

# Great Basin Cooperative Ecosystem Studies Unit

Strategic Plan  
February 7 & 8, 2002  
Reno, NV

## **Context for Planning**

### **Introduction**

The Great Basin Cooperative Ecosystem Studies Unit (GB-CESU) is unique to the Great Basin region of the United States and is one of a national network of formally designated partnerships. The objectives of the GB-CESU are to:

- Provide research, technical assistance and education to federal land management agencies, environmental and research organizations, local governments, and communities;
- Develop a program of research, technical assistance and education that involves the biological, physical, social, and cultural sciences needed to address resource issues and interdisciplinary problem-solving at multiple scales and in an ecosystem context at the local, regional, and national level; and
- Place special emphasis on the working collaboration among federal agencies and universities and their related partner institutions.

This unique partnership of academic and federal agencies along with interested cooperators, brings together the expertise and experience needed to effectively address the critical concerns and issues that are confronting today's land managers. The academic partners of the GB-CESU coalition have a wealth of scientific and technical talent to address high priority research, educational and management issues in the Great Basin, including over 500 faculty in the natural resource and environmental sciences. The diversity of disciplinary strengths currently involved in programs and projects within the Great Basin include the full spectrum of biological, economic, physical and social sciences. The broad array of research libraries, laboratories and museums are offered by the partners and cooperators as resources for the GB-CESU. In addition, the partners have a major network of field experiment stations, many of which are operated in cooperation with the proposed partner federal agencies. Many of the academic partners are currently involved in multi-institutional and multidisciplinary projects with each other, and all have cooperative projects with federal partners at this time. The diversity of research and education capabilities of the academic partners in combination with the research and management knowledge of the federal partners provides unique opportunities for increased cooperation and coordination to address the highest priority issues and needs within the Great Basin.

## Geographic Area Encompassed

The Great Basin ecosystem encompasses most of Nevada, the western half of Utah, the southern third of Idaho, the southeast corner of Oregon, and a narrow strip of northeastern California. Over 60% of the land in the Great Basin is in the public domain, with public lands constituting 87% in Nevada. The Great Basin ecosystem is, as its name implies, a huge biogeographic ecoregion in the heart of the western United States, bordered on the west by the Sierra Nevada, on the east by the Wasatch front of the Rocky Mountains, on the north by the Snake River and on the south by the Mojave Desert. The Great Basin is approximately 900 miles long from north to south at its longest point and 570 miles wide from east to west, exceeding the land area of the entire northeast region of the United States. The basin can be generally characterized as a series of north to south trending mountain ranges, semi-arid foothills and arid valley rangelands, riparian wetlands and desert playas. The Great Basin has a scarcity of precious natural resources such as water, yet has an abundance of minerals such as gold and tremendous untapped geothermal resources. For example, Nevada produces enough gold to rank third among nations of the world in gold production. The population of the Great Basin is largely concentrated in urban areas, with the rural areas among the most sparsely populated in the United States.

The Great Basin ecosystem plant communities are home to more than 200 bird, 70 mammal, and 20 amphibian and reptile species. The Great Basin is also home to many sensitive, threatened and endangered plant and animal species, many of which are found nowhere else. Today the unique character of the Great Basin is at risk of being altered forever. Its vast landscape, once known for habitats rich in plant and wildlife diversity that supported a way of life unique to the history of the west, is facing potentially devastating and permanent change.

## Trends

- Noxious weed invasions are increasing by at least 14% annually.
- Populations of species heavily dependent on sage brush/grassland habitat such as mule deer, pronghorn antelope, Morning dove, columbine sharp-tailed grouse, sage grouse, mountain quail, ring-necked pheasant are currently declining and additional species, now at stable numbers, are expected to decline in the future.
- Throughout the West, weed infestations are reducing grazing capacity for both cattle and wildlife from 35 to 90%.
- The increase in density of vegetation including finer fuels such as cheat grass has disrupted the natural occurrences of fire increasing its frequency, expanding its range, and supporting a vicious cycle of invasive plant establishment. Unless this cycle is reversed there will continue to be:
  1. Loss of native plant communities.
  2. Increased instability of watersheds and soils.
  3. Loss of forage for wild horses.
  4. Loss of wildlife habitat.
  5. Reduced livestock grazing.
  6. Fewer recreation opportunities.
  7. More dangerous and costly suppression of wildfire.
- The growth and urbanization of the Great Basin's human population continues to be among the most rapid in the nation. Coupled with one of the country's highest per capita incomes, this growth increases the pressure on recreation and cultural resources, and adds considerable complexity to decision-making and political processes.
- The use of biotechnology to improve animal and human health; increase the production, safety and nutrition of our food supply; improve the management of our natural resources; control pests; and assist in the solution of complex environmental problems is increasing at an accelerated rate.

## **Identification of Partners and Cooperators**

### **Description of the Partnership**

The GB-CESU is composed of eleven academic and four federal agency partners plus ten cooperating organizations that have a significant stake in Great Basin management directions and future outcomes. As Host University, the University of Nevada, Reno provides all required administrative services and coordinating activities for the GB-CESU and serves as coordinator of biological, ecological, environmental, economic and social programs. Utah State University, as Senior Partner, provides leadership and coordination to the critical areas of RS/GIS, and information resource management and networking services. The organizational structure recognizes that, depending on the issue or problem area, any individual partner may provide project leadership based on their expertise and resources. Also recognized are the strengths, skills, and needs of the cooperators, and their potential contributions to programs as well as the potential for cooperation and assistance of the partners to their projects addressing the high priority needs of the Great Basin.

### **Identification of Participants**

#### **Academic Partners**

1. University of Nevada, Reno (Host Institution)
2. Utah State University (Senior Partner)
3. Desert Research Institute
4. D-Q University
5. Great Basin College
6. Haskell Indian Nations University
7. Idaho State University
8. Oregon State University
9. University of Nevada, Las Vegas
10. University of Utah
11. White Mountain Research Station

#### **Federal Agency Partners**

1. Bureau of Land Management
2. U.S. Geological Survey – Biological Resources Division
3. National Park Service
4. U.S. Forest Service

#### **Cooperators**

1. The Rocky Mountain Elk Foundation
2. The Nature Conservancy
3. Pyramid Lake Paiute Tribe
4. Walker Lake Paiute Tribe
5. Fallon Paiute-Shoshone Tribe
6. Nevada Department of Conservation and Natural Resources
7. Community College of Southern Nevada
8. Stanford University's Center for Conservation Biology

## Current Programs and Projects

**CESU PROJECT TABLE \***

	Project Title/ Author/Institution	Funding Source	Start/End Date	Project Type	Field
1	Traditional Use Study, Lassen Volcanic National Park Douglas Deur University of Nevada – Reno	NPS	9/28/01 - 9/30/02	Research	Cultural
2	Bell Rapids Documentation, Hagerman Fossil Beds National Monument Douglas Deur University of Nevada – Reno	NPS	9/28/01 – 12/1/02	Research	Cultural
3	Great Basin Cooperative Ecosystem Studies Unit David Thawley University of Nevada – Reno (Host)* Utah State University (Senior Partner) Desert Research Institute D-Q University Great Basin College Haskell Indian Nations University Idaho State University Oregon State University University of Nevada, Las Vegas University of Utah White Mountain Research Station	USDA Forest Service	10/1/01 – 9/30/02	Research/ Technical Assistance/ Education	Interdisciplinary
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6	Great Basin Cooperative Ecosystem Studies Unit David Thawley University of Nevada – Reno (Host)* Utah State University (Senior Partner) Desert Research Institute D-Q University	BLM	10/1/01 – 9/30/02	Research/ Technical Assistance/ Education	Interdisciplinary

	Great Basin College Haskell Indian Nations University Idaho State University Oregon State University University of Nevada, Las Vegas University of Utah White Mountain Research Station				
7	Administrative History of Mojave National Preserve Craig Palmer Mojave NP & University of Nevada, Las Vegas*	NPS		Research/ Technical Assistance	Social/ Cultural/ Historic
8	Conduct Survey of Threatened Desert Bighorn Population Kathy Longshore, USGS-BRD	NPS CESU USGS- NRPP		Research	Wildlife Biology And Conservation

\* @ March 31, 2002

## **Mission Statement**

The Great Basin Ecosystem Study Unit is a partnership for research, technical assistance and education to enhance understanding and management of natural and cultural resources within the Great Basin.

## **Critical Needs and Program Emphasis**

The growing concern regarding ecosystem health in the Great Basin has been clearly outlined by the Bureau of Land Management in two publications - "Out of Ashes, An Opportunity" in November, 1999, and "The Great Basin: Healing The Land" in April, 2000. The Great Basin Restoration Initiative, proposed and defined in these publications documents the diversity of problems and issues confronting the Great Basin ecosystem. Restoration of ecosystem health, revitalization and stability of rural economies, and enhancing our understanding and appreciation of historic cultural resources pose major challenges which must be addressed by the land management agencies.

Encompassing all these specific concerns are three overarching, transcendent themes that form the root causes of virtually all contemporary concerns and issues. They are:

1. The rapid loss of ecosystems and associated plant and animal species across the region for many and varied reasons resulting in many and varied ramifications.
2. The inability of users, managers, and the general public to agree on what the changes are, or what they represent, let alone the ability to agree on prudent courses of action or solutions to the resulting problems.
3. The contrast between the scales of time and space at which Great Basin Ecosystems actually operate, versus the much more limited scales of time and space at which most people view them, utilize them and have attempted to manage them.

The ecological health and resiliency of many important components of the Great Basin are clearly in jeopardy. One could list numerous concerns and issues, and any one of these might be the highest priority to a particular individual or group. There is general consensus that the following are the very high priority areas of concern to all partners and cooperators in the GBCESU.

### **Research**

#### **Fire Ecology and Post-Fire Rehabilitation**

Wildfires were historically a natural process for maintaining ecosystem health, but fire suppression and timber harvest policies and the introduction of cheatgrass and other non-native species have significantly altered ecosystem response to wildfires. Encroachment of urban development at the wildlands interface has seriously increased wildfire risks to human safety and private property. Vegetation management strategies such as selective timber harvest, prescribed fire, controlled grazing and green strip planting need further evaluation and implementation where appropriate. Scientists and land managers accept the inevitability of cheatgrass as a permanent part of the Great Basin landscape; however, methods for controlling the spread of cheatgrass dominance of rangelands must be developed and, where feasible, native plant communities restored. Restoration of rangelands devastated by wildfire must at the present time be considered "a great experiment". There is inadequate understanding of management strategies for ecosystem protection, prevention of nonnative

plant species dominance, restoration of critical wildlife and other species habitat, or appropriate revegetation and restoration techniques. More specifically long-term research projects need to be initiated over the next three years that:

- Develop pre-fire management strategies to restore natural fire processes.
- Improve containment and control of fire.
- Ensure the safe and effective utilization of prescribed burning.
- Increase post-fire plant diversity.
- Effectively restore post-fire re-establishment of native plant species in low precipitation ecozones.
- Improve the protection of important cultural resources from fire damage such as rock art and other artifacts.

### Inventory Ecosystem Conditions, Collect Baseline Data, and Establish Monitoring Systems

Multiple uses of public lands in harmony with ecosystem protection and restoration is current public policy. Current, and often conflicting, uses include mining, livestock grazing, limited timber harvest, military training, wildlife and wild horse habitat, wilderness and species protection, and a myriad of recreational uses. Although the public generally supports the above uses of range resources, specific uses are highly objectionable to certain individuals and interest groups. Much of the controversy over public land management is closely related to one or more of the above multiple uses. The scientific and land management communities must take a more proactive role in providing the appropriate science and knowledge for public decisions on appropriate natural resource uses. Providing reliable, factual information regarding ecosystem condition, trends, and the impacts of various management strategies will require the large-scale application of assessment and inventory tools with long-term possibilities for longitudinal comparisons. Meeting this need will require near term initiation of long-term studies that will:

- Complete a Great Basin wide inventory of current ecosystems and habitat conditions including the impacts of land use changes.
- Identify, monitor, and preserve healthy ecosystems, including reference sites with temporal variation.
- Implement a monitoring system and a research strategy to more broadly and intensively utilize the database created.
- More effectively utilize GIS and remote sensing methodologies to address inventory and monitoring needs.
- Establish monitoring technologies to more accurately assess the impact of global changes on ecosystem dynamics.
- Inventory and document the location of important cultural resources.

### Assess the Impact of Invasive Plant Species on Native Plant Populations and Ecosystem Processes

Scientists, land managers and other interests agree that the most serious threat to ecosystem health in the Great Basin is the invasion of non-native plant species. The BLM estimates that over 25 million acres of the Great Basin are now approaching annual grass dominance, with cheatgrass and medusahead as the dominant non-native species. These species aggressively compete with native perennials following wildfire, and then alter the wildfire cycle after achieving dominance, making it virtually impossible for native shrubs and grasses to recover. The Nevada Weed Association has identified over 30 invasive weed species in Nevada alone that are viewed as serious threats to the

rangeland and riparian ecosystems. Tall whitetop is aggressively spreading in riparian and other areas. Tamarisk, or salt cedar, is increasing throughout Great Basin riparian ecosystems and, if not controlled, may become one of the dominant water consumers in the region. Leafy spurge, widespread in the northern states, has been introduced in the northern regions of the Great Basin. Invasive species are so widespread that near term research results are urgently needed to:

- Contain and Control noxious weeds.
- Improve the post-control restoration of native species.
- Protect and preserve valuable cultural resources from deleterious effects of control procedures.

### Increase Our Understanding of the Basic Causes for the Decline in Populations of Threatened Species and the Potential for Restoration

The conservation of biological diversity, species of plants and animals, and the genetic information they contain is a major concern in the Great Basin. Its location and physiography has resulted in the evolution of many species and subspecies of plants and animals that are unique, and many of these species are or may be threatened with extinction. For example, in Nevada between 140 and 160 species and subspecies are listed under the U.S. Endangered Species Act as threatened or endangered, are candidates for listing, or have been proposed for listing. Recently, once-common species that are dependent on sagebrush ecosystems such as the Sage Grouse, the pygmy rabbit, and several species of songbirds also have declined precipitously and may be petitioned for listing as well. Thus, one of the major challenges for land management in Nevada is to conserve the state's unique biological heritage while providing for economic growth and other immediate human needs. The GB-CESU offers the mechanism to integrate first-rate science, meaningful public input, and significant interagency cooperation to effectively address this critical issue. More specifically, near-term initiation of long-term research is necessary to:

- Better understand the environmental conditions necessary for the successful restoration of threatened species.
- Develop management procedures to alleviate pressures on threatened populations.
- Evaluate the costs, benefits, and impacts on local economies when threatened species are identified and procedures are implemented to provide protection or restoration.

### Protect and Preserve Human and Cultural Resources

Concurrent with the threats to ecosystem health and survival are threats to the survival of human and cultural heritage, both past cultures and present rural and tribal lifeways. Urban expansion and uncontrolled outdoor recreation threaten archaeological resources that document past lifeways, as well as traditional and sacred properties of Native Americans. The Great Basin is rich in cultural history and tradition, and recent survey results indicate strong urban support for protecting valuable human and cultural resources. Urban respondents to the survey strongly supported the protection and enhancement of rural communities and families, viewed them as the primary managers of their public lands, and insist that all stakeholders be involved in the public land decision-making process - particularly those most affected. Economic decision-making models are needed at the enterprise, community and ecosystem level that identify both economic opportunities and impacts of public land decisions. Models that can anticipate future scenarios and inform decision makers of the consequences of alternative decisions are also needed. Critical, short-term research results are needed to:

- Develop and utilize more effective needs assessment approaches to identify the highest priority tribal needs while maintaining sensitivity to cultural, social, and historic land use practices.

## Water, Soil and Related Issues

The Great Basin is an arid region with extremely limited water supplies. Water resources coming into the Great Basin originate from watersheds mostly on public lands. Water is vital to the health of the Basin's unique ecosystem and the economic viability of its communities. Efficient use of the Basin's scarce water supplies while protecting water quality will be critical to meeting the future water demands of the region. Competition for water resources has intensified as water demands continue to increase for non-traditional uses such as water quality improvement, protection of endangered and threatened species, maintenance of stream riparian zones and wetlands and water-based recreational activities. Continued conflicts can be expected as new mechanisms evolve for water reallocation and transfers from one use to another. Water conservation, augmentation of water supplies, better management and operation of reservoirs, and conjunctive use of surface and groundwater offer some alternatives to cope with emerging new water demands. Compliance with the Clean Water Act, Federal reserved water rights, Tribal water rights, clean up of superfund sites, and mine de-watering are other important issues facing the Great Basin. Near-term initiation of long-term research is needed to:

- Better understand surface and ground water resources including flow delineation, recharge rates, water quality, water recycling and water reclamation methodologies.
- Delineate the impacts resulting from the reallocation of water and changes related to water rights.
- Better understand soil nutrient dynamics, microbial activity and landform processes related to the functioning of watersheds.
- Gain insight into the historic and cultural view of water and the traditions that surround its use.

## **Education and Outreach**

### Education

Agency partners have indicated a growing concern over their ability to identify and recruit qualified personnel for the future. The GB-CESU academic partners propose to initiate immediate discussions with our federal partners to (1) clearly identify their human resource needs, (2) make certain that our academic programs will provide qualified students for employment, and (3) provide direct training and recruitment opportunities through undergraduate student internships and graduate research training in projects that directly relate to priority needs of the agencies.

Additional high priority areas identified for increased attention are:

1. A comprehensive review of current curricula in natural and cultural resource management with emphasis and inputs from employers on relevance to needs and attractiveness to students.
  - Incorporate courses and programs that meet agency needs in terms of critical thinking skills and conflict resolution.
  - Establish a system of regular curriculum review by agencies.
  - Establish a system of systematic review of requirements for federal employment (X-118).
  - In addition to internships, develop innovative work experiences that meet federal employment requirements.

2. Increase the offering of continuing education courses for credit and certification programs for agency personnel and others.
  - Develop course series, certification programs, and other less formal approaches to disseminate the wealth of current knowledge as well as new knowledge resulting from research results.
  - Increase the utilization of distance education techniques to more effectively reach remote audiences and increase general dissemination of information and knowledge.
3. Increase the enrollment of undergraduates in natural resource and other relevant programs to meet future agency personnel needs.
  - Increase the attention given to recruiting representatives of minority populations.
  - Increase the exposure of K – 12 students to career opportunities in fields related to agency personnel needs.
  - Enhance the attractiveness of curriculum offerings.
4. Increase the number and diversity of internships available to students.
  - Increase the number of interns representing minority populations.
  - Combine for-credit work/learning experiences with work/task needs.
  - Expand the use of SCEP opportunities as recruiting tools.
5. Develop education programs in land use ethics.
  - For future educators in the K – 12 system.
  - For students in the K – 12 system.

### Outreach

Increasing public understanding and education regarding basic ecosystem processes and the impact of public policy decisions may improve our ability to gain consensus and support for science based management strategies. The need for a knowledgeable public has never been greater as agency professionals grapple with a growing assortment of environmental, ecological, social and cultural complexities that make the implementation of sound management decisions increasingly difficult. Priority areas for increased emphasis include:

1. Creating opportunities for university faculty and land managers to interact, communicate concerns and explore solutions to real problems.
2. Increase agency and university capabilities to more effectively meet Native American Tribal needs.
  - Assist in efforts to build Tribal capacity and preserve native cultures.
  - Assist Tribes in meeting their needs for resource and environmental protection.
3. Increase outreach education capabilities and opportunities:
  - For professionals in the media and public officials, including the judiciary.
  - For the general public regarding ecosystem health and the economic cost of not protecting ecosystems
  - By developing interactive traveling exhibits that include content on the value of healthy ecosystems, the role of fire, the changes that are underway, the GB-CESU, etc.
  - To inform private landowners about ecosystem health and help them design and implement appropriate/sound uses.
4. Involve stakeholders in planning processes and the development of education and outreach programs.
5. Develop information dissemination systems that ensure that small communities and tribes are included and receive needed and timely updates regarding career opportunities and agency assistance programs.

## Technical Assistance

One of the most serious challenges to implementing effective land management strategies is the lack of understanding of how best to achieve many of the agency partner's stated goals. The federal land management agencies and their personnel are very good at what they do, but in many situations the science and technology for implementing practices to achieve mandated outcomes are not well understood or documented. Therefore, technical assistance is needed in the following high priority areas:

1. Improve the dissemination and accessibility of technical information and data by:
  - Developing a fully integrated, freely accessible, multi-scale, geo-spatial database.
  - Establishing a clearinghouse for data, procedures, and other pertinent information related to the rehabilitation and restoration of Great Basin Ecosystems.
  - Complete a National, cooperative, level-3 soil survey across the Great Basin.
  - Produce maps of vegetation and species distribution with greater detail and finer resolution.
2. Develop a systematic procedure based on current knowledge and processes that will improve the land manager's ability to assess ecosystem health.
3. Establish procedures to systematically disseminate information about the GBCESU such as:
  - Databases
  - Personnel
  - Available expertise
  - Available laboratory facilities and equipment
  - Funding opportunities
  - Student internships and opportunities to assist in data collection
4. Develop training programs to assist agency personnel gain skills and implement:
  - Community-based monitoring programs
  - GIS analysis of spatial information
  - Bio-assessments of wetlands and riparian areas
  - Economic, environmental and cultural analysis
  - State and transition pathway models

## Strategies

### Programmatic Strategies

1. Develop at least one broadly defined, multidisciplinary, multi-institution, multi-agency research project that includes participation and contributions from all partners.
2. Conduct an assessment of agency needs and match research capability and interests to most effectively address the need.
3. Organize a review panel to forecast agency employment needs, describe performance expectations for new employees, assess current curriculum requirements and recommend changes to more effectively address projected needs and expectations.
4. Organize a team of agency professionals and university faculty to conduct a field visit to a site exhibiting one or more high priority problems.
5. Hold an annual conference focused on one high priority problem or issue of concern to agency partners.

6. Assess the needs of agency professionals for training and updating in advanced technology and conduct training sessions, short courses, extended educational offerings, and seminars to address the identified needs.
7. Identify the needs of local governments, tribes, and communities for educational programming and implement projects to address the identified high priority needs.

### **Administrative Strategies**

1. Develop databases to provide information regarding:

Administration such as:

- Current projects.
- Forms and procedures.
- Scientists and expertise.
- Current priorities.

Data banks such as:

- Available maps and specifications.
- Other data sources.

Available resources such as:

- Equipment and laboratory facilities.
- Funding opportunities.
- Student internships and employment opportunities.

2. Develop a web site to provide:

- Links to databases and the CESU network.
- General information and promotional material.
- Updates regarding activities, events, conferences, etc.

3. Develop procedures to ensure coordination, internal communications, project identification, accomplishment reporting, and record keeping.
4. Arrange for site visits by agency coordinators to partner universities on a routine and systematic basis to become familiar with university capabilities and secure ongoing support and cooperation from university officials.