POSTER ABSTRACTS

(listed alphabetically by primary author)

Posters are on display in the Pond Student Union Ballroom, Thursday, 10 am–5 pm, and Friday, 8 am–6 pm.

Digital Geology of Idaho: Web-based Teaching Using GIS Software for Visualizations

Diana Boyack, Digital Mapping Lab Manager, Idaho State University, Geosciences Department, Pocatello, Idaho
Paul K. Link, Idaho State University, Geosciences Department, Pocatello, Idaho
Laura D. De Grey, Idaho State University, Geosciences Department, Pocatello, Idaho
Daniel P. Ames, Idaho State University, Geosciences Department, Pocatello, Idaho

Using an NSF Geosciences Education Grant the Digital Atlas of Idaho (http://imnh.isu.edu/digitalatlas) will be used as a foundation to create an upper-division undergraduate Idaho Geology course for the web, and to create web-based laboratory exercises for Physical Geology, Historical Geology, and Physical Geography at the undergraduate college level. There will be fifteen self-contained units regarding regional geology of Idaho. Geographic information systems (GIS) software will be used to create 3-D flythroughs with geology draped over digital elevation models (DEMs), and other types of visualizations to highlight geologic events in Idaho history. The topical components include 1. Teton, Albion and Pioneer Ranges: Slices of the Middle Crust, 2. Mesoproterozoic Belt Supergroup; 3. Idaho's Mining Wealth: Silver Valley; 4. Accreted Terranes, Western Idaho Suture Zone and Hells Canyon; 5. Mesozoic Idaho Batholith; 6. Challis Magmatic Episode and Trans-Challis Mineralization; 7. Overthrust Belt; 8. Neogene Snake River Plain-Yellowstone Volcanic Province; 9. Columbia River Basalt Province; 10. Basin and Range Province; 11. Snake River Plain Aquifer; 12. Pleistocene Mountain Glaciation; 13. Palouse landscape and post-glacial climate change; 14. Lake Missoula Floods; 15. Lake Bonneville Flood.

Threats and Proactive Management Strategies for Protection of a Pristine Sagebrush Steppe Ecosystem

Brandon Brown, Fuel Use Specialist, Bureau of Land Management, Shoshone, Idaho
Jesse German, GIS Specialist, Bureau of Land Management, Shoshone, Idaho

The area of the Craters of the Moon National Monument and Preserve known as Laidlaw Park was inventoried in 2004 as part of large-scale hazardous fuels reduction program. The Bureau of Land Management inventoried the area for fuel loading, ecological conditions, and vegetation community composition. Inventory data was collected with the intention of supporting NEPA analysis for the use of prescribed fire, herbicide use, reseeding, and mechanical techniques as a means of proactive fuels and sagebrush habitat management. Using GIS as a platform for analysis, risk assessments were made and interpreted with the overall goal of developing treatment plans to restore degraded areas while proactively maintaining pristine areas. Analysis of the data shows a trend from a native perennial vegetation community to a non-native annual vegetation community. Laidlaw Park represents pristine or historic conditions for the Great Basin sagebrush steppe community which has been drastically lost or degraded over millions of acres in the western United States. GIS analysis of inventory data shows the initial stages of native habitat loss within Laidlaw Park and provides support for a proactive vegetation management program to restore historic fire cycles, prevent non-native species invasion, and maintain remaining sagebrush steppe habitat.

Effects of the Johnny Creek and Blackrock Canyon Fires – Series of Five Posters

Century High School Physical Science Honors Students, Pocatello, Idaho

The hills around Pocatello, Idaho are often sites for natural and man-made wildfires. The honors physical science classes at Century High School decided to investigate what effects wildfires have on these areas. We did soil infiltration studies and vegetation density studies at two sites near Pocatello; the Johnny Creek fire site, which is 17 years old, and the Blackrock Canyon fire site, which is 2 years old. We sampled both burned and unburned areas at both sites. We wanted to find out if a wildfire changed the soil's ability to absorb water, and if it changed the density and diversity of vegetation. The data we collected and some preliminary conclusions are presented in the poster. Some of our data has led us to more questions that we hope to research further.

1. Fire effects on vegetation
   Cassie Benson, Rilee Glenn, Scott Orren, Patrick Nelson, Nichole Gardner

2. The effects of wildfires
   Kelcie Dickerson, Elisa Belnap, Paul Krumwiede, Justin Llewellyn, Ryan Syndergard
3. Johnny Creek area and Blackrock Canyon area vegetation percentages and soil infiltration rates
   Aaron Jenkins, Matt Helm, Chris Johnson, Katherine Moore, Brittney Terry
4. Wicked Wildfires!
   Emily Jones, Kelsey Reiland, Ashley Laurence, Chester Kener, Matt Follett
5. Effects of Wildfire
   Emily Newhouse, Grace Devaud, Zachary Hughes, Jordan Kress, Ryan Evans

Paleomagnetic Studies of the Subsurface Stratigraphy of the Idaho National Laboratory

Duane Champion, Research Geologist, U.S. Geological Survey, Menlo Park, California

Production of nuclear wastes at the Idaho National Laboratory (INL), and their movement into the subsurface and ultimately into the Snake River Plain aquifer have prompted study of the stratigraphy under the INL through cored and uncored wells. Cored wells allow a physical description of the subsurface basalt lava flow and sediment succession, and provide samples for chemical and paleomagnetic analyses. Studies of the paleomagnetic samples generate magnetic polarity and mean paleoinclination data that can be used to correlate individual buried lava flows from corehole to corehole. These correlated flows sometimes can be followed for miles in the subsurface, from well to well, in what looks in vertical cross-section like a thick, layered cake. Or, they can pinch out and be replaced by a different lava flow at that depth interval. One sequence of lava flows vented near the Radioactive Waste Management Complex, but only found at depths from 350 to 500 feet in the southern INL area, is particularly important in this subsurface correlation. These Group F lava flows, dated at 570 ka by argon isotopic studies, have reversed remanent polarities and document an excursion of the geomagnetic field during otherwise normal magnetic polarity time. Vertical cross sections, drawn through the coreholes show a subhorizontal attitude for these lava flows, but detailed inspection seems to suggest that the flows impossibly moved uphill to the north. What instead must have happened is that broad subsidence of the Snake River Plain is tipping the Group F flows toward the south.

Annotated Checklist of the Ants (*Hymenoptera: Formicidae*) of the Idaho National Laboratory

William H. Clark, Director, Orma J. Smith Museum of Natural History, Caldwell,Idaho
Paul E. Blom, Research Biologist, USDA ARS Horticultural Crops Research Unit, Prosser, Washington

A checklist of the ants was needed as a first step in characterizing the diversity and distribution of this taxon on the INL. Ants are very important components of the desert ecosystem based on their distribution, habitat preferences, food habits, and relative abundance. Also, since most temperate species nest in the soil, they are potentially important at the INL where they may tunnel into and disturb buried waste. Our research in the northeastern portion of the Snake River Plain from 1986 to 1996 included baiting, pitfall traps, suction trap, and direct, manual collection of ants across most of the ~756,300 ha (~890 mi^2) of the INL. This effort produced thousands of ant collections, of which 1,115 (mostly nest series) are reported here. These collections contained 47 species in 20 genera from 3 subfamilies. This more than doubles the number of the species previously reported from the INL. All but three ant genera known for the state of Idaho can be found at the INL. Additionally, four species from Idaho are reported for the first time: *Liometopum luctuosum*, *Formica gynocrates*, *Formica spatulata*, and an undescribed species of *Myrmica*. *Formicoxenus diversipilosus* was only found within the nests of the *Formica rufa* group, *Formica planipilis* and *Formica subnitens*. These represent new host records for the species. *Formicoxenus hirticornis* was found nesting with the thatch ants: *Formica planipilis*, *Formica ciliata*, *F. laeviceps*, and *F. subnitens*, all of which represent new host records for this species. This information provides a baseline for other researchers.

Native Beardtongue, Biscuitroot, and Buckwheat for Southern Idaho Restoration

Ann DeBolt, Botanist, U.S. Forest Service Rocky Mountain Research Station, Boise, Idaho
Nancy L. Shaw, Research Botanist, U.S. Forest Service Rocky Mountain Research Station, Boise, Idaho

Native species of *Penstemon*, *Lomatium*, and *Eriogonum* are widely distributed across southern Idaho, including the area known as the Great Rift. These species enhance the environment by increasing biodiversity, stabilizing soil, improving habitat for many organisms, and adding to the aesthetics of western wildlands. The restoration potential of seven wide-ranging species is being examined: *Penstemon acuminatus*, *P. deustus*, *P. speciosus*, *Lomatium dissectum*, *L. grayi*, *L. triternatum*, and *Eriogonum umbellatum*. At least four of the seven species are known from Craters of the Moon National

Monument and Preserve. Germplasm collection and common garden establishment is underway for more than one hundred-twenty accessions, and seed biology characteristics are being investigated. Cultural practices, seed and plant predator relationships, pollination biology requirements and limitations, and herbicide and drip irrigation trials are being investigated by various collaborators. Research components will facilitate the development of propagation and seed production protocols and assist in the identification of populations for seed increase for restoration of southern Idaho rangelands.

Odonata of the Great Rift Volcanic Zone and Craters of the Moon National Monument and Preserve

Kent Fothergill, Conservation Biologist, Red Willow Research, Inc., Buhl, Idaho
Miriam Austin, Field Biologist, Red Willow Research, Inc., Twin Falls, Idaho

Odonata (dragonflies and damselflies) are charismatic and fascinating obligate predators. *Odonata* larva are top predators in waters in which fish are absent. The Great Rift area has not been an area of intensive odonatological study, but there is much to be learned. Past work and recent *odonata* counts performed at Minidoka National Wildlife Refuge will be summarized. Life history traits will be examined of *odonata* known to utilize the rift zone and future work proposed.

Upper Columbia Basin Network Natural Resource Inventory and Monitoring Program

Lisa Garrett, Upper Columbia Basin Network Coordinator, National Park Service, Moscow, Idaho

Knowing the condition of natural resources in national parks is fundamental to the National Park Service's (NPS) ability to manage park resources unimpaired for the enjoyment of future generations. The challenge of protecting and managing a park's natural resources requires a multi-agency, ecosystem approach because most parks are open systems, with threats such as air and water pollution or invasive species, originating outside of the park's boundaries. National parks are part of larger ecosystems and must be managed in that context. The intent of park vital signs monitoring is to track a subset of physical, chemical, and biological elements and processes of park ecosystems that are selected to represent the overall health or condition of park resources. The broad-based, scientifically sound information obtained through natural resource monitoring will have multiple applications for management decision-making, research, education, and promoting public understanding of park resources. The Upper Columbia Basin Network (UCBN) was formed to address the need of park managers to know the condition of natural resources through a program of natural resource inventory and monitoring. The parks in the UCBN include: Big Hole National Battlefield, City of Rocks National Reserve, Craters of the Moon National Monument and Preserve, Hagerman Fossil Beds National Monument, John Day Fossil Beds National Monument, Lake Roosevelt National Recreation Area, Minidoka National Internment Monument, Nez Perce National Historical Park, and Whitman Mission National Historic Site. The UCBN is just 1 of 32 networks across the country formed to implement network-wide natural resource inventory and monitoring programs.

Post-outbreak Densities of the Sagebrush Defoliator Moth (*Aroga websteri*) on Two *Artemisia* Hosts

Nancy Hampton, Ecologist, Idaho State University / Idaho National Laboratory, Idaho Falls, Idaho
Nancy Huntly, Professor of Ecology, Dept. of Biological Sciences, Idaho State University, Pocatello, Idaho

Periodic outbreaks of the sagebrush defoliator moth, *Aroga websteri Clarke (Lepidoptera: Gelechiidae)*, can kill sagebrush plants and significantly reduce productivity. Although several sagebrush species (*Artemisia spp.*) are acceptable hosts for *A. websteri*, previous studies suggest that *Artemisia tridentata* may be preferentially selected over other species when they occur together. In 2003, a widespread outbreak of *A. websteri* occurred in a portion of the Snake River Plain in southeastern Idaho. We measured post-outbreak *A. websteri* densities on *A. tridentata ssp. wyomingensis* and *Artemisia tripartita* in communities where the two species occur together or independently. Higher *A. websteri* densities were found on *A. t. wyomingensis* when *A. tripartita* was also present ($p < 0.01$, df=1). However, densities on *A. tripartita* were greater when it was the single, dominant host ($p=0.02$, df=1). These preliminary results suggest that 1) selective or preferential use of *Artemisia* hosts may affect *A. websteri* population trends, and 2) the density and distribution of *Artemisia* species and subspecies could influence the spatial and temporal pattern of outbreaks. Further data collection and analyses are in progress. As degradation and alteration of sagebrush communities increase across the west, understanding patterns of outbreak and the population dynamics of *A. websteri* could be important to managing critical sagebrush habitat.

Insects in Sagebrush Communities: Ecological Function and Natural History

Nancy Hampton, Ecologist, Idaho State University/Idaho National Laboratory, Pocatello, Idaho
Nancy Huntly, Professor of Ecology, Dept. of Biological Sciences, Idaho State University, Pocatello, Idaho

Insects have important ecological functions as herbivores, pollinators, prey, and decomposers. Nevertheless, little is known

about the vast majority of insects associated with sagebrush ecosystems. The combined inventories from Craters of the Moon National Monument and surrounding sagebrush communities are estimated to total over 2,800 insect species in more than 300 families and 1500 genera. Recent research indicates that relatively undisturbed sagebrush habitat in southeastern Idaho supports a higher richness of insects and other arthropods than similar communities in the region. However, life cycles, population dynamics, and species composition for insects occupying sagebrush communities have been little studied, and detailed natural histories are known for only a few key species. Here, we present an overview of the ecological function of primary insect groups and a brief natural history of several common species associated with sage-steppe. The purpose of this overview is to emphasize the need for better understanding the ecological role of insects and to encourage research to elucidate the function of insects in sagebrush communities.

Robert "Two Gun Bob" Limbert – Explorer and Photographer of Craters of the Moon

Clark Heglar, Lead Interpreter / Historian, Celebration Park, Melba, Idaho

Robert "Two Gun Bob" Limbert was the first to completely explore and document The Great Rift and what would become Craters of the Moon National Monument. It was his photographs and article in the March 1924 National Geographic that created the interest in an area that had largely been ignored, to became Idaho's first National Monument. A photo display was created from Limbert's negatives that are on permanent loan from Craters of the Moon to the Special Collections Archives at Boise State University. His photographs that show the exploration of the Great Rift and Craters will be displayed. Clark Heglar, a Limbert scholar and performing historian will discuss Limbert's role in the creation of Craters of the Moon National Monument and the scientific inquiry that was spurred by the interest following his explorations.

Dike Morphometry and Arrest Mechanisms along the Southern Great Rift, Idaho

Adrian A.J. Holmes, MS student, Idaho State University, Pocatello, Idaho
Scott S. Hughes, Professor and Chair, Dept. of Geosciences, Idaho State University, Pocatello, Idaho
David W. Rodger, Dept. of Geosciences, Idaho State University, Pocatello, Idaho

The extensional kinematics of the southern Great Rift are revealed by field measurements of tension cracks related to dike intrusion. The southern Great Rift is defined by three linear volcanic segments ranging in age from 2.2 ka to > 4.5 ka. Each segment is characterized by sub-parallel sets of tension cracks and a discontinuous central eruptive fissure. Subsurface basaltic dikes are interpreted to underlie each segment. This study uses measurements of surface strain to model the dimensions of the inferred dikes at depth. Surface strain associated with extension was determined by summing field measurements of tension crack and fissure widths along 22 rift-perpendicular transects. Surface strain measurements along the King's Bowl segment range from 0.64 to 4.50 m. Values range from 1.33 to 4.41 m along the New Butte segment and from 0.74 to 1.57 m along the Minidoka segment. Buoyancy equilibrium and boundary element modeling requires that the dikes beneath the segments of the southern Great Rift source or pinch off in the lower crust at depths of ~ 25 to 33 km. They intrude to depths of ~ 0.9 to 0.5 km, with central fissure eruption associated with intrusion depths < 0.7 km. Dike width at depth may approach up to ~ 20 m. Wider dike widths and shallower depths to dike tops in the model correspond to localities of central fissure eruption along the rift, providing further evidence to support the interpretation of dikes beneath the southern Great Rift.

Soils Inventory and Interpretations – Craters of the Moon

David Hoover, State Soil Scientist, USDA-NRCS, Boise, Idaho
Pete Biggam, Soils Program Coordinator, National Park Service, Geologic Resources Division, Lakewood, Colorado

Several years ago, the USDA-Natural Resources Conservation Service (NRCS) completed a soil survey for the much smaller Craters of the Moon National Monument. Even though the Monument has since expanded in size, there is a still a need for an inventory of the soils resource. In 2004, the NRCS contracted with the National Park Service (NPS) to develop a comprehensive soil survey, incorporating the recent soil survey with parts of four other soil surveys into one cohesive management tool. A soil survey not only produces maps at 1:24000 scale but also contains extensive information on the soil itself. There are soil and landscape features such as slope, depth of the soil over restrictive layers, and flooding. There are chemical and physical attributes of each soil type such as clay content, pH, shrink-swell capacities, cation exchange capacity, and calcium carbonate equivalence. A soil survey also contains interpretive groupings of the soils for road building and facilities installations. This survey will also include suitability for livestock grazing including plant communities and reactions to environmental and human range management factors. As part of the soils study, there is corresponding research through the University of Idaho on the distribution and extent of tephra within the Monument. Of particular inter-

est to this study is the extent of volcanic ash in the surface soil, its mineral composition, and its effect on water holding capacity and nutrient sorption as it relates to plant growth.

Living and Learning in the Sagebrush-Steppe: Place-based Learning in Southeastern Idaho's Native Habitat

Alana Jensen, Environmental Educator, Environmental Surveillance, Education and Research Program (ESER), Idaho Falls, Idaho

What students do in school is often isolated from the life and work of the community in which they live. Research shows that when learning is rooted in native habitats and real-world issues, it is more authentic and meaningful, and inspires students to be academic achievers and engaged citizens. Place-based learning is a teaching and learning process that uses the local environment and community as the context for learning. Place-based education grounds learning in something that is real, meaningful and accessible to students. The ESER Environmental Education Program place-based learning program, available to Idaho teachers, supplements textbook study with experiences and projects where the kids live. By learning about the sagebrush-steppe environment, students get the sense that school is relevant to their daily lives. Classroom visits by ESER professionals, a virtual desert field trip and other web-based units, a summer science camp, and service-based projects presented by the ESER Environmental Education Program complement existing subject matter and incorporate state standards.

Soil Profiles Associated with the Great Rift – Set of Two Posters

Darwin Jeppesen, Soil Scientist, BLM Idaho Falls Field Office, Idaho Falls, Idaho

1. General soil map of soils associated with the Great Rift
2. Soils, soil profiles, soils map

Post-fire Seed Ecology of Rush Skeletonweed (*Chondrilla juncea L.*) on Idaho's Snake River Plain

Cecilia Kinter, Postdoctoral research ecologist, Rocky Mountain Research Station / Univ. of Wyoming, Boise, Idaho
Nancy L. Shaw, Rocky Mountain Research Station, USDA Forest Service, Boise, Idaho
Ann L. Hild, Dept. of Renewable Resources, University of Wyoming, Laramie, Wyoming

Rush skeletonweed, a perennial, Eurasian composite, has been invasive on the western half of Idaho's Snake River Plain for several decades. Its numerous wind-borne seeds are often targeted for control, but recruitment from seed compared to root sprouts has not been quantified in the region, particularly following wildfire. On 11 burned/unburned plot pairs, we investigated rush skeletonweed seed ecology. Soil seed banks following fall 2003 and 2004 fruiting periods were small: mean <165 emergents/m^2 from grow-outs of unburned soils. Seeds sown in native soils had markedly higher emergence from sterilized soils (25.3%) than unsterilized soils (8.5%). Seeds buried in bags in the field in Oct03 displayed no secondary dormancy; total germination peaked at 32% by mid-Jan04, and only 1% of seeds remained germinable by Aug04. Of 2800 seeds sown adjacent to the seed bags, only four seedlings emerged by Aug04. Of 1509 rosettes excavated in the field, all but 62 originated from roots of existing plants, and most of these were found in spring 2005. A higher proportion of rosettes from seeds were found on burned plots (26.1%) than unburned plots (13.6%), and burned plots produced more new plants (e.g. 2.9 vs. 0.6 rosettes/m^2 in mid-Nov03). From Oct03 - May05, we found almost no rush skeletonweed recruitment from seed. Root sprouts were the main source of new plants, though episodic seedling establishment likely occurs under favorable conditions. Our data indicate that rush skeletonweed control on the Snake River Plain must focus on rosettes and roots, rather than seeds.

Idaho's Model Environmental Education Schools

Donny Roush, Executive Director, Idaho Environmental Education Association, Pocatello, Idaho

The Idaho Environmental Education Association (IdEEA) brought The EIC Model to Idaho in 2003. Schools in Bonners Ferry, Hailey, Hagerman, Salmon, Pocatello, and Ft. Hall are using their local environments as integrating contexts for learning, in support of the Idaho Achievement Standards. These schools enroll 1,701 students, of which 21 percent are ethnic minorities. Trends in student achievement are just beginning to emerge. Each school has received more than $10,000 in professional development through this network. Technical support, evaluation, and reporting are provided by IdEEA.

The Great Basin Native Plant Selection and Increase Project: Plant Materials for the Great Basin and Surrounding Areas

Nancy L. Shaw, Research Botanist, U.S. Forest Service, Rocky Mountain Research Station, Boise, Idaho
Mike Pellant, USDI Bureau of Land Management, Boise, Idaho

Additional native plant materials and planting strategies are required to recreate diverse plant communities, resist the spread of weeds, and reverse the decline of sage-grouse and numerous other organisms in areas of the interior western United States. An increasing demand and need for native seed is fueled by Executive Orders, Congressional direction, the National Fire Plan (including the Emergency Stabilization and Rehabilitation program). The Great Basin Restoration Initiative, a regional effort funded by the USDI Bureau of Land Management, organized a research effort to increase the availability of affordable native plant seed in the Great Basin. The US Forest Service Rocky Mountain Research Station is the project coordinator for this multi-state project that includes federal, state, and private cooperators in six states. Cooperators are studying plant materials development, basic biology, genetics, cultural practices, pollinator and pest management, and developing seed and seeding technology for more than 25 key native species. The focus of the project is on native forbs, given the need for forbs to restore diversity in wildlife habitat and the health of degraded rangelands. State Foundation Seed agencies and seed growers are partners in this effort to increase seed of selected species and populations.

Taking IT to the Field

Leona Svancara, Spatial Ecologist / Data Manager, National Park Service, Moscow, Idaho

For decades now, we have relied on information technology (IT) to increase productivity in the workplace. Computers have transformed offices such that month-long tasks now take only days and week-long communication now takes mere seconds. Today's state-of-the-art IT also has the ability to increase productivity of researchers and managers in the field. While global positioning systems (GPS) have been fully operational since 1993, the last 5 years have produced smaller, quicker, and more accurate receivers. They are now WAAS-enabled, allowing real-time correction, and can be teamed with laser-rangefinders to gather coordinates in inaccessible or dangerous locations. The last 5 years have also produced more powerful handheld personal data assistants (PDAs) that virtually eliminate the need for field data forms and pencils. Armed with wireless Bluetooth technology, PDAs can communicate with virtually any other computerized equipment available including GPS, digital cameras, and cell phones. National Park Service managers and scientists in the Upper Columbia Basin Network (UCBN) are challenged daily with knowing the condition of natural resources in their parks, writing management plans, and providing that knowledge to the general public. Given the large expanse of area under management and the relatively limited budgets, the UCBN is taking IT to the field in support of their natural resource inventory and monitoring program. Successfully planning and implementing IT in the field allows UCBN staff to accomplish more for less. Current uses include mapping vegetation, detecting landscape change, monitoring species of concern, and combating land degradation through the identification of invasive species.