultural and natural. This is a

clear expression of the growing integration of cultural and natural values in recognizing outstanding global resources.⁵

World Heritage in the United States

In order to shed some light on the preservation construct for World Heritage sites, the example of the United States may be helpful. All of us in the preservation field and many owners of antique properties are familiar with the National Register of Historic Places. National Register listing is the honor roll of properties of local, regional, or national significance and contains some 73,000 listings. By contrast, the designation of a National Historic Landmark recognizes nationally significant properties that are not only historically important to our country but have a high degree of integrity, meaning that they embody the character and qualities that were present when they acquired historic importance. There are some 2,300 National Historic Landmarks, representing a mere 3.2% of the number of National Register listings. In the United States, conceptualizing heritage at the territorial level has led to the rapid growth of heritage areas and corridors as tools for both preservation and community development. The relatively new national heritage areas program has designated 24 communities or multiple community areas of the nation as embodying heritage values.

A further narrowing of this type of recognition is seen in the twenty World Heritage sites in the United States, all of which have been judged to meet various criteria for global universal value by World Heritage experts. Olympic, Yellowstone, Redwoods, Yosemite, Grand Canyon, Carlsbad Caverns, Mammoth Cave, Great Smoky Mountains, Everglades, and Hawaii Volcanoes national parks, along with two USA-Canada transboundary protected areas, Waterton-Glacier International

Peace Park and the Kluane/Wrangell-St. Elias/Glacier Bay/Tatshenshini-Alsek complex, comprise the natural listings. The eight cultural sites include Mesa Verde National Park, Pueblo de Taos, Chaco Culture National Historical Park, Cahokia Mounds State Historic Site (all first peoples' sites of prehistoric and archeological value), the Statue of Liberty, Independence Hall, La Fortaleza and the fortifications at San Juan, and Thomas Jefferson's Monticello and the University of Virginia. These properties represent less than 1% of the National Historic Landmark count of approximately 2,300. Hence a pyramid of heritage preservation hierarchy is formed, with a broad base of local and regional properties of heritage value, 73,000 National Register listings; an elite group of nationally important ones, 2,300 National Landmarks; and a small representation of cultural heritage of global significance, 8 cultural properties inscribed on the World Heritage List.

There is a parallel pyramid of protected areas designated for natural values, ranging from local and state parks to national parks, national forests, and nature preserves, and thence to the dozen natural properties noted above that are inscribed on the World Heritage List. Many of our local and national parks are also express cultural values. The recognition of mixed values and the management for both was a theme throughout the symposium. The U.S. National Park Service defines cultural landscapes as a geographic area associated with a historic event, activity, or person, or exhibiting other cultural or aesthetic values. When presenting to the public in our work at Heritage Landscapes, we indicate that valued cultural landscapes are places where nature and culture have interacted to shape a place over time, the results of the interaction have imbued heritage values, and the

cultural landscape is worthy of our respect and stewardship to preserve and conserve it into the future.

It is curious that there is such a limited recognition of World Heritage designation in the United States. In contrast, consider Australia. As Jane Lennon indicates in discussing her country, "Today the 15 World Heritage areas in Australia are household names, icons of popular heritage and major tourist destinations but only after bitter contests with a variety of communities and commercial interests. World Heritage in Australia has been a very political issue." Particularly with the global economic engine of heritage tourism as a growing focus in the initiatives of many nations, World Heritage inscription is widely touted elsewhere, but remains unknown to many Americans.

World Heritage Cultural Landscapes

Since the adoption of the World Heritage Convention in 1972, a rich international discussion strongly influenced by the heritage policies of its 176 state parties, including the United States, have shaped consensus on its criteria and operational guidelines. Reciprocally, World Heritage policies and principles have returned home to every country to refine and enhance each state party's ability to address the complexity of its cultural and national heritage. A major influence in this exchange was the search in recent decades by preservation and conservation stewardship professionals for methods to protect and interpret areas whose significance is inextricably bound to both natural and cultural resources. In 1992, after a decade of extensive debate, the World Heritage Committee introduced cultural landscapes into the convention's operational guidelines with definitions and a structure that enables nominations of cultural landscapes of universal value to the

World Heritage List. The criteria defined three types of cultural landscapes, which are noted here with the number of times each criteria has been applied to the thirty-six cultural landscapes listed from 1993 to 2003:

- *Designed cultural landscape*, one created under a plan at a specific time (8);
- *Evolved cultural landscape*, one which is in either an *Evolved Relict* form that is no longer inhabited (3), or in an *Evolved Continuing* form where inhabitation and the actions of humanity continue to shape the landscape (22);
- *Associative cultural landscape*, one related to spiritual beliefs, art, or literature (7).

The watershed decision to include cultural landscapes recognized the inextricable links between people and places, culture and nature, the tangible physical aspects of heritage and intangible societal traditions and practices. As Mechtild Rössler states in her symposium paper:

In 1992 at Santa Fe, after extensive discussions, World Heritage Cultural Landscapes criteria were adopted to address the combined works of humanity and nature.... It also provided a new focus on the key areas of tomorrow's crops. At the same time innovations were introduced with the acceptance of traditional custodianship and customary land tenure in World Heritage protection. These developments both on the conceptual and operational levels have shown the stewardship role of World Heritage conservation with far-reaching impact for other conservation instruments.⁶

The first cultural landscape listing, inscribed in 1993 under the associative criteria, was Tongariro National Park, New Zealand, the Maori sacred mountains. "The [World Heritage] Committee recognized that these mountains have cultural and religious significance for the Maori people and represent the spiritual links between this community and its natural environment. It was the first time that a natural World Heritage site received international recognition for its intangible cultural values."⁷⁷ In addition, there are several World Heritage properties, listed prior to 1992, which could be inscribed under cultural landscape criteria. For example, Lennon indicates that heritage in Australia has been perceived as nature and Aboriginal culture, with misconceptions arising. She discusses the original nomination and listing of Ayers Rock under natural criteria, using the European name for this geological site, with subsequent re-nomination as *Uluru* under cultural criteria with redefined boundaries developed in consultation with the Aboriginal peoples who shaped this cultural landscape. Lennon states: "Four of Australia's World Heritage Areas (Kakadu, Uluru, Willandra Lakes and Tasmanian Wilderness) are inscribed as 'mixed sites' for their Indigenous cultural World Heritage values, in addition to their natural values. These mixed site listings require the integrated management of both the cultural and natural values."

From the perspective of local and indigenous peoples, the hands of people on the land and the continued application and sustainability of traditional practices is also a component. As stated by Rössler:

With the inclusion of cultural landscape categories in 1992, the World Heritage Committee recognized traditional management sys-

tems, customary law and long-established customary techniques to protect the cultural and natural heritage. Through these protection systems World Heritage sites contribute to sustainable local and regional development.

Cultural landscapes are particularly vulnerable to social, economic and environmental changes. The maintenance of the fabric of societies, traditional knowledge and indigenous practices are vital to their survival. In many cases, cultural landscapes and sacred natural sites are of vital importance to the protection of intangible values and heritage. World Heritage cultural landscapes and sacred properties can be models in effective landscape management, excellence in conservation practices and innovation in legislative protection. They are places where we can learn about the relation between people, nature and ecosystems and how this shapes culture, identity and enriches cultural, and in some cases, biological diversity.

Since 1992 ICOMOS and IUCN have collaborated increasingly on the identification, designation, and protection of landscapes embodying both natural and cultural resource values. Within ICOMOS, the territorial concept of cultural itineraries has been effectively expanded to address assemblies of non-contiguous territories unified by an overarching theme. The effectiveness of defragmenting protective mechanisms through consolidation of valued heritage into broader protected territories is indicated by the diversity of cultural landscapes and cultural itineraries recently inscribed on the World Heritage List. From

this milieu, multiple values and voices emerge, along with the related challenges of diverse resources, large-scale distribution, changing culture, community character, resource protection, and sustainability, among others.

IUCN, Cultural Landscapes, and Protected Areas

Cultural landscapes often embody both cultural and natural values. As Adrian Phillips has written, many World Heritage cultural landscapes coincide with protected areas recognized by IUCN. IUCN has defined protected areas as “areas of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.”⁷⁸ The resources conserved in protected areas are valued for biodiversity and sustainable development, among other environmental values. There are six IUCN protected area management categories:⁹

- Ia, strict nature reserve, managed for science;
- Ib, wilderness area, managed for wilderness;
- II, national park, managed for ecosystem protection and recreation;
- III, natural monument, managed for conservation of specific natural features;
- IV, habitat/species management area, managed for conservation through management intervention;
- V, protected landscape/seascape, managed for conservation and recreation; and
- VI, managed resource protected area, managed for sustainable use of natural ecosystems.

Phillips notes that this typology is a use-

ful construct that increasingly is being adopted by national governments. “A growing number of countries have integrated it within their domestic legislation or policy relating to conservation and protected areas. Only a few weeks ago, at the Seventh Conference of the Parties to the CBD [Kuala Lumpur, Malaysia, February 2004], this IUCN system was given intergovernmental support.”¹⁰

The United Nations’ most recent listing of protected areas, prepared for the World Parks Congress, Durban, South Africa, September 2003, records some 102,102 sites covering an area of 18.8 million km², designating 11.5% of the earth’s lands and less than 1% of the marine environments. The lack of representation of certain types of landscape is a source of concern, with limited savannah, lakes, and temperate forests, for example. Nonetheless, Phillips notes that “this is an impressive achievement and represents a major commitment by countries to protect their natural heritage. It is also a great gift to the new century, giving peoples and governments development and conservation options, which would otherwise have been lost.”¹¹

Phillips has found that many World Heritage cultural landscapes are listed for both natural and cultural values, and/or coincide with protected areas of various categories, most often with national designation. He states:

In the case of three of these, Tongariro, Uluru and Mt Perdu, natural values are so important that the area has been inscribed as a World Heritage property for these as well as for cultural values. These three areas, and another 16 of the 36 sites on the list, are recognized as national parks or designated as other kinds of protected areas under

national legislation. In other words, more than half of all World Heritage Cultural Landscapes currently inscribed on the UN List have natural values that are considered sufficiently important to merit their designation, by national or provincial authorities, as protected areas.

This assessment solidifies the case for multiple-value consideration of properties with intertwined cultural and natural resources. From another position, there are World Heritage cultural landscapes that have natural values that remain unrecognized and without protected area designations, and for which further assessment and protection are required. A common issue in properties with multiple values is the ascendancy of one set of values over another, rather than an appropriate balance of recognition and protection for all relevant values. In light of that challenge, IUCN has developed procedures for identifying natural values in cultural landscapes, which, in summary, attempt to:

- Reflect specific techniques of sustainable land use within characteristics and limits of the natural environment;
- Embody a specific spiritual relationship to nature;
- Maintain or enhance natural values in the landscape;
- Demonstrate traditional forms of land use supporting the biological diversity of wild species, domesticated animals, and cultivated crops;
- Embody outstanding natural beauty and aesthetic values; and
- Provide evidence of a unique past relationship between humanity and nature.

The conservation and management of protected areas also reflects shifting para-

digms, which Phillips skillfully demonstrated as being a contrast of considerations between past and present (Table 1). The obvious challenge is for IUCN and ICOSMOS to move forward in collaboration, seeking to identify and reflect both natural and cultural values of not only World Heritage properties but to apply the same constructs to national and regional protected areas and cultural landscapes globally.

International Case Studies from the Symposium

Argentina and World Heritage.

Presented by Maria Susana Pataro, the case of Argentina offers a national perspective. A country with 23 provinces and a capital city in a federal district, a land area of 3,761,274 km², including an Antarctic region and islands, and a population of 36 million, Argentina contains a variety of heritage resources. Adopting the convention in 1978, it has eight sites, four cultural and four natural, on the World Heritage List. The forming of a national World Heritage committee and continuing engagement at national, regional, and international levels has presented organizational challenges. There is a firm basis for addressing heritage preservation. Pataro states that “in 1994 the Argentine National Constitution was amended and the new text included an Article that clearly recognized the preservation of the natural and cultural heritage as a value to be promoted.” Argentina has engaged in the World Heritage dialogue, for example through participation in the debates and adoption, in 2002, of the Budapest Declaration, expressing the interrelationships among conservation, sustainability, and development.

The first cultural landscape listed in South America was the Argentine Quebrada de Humahuaca, a major trade route used for over 10,000 years, running from

<i>Topic</i>	<i>As it was: protected areas were ...</i>	<i>As it is becoming: protected areas are ...</i>
Objectives	<ul style="list-style-type: none"> • Set aside for conservation • Established mainly for spectacular wildlife and scenic protection • Managed mainly for visitors and tourists • Valued as wilderness • About protection 	<ul style="list-style-type: none"> • Run also with social and economic objectives • Often set up for scientific, economic, and cultural reasons • Managed with local people more in mind • Valued for the cultural importance of so-called “wilderness” • Also about restoration and rehabilitation
Governance	Run by central government	Run by many partners
Local people	<ul style="list-style-type: none"> • Planned and managed against people • Managed without regard to local opinions 	<ul style="list-style-type: none"> • Run with, for, and, in some cases, by local people • Managed to meet the needs of local people
Wider context	<ul style="list-style-type: none"> • Developed separately • Managed as ‘islands’ 	<ul style="list-style-type: none"> • Planned as part of national, regional, and international systems • Developed as ‘networks’ (strictly protected areas, buffered and linked by green corridors)
Perceptions	<ul style="list-style-type: none"> • Viewed primarily as a national asset • Viewed only as a national concern 	<ul style="list-style-type: none"> • Viewed also as a community asset • Viewed also as an international concern
Management techniques	<ul style="list-style-type: none"> • Managed reactively within short timescale • Managed in a technocratic way 	<ul style="list-style-type: none"> • Managed adaptively in long-term perspective • Managed with political considerations
Finance	Paid for by taxpayer	Paid for from many sources
Management skills	<ul style="list-style-type: none"> • Managed by scientists and natural resource experts • Expert-led 	<ul style="list-style-type: none"> • Managed by multi-skilled individuals • Drawing on local knowledge

Table 1. Shifting paradigms in protected area designation and management: a comparison of the “old” with the “new.” Source: Adrian Phillips, “Turning Ideas on Their Head: The New Paradigm for Protected Areas,” *The George Wright Forum* vol. 20, no. 2 (2003), p. 20.

the high Andean land to the plains. It was inscribed in 2003 as the culmination of an extensive process involving local communities. A cooperative multinational effort on the Qhapaq Nan (Inka Trail) Project includes Argentina, Bolivia, Chile, Colombia, Ecuador, and Peru. In the spirit of the Budapest Declaration and with a strong posture on community involvement, Argentina took an early role in supporting the transboundary Qhapaq Nan Project. The trail crosses through seven provinces in Argentine territory alone. This large-scale, linear project is an example of the expanded concept of World Heritage that cultural landscape thinking has fostered.

In Argentina as elsewhere, economics and tourism play a notable role in heritage preservation. Pataro states: "The dramatic social and economic situation of the country, that exploded by the end of December 2001, led to a chaotic period during which several changes occurred within different areas of the government, creating a time of discontinuity for those involved in heritage protection."¹² Following on the political shifts, the economic changes that decreased the value of the peso increased tourism in Argentina. As a result, "In December 2003, there was a 35% increase in tourism, the most visited sites being: the Patagonia Region, with the Glaciar Perito Moreno and the Peninsula Valdes, the Iguazu Falls in Misiones, and the Northwest, with the Quebrada de Humahuaca—three of our eight planetary jewels." Increased tourism, while adding economic value, applies increased pressure to natural and cultural resources, potentially degrading valued sites. These pressures also fuel the need for contemporary facilities that can be designed adjacent to rather than within the core resource areas and designed for harmony with the resources and region, but which are often placed adjacent to core

areas and developed with incompatible and jarring styles or scale. Success in drawing visitors can therefore threaten the very resources that draw them.

Australia and World Heritage. As noted previously, there is broad recognition among the populace of Australia regarding World Heritage. This country of coastlines, unique species, and impressive interior lands has set aside 4,100 protected areas for nature conservation, which is 8% (60 million ha) of its land area. The Register of the National Estate currently lists some 13,000 properties for heritage conservation. The Burra Charter, other charters and advisory tools, and the work of preservation professionals in Australia have been forward-thinking and useful as models to other nations. For example, both natural and cultural heritage are addressed in the *Environment Protection and Biodiversity Conservation Act 1999*. Lennon indicates that "the matters of national environmental significance are: World Heritage properties, Ramsar wetlands of international importance, listed threatened species and communities, migratory species protected under international agreements, nuclear actions, and the Commonwealth marine environments."¹³

A transformation of the preservation process has taken place in recent decades from a top-down, government-mandated process to one that engages the populace, to include the traditional owners, local indigenous people. This involvement is moving toward a community partnership in assessing conservation value and formulating heritage management decisions. These practices, proving useful for World Heritage sites, are being transferred to protected area conservation and management as well.

From a national perspective, Lennon indicates that the natural resources of the country and the Aboriginal imprints are

widely perceived as Australian heritage. However, this national focus limits the consideration of global significance. The movement to develop a national list of properties of heritage significance could serve to establish national historical contexts. Progressing from these contexts, the international significance of resources could be considered more holistically. For example, Lennon states: "The Royal Exhibition Buildings, Melbourne, [have] been nominated this year and the nomination of the Sydney Opera House is still under development as is a nomination of places exemplifying outstanding values in relation to convict history."

In terms of tourism, Australian World Heritage is highlighted through aggressive marketing. Early World Heritage designation battles, amid predictions of economic disaster for the logging and mining industries, pitted forces opposing international interference against those for inscription. Some twenty years later, attitudes have turned about, with a clamor for more World Heritage designations. Evidence of increased tourism and economic benefit, with an average visitor expenditure of \$4,000, and 4.93 million visitors in 2000 and some 4.74 million visitors in 2003, is fueling this change in attitude. It should also be noted that terrorism, war, and Asian health threats effected a decline in Australian tourism and were beyond national control.

Pilgrimage routes, India and Ireland.

Places of pilgrimage are imbued with meaning and association. The issue of pilgrimage, unlike that of heritage tourism, is based on spiritual beliefs. The act of pilgrimage takes a corporeal form in the tangible world, but the process of pilgrimage is intangible and contributes to salvation beyond this life. Heritage resources in both India and Ireland were explored.

Amita Sinha explored issues and solu-

tions for the 2004-inscribed cultural landscape of Champaner Pavagadh Cultural Sanctuary, Gujarat, India.¹⁴ The protected area (6 km²) is focused on the volcanic Pavagadh hill, which rises 830 m over an otherwise flat landscape. An important pilgrimage destination for Hindus is the Kali temple at the Pavagadh summit. Sacred sites link the goddess to earth. Jain temples and a Muslim tomb add religious eclecticism to the site. The multireligious import, environmental degradation, remains of Champaner (a 15th-century city), needs of local communities, and an influx of some 2 million pilgrims annually combine in a complex milieu requiring a multidimensional solution. This project of the University of Illinois brought professors, students, and local authorities together in a planning and design process focused on sustainability and pilgrimage-based heritage tourism. Diverse heritage resources permeate the area, with the archeological resources of Champaner and the sacred elements of the hill, including tombs, shrines, temples, and water tanks. Farming and grazing communities inhabit the ruins of Champaner and the plateaus of Pavagadh hill. Water is a scarce resource and rainfall scours unstable areas of the pilgrimage path. Inadequate planning legislation is also a stumbling block. Solutions strive to respect the historic and traditional character of the pilgrimage route, improve local communities, and absorb high-visitation impacts. In summary, Sinha notes: "We advocate a landscape management solution that integrates the needs of both the resident community and transient visitors, the urban fabric with the complex environmental ecosystem, and the buildings with the equally expressive intervening spaces." This should be coupled with "site-specific design solutions that promote access to the layered experience of landscape and

express the identity of the diverse sects and religions (Hindu, Jain, Muslim) that have historically embellished the area.”

The identification, demarcation, management, community engagement, and sustainability of a network of medieval Christian pilgrim routes in Ireland was presented by Tomas O Caoimh.¹⁵ The identification and development of a series of recognizable Irish pilgrims’ paths that access a series of sacred sites was the overriding project objective. Community development, heritage tourism, and increased awareness of both cultural and natural resources along these routes were sought. The research on several pilgrimage routes used in medieval times to sacred sites proceeded with a focus on seven paths:

- *St. Kevin’s Way*, from Hollywood to Glendalough in County Wicklow;
- *St. Declan’s Way*, from Lismore to Ardmore in County Waterford;
- *Cosán na Naomh* or The Saints’ Road, from Ventry to Mount Brandon in County Kerry;
- The *Slí Mhór* or Great Way, from Lemanaghan to Clonmacnois in County Offaly;
- The *Tóchar Phádraig* or St. Patrick’s Causeway, from Ballintubber to Croagh Patrick in County Mayo;
- *Lough Derg*, pilgrim path to the shore of Lough Derg in County Donegal, site of St. Patrick’s Purgatory; and
- *Turas Cholmcille* or Colmcille’s Round, traditional pilgrim rounds in Glencolmcille, County Donegal.

Research findings indicated some evidence of use as early as the sixth and seventh centuries, prior to the establishment of Christianity in Ireland. Known sacred sites, Ordnance Survey maps, and field monuments were used to verify routes. The plan-

ning process considered authenticity of alignment along with issues of ecologically sensitive, safe passage along busy roads, access over private property, and proximity of services for pilgrim path users, with contemporary routes being adjusted accordingly. Eventually five paths were developed with marking systems and local information through intensive community involvement. Engagement of local communities has enhanced pride of place and increased ownership and an understanding of preservation needs of the pilgrims’ paths, thus achieving the primary goals of the Heritage Council. In conclusion, O Caoimh states:

Across our planet there are many landscapes which are sacred to the people who inhabit them, [and] many of them provide a way for pilgrims making a journey to a sacred site, a journey which is also sacred in itself for those making it. Pilgrimages are said to be responsible for the largest gatherings of human beings on the planet. Whether it is the *hajj*, a journey to Benares, walking on the Camino to Santiago or on the medieval pilgrim routes in Ireland, pilgrimage is an activity very much part of the human story. At the Heritage Council in Ireland we believe that we have learned much from this project, which has had an impact right across our work, and we are very happy, now and for the future, to share what we can of what we have learned.

Student learning, Czech Republic. Penn State University’s Department of Landscape Architecture sponsors a Czech program of on-site learning partnering with the Silva Tarouca Research Institute. Brian Orland reported on an exchange program

that had eight students participating in studying and problem solving for target landscapes within Cesky Raj (Bohemian Paradise) region in the northern Czech Republic (Figure 1).¹⁶ This area, a tourist destination for two centuries, is of geologi-



Figure 1. Czech students taking part in field session on landscape analysis. (photo courtesy of the author)

cal interest with sandstone cliffs, caves, tunnels, and rock windows. It was proposed for listing as a natural property and is a Czech Protected Area, but the traditional Bohemian villages, chateaux, castles, ruins, and designed and agricultural landscapes comprise a cultural heritage of import. Management practice cannot proceed in Czech protected areas until local land use plans are completed and approved, but the skills required to produce such plans are lacking at the local level, hence the value of a professor and graduate student team in shaping elements of such a plan. The student team used field study of issues, development of graphics, team problem solving, and intensive community workshops to address the issues of both cultural and natural resource protection and to provide an example of a targeted planning process that systematically collects and applies information to the resolution of management

issues. Approaches in landscape and visual character analysis were modeled, addressing such issues as managing viewsheds, maintaining traditional village form while accommodating growth, retaining and revealing traces of the local strip field patterns, and other relevant issues.

For example, at Castle Humprecht in Sobotka managers sought a plan for the surrounding forest that would “defuse a conflict of interest between the foresters’ production practices, protection of the historic monument, and conservation of nature and historic landscape character.” Orland goes on to state: “The liaison of State agency, community and University may provide a model for assisting emerging countries in their goals for protecting heritage landscapes and at the same time meeting important educational goals.”

International interest in the heritage of Iraq. In his paper addressing the rich heritage of Iraq at risk from armed conflict, Salim Elwazani stressed the role of the international community in preservation advocacy and action.¹⁷ The ancient Mesopotamian landscape, one of the cradles of civilization, holds a wealth of incomparable and valuable heritage resources that are vulnerable. Elwazani reports that “the military confrontations that have engulfed the region in the last few decades have accelerated the pace of danger not only for the defenseless ancient sites, heritage areas, and monuments, but also for the ‘sheltered’ archeological collections.” The development of an indicative list of resources and movement toward World heritage nominations were called for. Viable protection mechanisms for both environmental and cultural resources at risk are urgently

needed. Engagement of the international community was seen as the solution. In a late-breaking presentation on the situation in Iraq, Alvin Rosenbaum focused on potential opportunities for local work programs that would address heritage preservation, environmental restoration, recovery from conflict, and a return to peace. Within the complexity of the situation, creative project development to address all these issues was taking form.

Traditional agriculture—Philippine Cordilleras Rice Terraces. The Philippine Cordilleras Rice Terraces were the first property inscribed on the World Heritage List as an “evolved continuing” cultural landscape where people live and interact daily with heritage resources. These dramatic, beautiful compositions of small rice paddies framed by low walls on steep slopes (Figure 2) were created by rice-farming peoples over time and are thought to be some 2,000 years old. This majestic agricultural landscape of rice terraces is spread over 20,000 km², or 7% of the Philippine land area, in the provinces of Kalinga–Apayao, Abra, Benguet, and Ifugao. The conservation, current use (or lack thereof), and integrity of these terraced areas vary widely.

The farming and management of the rice terraces are linked to water supply for irrigation and forest conservation for water-

shed protection and building materials through traditional tribal practices within each hamlet. Inscribed for cultural values, ecological values and the lessons of traditional practices are also inherent in the rice terraces of the Philippine Cordilleras. Phillips enlarges on this by observing: “Although the rice terraces are not recognized under national law as a protected area within the IUCN system, in fact they manifest many of the characteristics of a Category V protected area [i.e., protected landscape]; indeed they are given as a case study in IUCN’s published advice on this topic.... Strategies for its future management should draw on experience in the management of many Category V protected areas elsewhere in the world. Examples are:



Figure 2. Landscape of rice terraces in the Philippine Cordilleras. (photo courtesy of the author)

integration of rice growing with ecotourism; the development of new markets for rice and rice wine from the region; and capacity building among the local community based on traditional values.”

With access limited by steep slopes, rice farming at high altitudes in small paddies is

a strenuous and difficult work of manual labor. Among the risk factors for conservation and sustainability of the resources and their unique character are the breakdown of tribal practices, out-migration of younger people, and importation of nontraditional tools and materials. In his presentation, Augusto Villalón itemized a comprehensive planning approach: “Program components were: (a) natural hazard management, (b) agricultural management, (c) watershed management, (d) water management and irrigation, (e) transport development, (f) tourism development, (g) socio-cultural enhancement, (h) livelihood development, (i) institutional development.” It is clear that the perpetuation of traditional practices unique to this cultural landscape is required to sustain the resources. However, management challenges are significant, with changes in management structure and organization since World Heritage status hindering both continuity and availability of resources for conservation. Placed on the List of World Heritage in Danger in 1999, the Rice Terraces of the Philippine Cordilleras are truly at risk from multiple factors. In closing, Villalón stresses that “unless national authorities see the need to simultaneously preserve the integrated network of culture, nature, agriculture, and environment that are the elements to preserving the site, only little gains can be achieved and the cultural landscape will deteriorate into disrepair.”

Traditional agriculture—Mexico Tequila District. The cultivation of blue mezcal, or *mezcal azul*, in fields, plantations, and other early tequila production sites comprises a sizable agricultural and industrial system in the Tequila

Volcano region of Mexico (Figure 3). In western pre-Hispanic Mexico, two types of alcoholic beverage were prepared, derived from agave from fermented juices and cooked agave hearts. Cooking the *tatamado*, the center core of the plant, produced a form of sugar. Wells and circular ovens used in fermentation are dispersed over the landscape. In a visually stunning presentation by Ignacio Gómez Arriola and Francisco Javier López Morales, the complex system of agave field patterns (Figure 4), tequila plantations, transportation routes, production facilities, and social traditions were demonstrated to have developed from before Spanish contact to the present in this evolved continuing landscape.¹⁸ The nomination of the Tequila region cultural landscape is in progress. As a context for its possible inscription, the medieval vineyards of Wachau in Austria and Hungary, the Loire Valley landscape of France, the Cuban tobacco plantations of the Valley of Viñales, the Portuguese Alto Douro wine region, and the Philippine Rice Terraces already have been inscribed on the World Heritage List. The complex system of resources that comprises the Tequila region is an example of an agricultural and indus-



Figure 3. Typical agave field in the Tequila Volcano Region of Mexico. The plants are a striking shade of blue. (photo courtesy of the author)



Figure 4. Aerial view shows agave field patterns. (photo courtesy of the author)

trial heritage that is unique and of high heritage value to Mexico and quite possibly to the world.

Traditional agriculture—the Japanese farmer as gardener. “The farmer is a good gardener for Japan.”¹⁹ In Japan the entire surface of the available land has been cultivated, tended, and shaped into a scenic, aesthetically pleasing cultural landscape (Figure 5). In the spring, rice paddies reflect the sky as bright green growth emerges. In each view a landscape of fields, paddies, canals, terraces, and mountains is seen. Productivity and rural beauty are the goals of the Japan Ministry of Agriculture, expressed in the motto “Aiming for a stable food supply and a beautiful country.” However, the agricultural landscape and the traditional rural culture that supports it are threatened by various

forces. Increased development overtakes farmlands, while rural revitalization projects create new patterns and bring nontraditional architecture into rural areas. Declining farm incomes and out-migration from rural to urban areas make agriculture less viable. However, the Japanese people value fresh, tasty, farm-grown foods. Some interesting techniques are being applied to these issues.

Modest grassroots approaches by rural citizens as well as grander Ministry of Agriculture initiatives are being directed to rural preservation issues. For example, rice is a dietary staple, and a program providing for rural rice paddy cultivation by city families at an annual fee that is less than the cost of the purchase of the rice has had some success. In addition, as Mary Humstone notes, “Urban–rural exchange programs give urban people a chance to experience rural life while also helping to



Figure 5. Japanese thatch harvest. (photo courtesy of the author)

preserve some of Japan's most beautiful landscapes. With help from the Ministry of Agriculture and organizations such as the Japan National Trust, many rural communities have set up exchanges with urban residents, who volunteer to repair terraces, roads and canals, and help with planting and harvest."

Japanese building traditions are based on local climate and materials (Figure 6). These yield, as Humstone observes, "significant features of the cultural landscape including rice storage buildings, storehouses for household goods (*kura*), barns and other farm outbuildings, irrigation canals and ponds built to heat water from the mountains for irrigating rice fields, rural shrines, stone markers, some inscribed with haiku, and even self-service vegetable stands." The designation of historic rural villages as preservation districts to include landscape features has made government

restoration grants available. While preservation and conservation efforts in Japan have most often focused on important shrines, palaces, gardens, and scenic landscapes in the past, recently a new direction was signaled by the designation

of two rice terraces as "Places of Scenic Beauty." This action has led to broader consideration of how to identify and protect notable agricultural landscapes. Humstone notes that "the government is also considering adding a new category, Cultural Landscapes, to its 'Historic Sites and Monuments' division, which currently

includes Historic Sites, Places of Scenic Beauty and Natural Monuments."

Programs promoting rural villages recognize both the tangible and intangible resources of village beauty and traditions, giving awards "for places that not only look beautiful, but also have kept or rekindled community traditions, or that have diversified and strengthened their agricultural base." Direct marketing programs promote increasing farm incomes. As always, a concern raised is the potential to degrade village culture and traditions through these programs.

China and cross-cultural miscommunication in natural area protection. The Chinese view, with its origins in Confucianism and Taoism, includes humanity and nature. As Feng Han states, "Scenic and Historic Interest Areas are the places where the natural beauty and cultural elements are at 'perfect oneness' and

present the Chinese perceptions of Nature, namely, beautiful, peaceful, full of human spirituality, and embracing human beings." In China, the naming of the national park system as *scenic and historic interest areas* rather than *nature reserves* expresses these values. In opposition

to this harmony of nature and humanity, Western thinking positions nature as apart from humanity and the wilderness is revered as a place separate from people. Even the term *cultural landscape* poses a quandary for the Chinese. As Han notes, "The core of the concept of cultural landscape that is aimed at broadening the view



Figure 6. Traditional Japanese farm. (photo courtesy of the author)

of the landscape towards settlement and all interfaces between humans and Nature and beyond the aesthetic, the past, and 'wilderness' in the West, is not widely accepted by the Chinese because of the lack of theoretical understanding of contemporary cultural landscape."

Traditionally, wilderness is not a type of natural setting or a concept understood or valued in China. Nature is aesthetically pleasing and human influenced. Han electrified the symposium audience with her statement that "the Chinese believe artistic re-built Nature is more beautiful than the original one, based on their tradition of great aesthetic achievements." However, with global influences being brought to bear on China to a degree, a yearning for wilderness is now in evidence and a debate over the unity and separation of nature and culture is in play.

Added to this friction is the recent review of two World Heritage sites designated for natural values where foreign review teams found increased development as a threat to the natural resources and were critical of the burgeoning growth in the inscribed areas. The Chinese government response to the critique was to pursue removal of development, including traditional villages, at a high cost. In the Wulingyuan Scenic and Historic Interest Area, designated in 1992, a 1998 report by UNESCO noted that it was "overrun with tourist facilities, having a considerable impact on the aesthetic qualities of the site"; agriculture and urbanization were also cited. In response, "the Central and Provincial Governments of China decided to demolish 340,000 m² of recently built facilities and artificial scenic spots to respond to the Committee's critics in the five years beginning in 2001; and to remove or resettle 1,791 people from 546 families from 2001 to 2003 in order to restore the

natural ecosystem." Shocked reaction followed Han's disclosure of the resistance, confusion, and questions raised by the mandate to "move [people] out of the land where they have lived for generations and why their existence is an 'ecological and visual impact on the nature'. They are also worried about how to survive in a new strange world [away from their] mountain with limited financial compensation from government." Similarly, in the Jiuzhaigou Valley Scenic and Historic Interest Area, the 1 million annual visitors prized the colors of the water and unique natural scenery. An ecological restoration program that removed tourist facilities, with reconstruction limited to adjacent lands, followed degradation and development. Again, a costly process was pursued, resulting in wrenching changes. Han explains:

The price of the removal of all tourism facilities and the prohibition of grazing of the local minorities is the disappearance of culture. Traditional local life formed ... five thousand years ago has been totally changed. It was once a living cultural landscape with nine minority villages living in this valley (the meaning of [the] name of Jiuzhaigou Valley) [with] their own customs, grazing and farming generations by generations. Now they still live [on] this site but their existence has become a tourist gaze, [and they have become] the tourists' image of minorities and herdsmen. They stopped their traditional life of living in Nature, in return for the high economic benefits from the local government. Tourism has eliminated the need for the natural resources 'exploitation' that they formerly lived on.... While the local people are los-

ing their homeland, we are losing our living culture; we are creating 'dead culture' (museums) while we are killing living culture.

These two examples from China are complex, but clearly they highlight cultural differences and target the potential missteps in application of natural and cultural values as judged by those outside of a culture.

Financial Support

While individual project efforts can be cited in the emerging conjunction and/or collision of natural and cultural resources and their identification, documentation, preservation, use, and management, there are pervasive limitations of funding at all levels. Traditional sources of support in both the public and private sectors respond to either natural or cultural resources activities. Rössler recommends support from donors in exploring the interaction of natural and cultural resources and in providing support for their safeguarding. Pataro noted that it would be desirable to increase awareness about the intertwined relationships between conservation and development (and, I would add, economic viability and sustainability) among international financial institutions. Donors to the UNESCO World Heritage Fund should direct funding toward cultural landscape programs. Lennon targets the gap between private and public with her comment that, in Australia, "while much practical conservation effort over the last decade has occurred at whole-farm and water catchment levels through the federally funded National Heritage Trust identifying and protecting remnant vegetation, there has been little effort at regional landscape protection and in managing delineated cultural landscapes either on private property or in public land reserves. Since 1996, the Trust

has invested \$1.4 billion to help local communities support the sustainable management of Australia's natural resources through Landcare, Bushcare, Coastcare, and Rivercare programs."²⁰ Funding remains a challenge; however, the ability to point to comparable funded programs and a level of international attention to the subject of cultural and natural resource stewardship is an advantage.

Conclusions and Declaration

The papers presented and extensive dialogue among presenters and attendees at the 7th US/ICOMOS Symposium was, as intended, a highly interesting and useful platform for learning from each other. As a plethora of issues emerged in a variety of forms, it became clear that a declaration could be crafted that would aid us all in our efforts. In closing her paper, Mechtild Rössler brought us this useful quote: "Biodiversity should be appreciated in terms of human diversity, since different cultures and people ... confront and perceive biodiversity in different ways. This is due to their distinct heritage and experiences, which are translated into knowledge systems, cultural expressions and language, and which enrich and transform the environment, landscapes and especially biodiversity."²¹ Multiple values—cultural and natural, tangible and intangible, historical, ecological, and social—were stated and explored. It was widely agreed that multiple voices—traditional, local, regional, national, international, multicultural, and professional, and those of students, politicians, and citizens—need to be brought to continuing exchanges. Identification and documentation need to be followed by adequate planning in a holistic approach. Recognizing that the quality of life and experience of places is enriched greatly by the shared global heritage of cultural and natural land-

scapes, we affirmed in the *Natchitoches Declaration on Heritage Landscapes*, 27 March 2004, that the traditional separation of cultural and natural resources within our shared legacy of heritage landscapes was no longer sustainable. Within the variety of cultural frameworks, patience and insight are required in listening, understanding, and acting on the many facets of protection of heritage landscapes.

Endnotes

¹ A compact disk with the program, declaration, introductory paper by the author, speaker papers, PowerPoint presentations, and descriptions of some field sessions is available from US/ICOMOS (info@usicomos.org).

² An interactive world map of sites is at <http://whc.unesco.org/>.

³ World Heritage natural property criteria are excerpted from documents (2003) that can be found on the World Heritage website (URL above). For the purposes of this paper, the author has summarized the criteria wording.

⁴ Cultural property criteria are also drawn from the World Heritage website. For the purposes of this paper, the author has summarized the criteria wording.

⁵ As noted by Mechtild Rössler, chief, Europe & North America, UNESCO World Heritage Centre, in her remarks to the symposium.

⁶ Mechtild Rössler, "World Heritage—Linking Cultural and Biological Diversity," 7th US/ICOMOS Symposium, 2004. Hereinafter, all papers cited are from the symposium unless noted otherwise.

⁷ Ibid.

⁸ Adrian Phillips, "World Heritage Cultural Landscapes—An Overview of the Natural Values." Phillips serves as vice chair for World Heritage of the IUCN World Commission on Protected Areas (WCPA).

⁹ IUCN, *Guidelines for Protected Area Management Categories* (Gland, Switzerland, and Cambridge, U.K.: IUCN and World Conservation Monitoring Centre, 1994).

¹⁰ See the CBD website, www.biodiv.org.

¹¹ Phillips, "World Heritage Cultural Landscapes—An Overview of the Natural Values."

¹² Maria Susana Pataro, "Implementation of the World Heritage Convention in Argentina." Pataro is with Argentina's Ministry of Foreign Relations, International Trade, and Worship.

¹³ Jane L. Lennon, "Paris Down Under—World Heritage Impacts in Australia." See also www.environment.gov.au/epbc.

¹⁴ Gary Kesler, D. Fairchild Ruggles, Amita Sinha, and James Wescoat, Jr., "Champaner Pavagadh Cultural Sanctuary, Gujarat, India: Challenges and Responses in Cultural Heritage Planning and Design." Sinha is a professor in the Department of Landscape Architecture, University of Illinois at Urbana-Champaign, USA.

¹⁵ Tomas O Caoimh, "The Pilgrims' Path: Promoting Sustainable Development of Walking Routes through Sacred Sites in Ireland." O Caoimh is with the Heritage Council of Ireland.

¹⁶ Cecelia Rusnak, Brian Orland, and Jan Hendrych, "Reciprocal Benefits of Student Service-Learning in Addressing the Needs of Heritage Landscapes." Orland is head of the Department of Landscape Architecture, Penn State University. The project was a partnership with the Silva Tarouca Research Institute for Landscape and Gardening, Pruhonice, Czech Republic.

¹⁷ Salim Elwazani, "Identification and Preservation of the Iraqi Heritage Areas: The International Hand."

¹⁸ Ignacio Gómez Arriola and Francisco Javier López Morales, "The Agave Landscape and the Ancient Tequila

Industrial Installations: A Proposed Mexican Cultural Landscape.”

¹⁹ This old saying was used as the title of Mary Humstone’s paper “‘The Farmer is a Good Gardener’—Lessons from Japan.”

Humstone is at the University of Wyoming, USA.

²⁰ See www.nht.gov.au/overview.html.

²¹ Juan Mayr, “Cultural Diversity and the Environment,” unpublished report (2003).

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NATCHITOCHES DECLARATION ON HERITAGE LANDSCAPES

27 March 2004, Natchitoches (Nak a tish) Louisiana, USA

On the occasion of the 7th International Symposium of US/ICOMOS, *Learning from World Heritage: Lessons from International Preservation & Stewardship of Cultural & Ecological Landscapes of Global Significance*, 123 delegates from all over the United States, twelve nations and several disciplines met in Natchitoches, Louisiana, from 25 to 27 March 2004, to share experience, draw lessons and address issues surrounding the interface of nature and culture in the landscape.

The symposium benefited from the continuing reflection carried through World Heritage international and regional meetings addressing cultural landscapes, and the ICOMOS General Assembly, Zimbabwe, 2002, the World Parks Congress, Durban, South Africa, 2003, the review of IUCN categories of protected areas and the recent revision of the World Heritage Operational Guidelines merging the cultural and natural criteria.

The World Heritage Operational Guidelines were amended in 1992 to include *cultural landscapes* and it is apparent that this addition has been instrumental in focusing on the interaction of people and nature over time. Thirty-six evolved continuing or relict, designed and associative landscapes have received World Heritage listing between 1992 and 2003, recognizing their outstanding universal value. The majority of these, twenty-two, are evolved continuing landscapes where people and nature dwell together. There is a convergence of natural and cultural values in the landscape, and a growing recognition that the traditional separation of nature and culture is a hindrance to protection, and is no longer sustainable. Further, heritage landscape protection is required at the local, national and global levels in order to transmit these universally valuable heritage resources to future generations.

Considering the fundamental nature of landscape at the nexus of biodiversity and cultural diversity; taking also into consideration that a series of threats to globally important landscapes include loss of character, degradation, intense use, unregulated tourism, population shifts, economic factors, encroachment, pollution, and that our inability to fully fathom heritage landscapes is the largest threat, therefore the participants of the 7th International Symposium adopt the following declaration of principles and recommendations, addressing them to national and local authorities as well as institutions and international organizations, in particular to ICOMOS and to its partners IUCN and ICCROM.

A Concept in Evolution and an Inter-Disciplinary Commitment

Heritage landscapes are unique places that are the prime expression of the richness of the world and the diversity of its culture. Actions to deepen the understanding of the complexity of heritage landscapes, whether productive, commemorative, inspirational, rural or urban, countryside, seascapes, cityscapes, industrial landscapes, routes, or linear corridors, are needed at the international, national and regional levels. The preservation and conservation of heritage landscapes is coming into focus, but international bodies have much to do to address their complexity. Accordingly we stress the need to:

- Pursue an inter-disciplinary approach within the cultural heritage field, in concert with natural heritage professionals and organizations, to identify, document, designate and manage heritage landscapes, using a holistic model.
- Pursue global theme studies of landscape typologies, such as the project on globally important agricultural systems, in an interdisciplinary milieu.
- Strengthen the collaboration of ICOMOS and IUCN in the identification, evaluation, monitoring and periodic reporting on heritage landscapes in the context of the World Heritage Convention and other cooperative efforts.
- Press forward ICOMOS, ICCROM and IUCN training in understanding and applying the revised World Heritage Operational Guidelines to build capacity at the professional and community level.
- Improve the preparation processes for ICOMOS heritage landscape evaluation missions to include full baseline data and professional reviews.
- Develop model World Heritage nominations for heritage landscapes.
- Develop heritage landscapes model management plans to share with state parties.
- Call upon ICOMOS, the ICOMOS International Scientific Committees, especially the ICOMOS/IFLA Historic Gardens & Cultural Landscapes Committee, to take a leadership role in these efforts.

Responding to Threats

Threats are multiple and pervasive and require attention.

- Recognize and pursue planning for global changes in land use that pose specific challenges to cultural landscapes, such as agricultural change and tourism pressure.
- Develop a stronger system to ensure rapid intervention and mobilizing resources for heritage landscapes under threat.
- Focus additional attention on the issues of heritage landscapes in the response to catastrophic events.
- Provide guidelines to aid in sustainable tourism for heritage landscapes.

Engaging Communities, Multiple Values, Multiple Voices

Communities and landscape are intertwined. People define and steward place, shaping their lifeways through time in partnerships with the landscape. Local knowledge and traditional skills both imprint and sustain heritage landscapes and are to be studied, understood and respected in the preservation and conservation process. The full engagement of communi-

ties in the protection and sustaining of heritage landscapes is required. Accordingly we stress the need to:

- Foster the development of ICOMOS guidelines and principles of practice for the inclusion of consultative, community-based processes in the planning and management of heritage landscapes.
- Support the understanding and continuation of traditional practices in the stewardship of heritage landscapes.
- Recognize that multi-values are present in heritage landscapes and that multiple voices, including strong community engagement, need to be brought to their protection and management.
- Respect the living traditions and footprints of indigenous peoples that permeate the heritage landscape.

National & International Cooperation

Constant advocacy and promotion are required by all partners, in particular within the World Heritage system, to forge cooperative partnerships among state parties and across national boundaries. Accordingly we stress the need to:

- Use heritage landscape conservation to promote sustainable approaches to international cooperation among nations and peoples.
- Encourage nations to conduct national thematic studies of landscape types—agriculture, land and water migration routes, pilgrim trails, etc.
- Encourage international multi-national cooperation to identify and safeguard heritage landscapes that cross national boundaries.
- Provide guidelines for national legislation for the protection of cultural landscapes, to include watershed management, transboundary areas and buffer zones.
- Demonstrate, in the form of case studies and reporting, how recognition of heritage landscapes can provide economic benefits.

We respect and deeply appreciate the landscape preservation and conservation efforts that have reached fruition. Much work remains to be done and threats are urgent and pervasive. With this declaration, we call for increased commitment to the gamut of preservation and conservation planning and management efforts to preserve the universally significant heritage landscapes of our planet. We extend our thanks to all who have made this symposium a rich exchange and thank our gracious hosts in Natchitoches, Louisiana.

*Adopted at the US/ICOMOS 7th International Symposium at Natchitoches, USA,
27 March 2004*

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