

# GREAT BASIN: An Ecoregion-based Conservation Blueprint

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## EXECUTIVE SUMMARY



Three or four little puddles, an interminable string of crazy, warped, arid mountains with broad valleys swung between them; a few waterholes, a few springs, a few oasis towns and a few dry towns dependent for water on barrels and horsepower; a few little valleys where irrigation is possible and where the alfalfa looks incredibly green as you break down out of the pass... Its rivers run nowhere but into the ground; its lakes are probably salty or brackish; its rainfall is negligible and its scenery depressing to all but the few who have lived in it long enough to acquire a new set of values about scenery. Its snake population is large and its human population small. Its climate shows extremes of temperature that would tire out anything but a very strong thermometer. It is a dead land, though a very rich one.

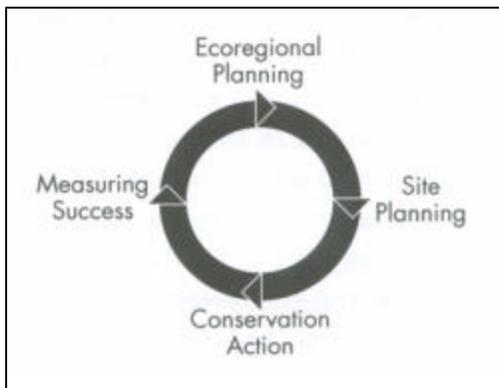
Wallace Stegner, *Mormon Country*, 1942

The  
Nature Conservancy®  
of Nevada

October 2001

## A CONSERVATION VISION

The mission of The Nature Conservancy is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. It has become clear that if The Nature Conservancy is to successfully achieve this mission, we must focus our work at larger scales than we or any other conservation entity ever has. This imperative to work at increasingly broader scales has led us to our current conservation approach which emphasizes communities and ecosystems, conservation at multiple scales and all levels of biological organization, and biodiversity planning along ecoregional<sup>1</sup> rather than geopolitical lines.



Ecoregional-level planning is the first step of a four-part conservation approach. The primary goal at this initial stage is to identify important conservation areas and networks of conservation areas that would protect the diversity of species, communities, and ecological systems that are representative of and unique to each ecoregion in the least area possible. The principal product, a “portfolio” of conservation sites, broadly

identifies areas of conservation importance that will serve as the blueprint for where The Nature Conservancy will focus conservation actions in the coming years. To be sure, ecoregional plans will identify more potential conservation sites than The Nature Conservancy will be capable of conserving on its own. Conservation partners, public and private, are crucial to the quality and success of ecoregion-based conservation efforts.

This is nowhere more true than in predominantly publicly-owned ecoregions, such as the Great Basin. In the spring of 1999, The Nature Conservancy of Nevada (TNC NV) initiated the Great Basin ecoregion planning process, the first comprehensive planning effort that has been made for the Great Basin. The resulting plan identified 358 potential conservation areas encompassing almost 28.5 million acres as important areas of biodiversity. More than 78% of the Great Basin

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<sup>1</sup> Ecoregions are relatively large geographic areas of land and water delineated by climate, vegetation, geology, and other ecological and environmental patterns. See The Nature Conservancy, *Conservation by Design: A Framework for Mission Success* (Arlington: The Nature Conservancy, 2000, 2<sup>nd</sup> ed.).

is managed by federal partners, the largest among them being the Bureau of Land Management (BLM), U.S. Forest Service (USFS), the Department of Defense (DOD), and U.S. Fish and Wildlife Service. Collaborative efforts across administrative boundaries are imperative to accomplish the overarching goal of efficient biodiversity conservation in the Great Basin.

## **THE GREAT BASIN**

The Great Basin encompasses more than 72 million acres of semidesert from the east slope of the Sierra Nevada across much of Nevada to the Wasatch Mountains of the western Rocky Mountains in central Utah. It would be simplifying matters too much to merely imagine the region as the gigantic bowl its name conjures up. Between the outer mountain boundaries lie more than 300 mountain ranges interspersed among long, broad valleys, a landscape that has once been likened to an army of caterpillars crawling northward out of Mexico.<sup>2</sup>

The ecoregion is characterized by salt desert scrub and sagebrush shrublands in the valleys and the lower slopes, and by pinyon-juniper woodlands, mountain sagebrush, open conifer forests, and alpine areas in the mountain ranges. Upon closer inspection, these larger ecological systems reveal important aquatic, riparian, wetland, badland, and dune habitats nestled within. Isolated mountain tops, isolated aquatic habitats in valley bottoms, and unusual badlands and sand dunes highlight the Great Basin's unique biological diversity: more than 280 plants and animals are considered endemic (occurring nowhere else) to this cold desert ecoregion.

## **DRAWING THE BLUEPRINT**

The myriad of ecological systems and habitats combined with the high degree of endemism present in the Great Basin posed daunting challenges to selecting a set of conservation targets<sup>3</sup> at multiple spatial scales and levels of biological organization to best represent the range of biological diversity within the ecoregion. With the assistance of biological experts, the Great Basin planning team chose 675 plants, animals, ecological systems, aquatic habitats and rare

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<sup>2</sup> Captain Clarence E. Dutton in P.B. King, [The Evolution of North America](#) (Princeton: Princeton University Press, 1977).

<sup>3</sup> A set of plants, animals, natural communities, and ecosystems, which we refer to as "conservation targets" was selected to guide the planning process and, in turn, to identify the conservation sites that harbor regionally and globally significant biodiversity. For a list of all Great Basin conservation targets, please see [Great Basin: an Ecoregion-based Conservation Blueprint, v.2001a](#).

terrestrial communities, which ultimately drove the selection of conservation areas for protection. In addition to 29 terrestrial ecological systems, 36 imperiled terrestrial communities, and 32 aquatic ecological systems, the list captures all imperiled species, all federally listed threatened and endangered species and a representative subset of species of special concern (including disjunct species, wide-ranging species with migratory concentrations, and declining species).

The Great Basin planning team<sup>4</sup> gathered information on the status and distribution of the conservation targets and started off with an initial database of nearly 2800 viable occurrences of species and terrestrial communities derived from the California Natural Diversity Database, Nevada Natural Heritage Program and Utah Natural Heritage Program. It became immediately clear, however, that there remained significant gaps in specific biodiversity data for the Great Basin ecoregion. Almost no information was available for aquatic communities. Vegetation coverages from the state Gap analysis projects (GAP) missed many of the small patch and linear communities. Information estimating occurrence viability for species, natural communities, and ecological system targets was sparse. To fill these data holes, the planning team traveled throughout the ecoregion and met with over 170 biologists, land managers, academics, and other experts with knowledge about the abundance and distributions of conservation targets, their viability, the state of important ecological processes at these locations, and threats to both site processes and the targets themselves. Altogether, these interviews helped to nearly double the number of viable occurrences of conservation targets and to identify a total of 660 potential sites for conservation attention. The team also used ecological models of vegetation and physical gradients to map the distribution and diversity of ecological systems throughout the Great Basin.

Next, conservation goals were established for each conservation target based on its global distribution, rarity, and vulnerability. The team sought to capture within the blueprint all known viable<sup>5</sup> and feasibly restorable occurrences of imperiled species, imperiled plant communities, and all aquatic species targets. Less imperiled species had less robust goals based on their

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<sup>4</sup> Members of the Great Basin planning team included many participants at various stages of this effort. They are listed at the end of this summary.

<sup>5</sup> For our purposes, viable species or populations are defined as having high probability of continued existence in a state that maintains its vigor and potential for evolutionary adaptation over a specified time period (we assume 95% certainty of surviving 100 years or 10 generations).

geographic distributions, while representative ecological systems had goals based on size, condition, and landscape context criteria that would most likely result in the long term viability of that system within the ecoregion. The planning team used the six subsections of the Great Basin to geographically stratify known occurrences in an effort to capture variation at multiple scales.

To handle the enormous amount of biological data collected for the ecoregional planning effort, the Great Basin team chose to use a computerized portfolio selection program specifically designed for The Nature Conservancy to design and compare portfolios of conservation sites. This tool enabled the planning team to evaluate each potential conservation site relative to the conservation targets within it and surrounding it, and then to amass the most efficient suite of sites that captured the greatest number of conservation targets not only in the least area possible but within the most ecologically intact and unfragmented areas. The initial portfolio of conservation areas was evaluated by the planning team and adjustments, where necessary, were made. The resulting 358 conservation sites (figure 1) cover about 40% of the ecoregion and capture three quarters of the sites originally identified by the biological experts that the team had interviewed.

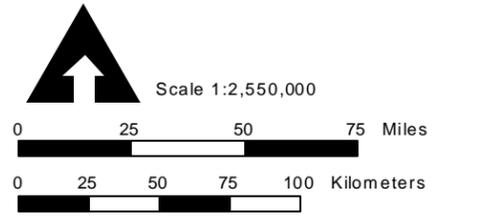
**The Great Basin portfolio of 358 conservation sites encompasses about 28.4 million acres of lands and waters. If appropriately managed and protected, these sites will make tangible progress toward conserving the Great Basin's biodiversity.**

About eleven percent of the portfolio already lies in well-protected lands, although this includes wilderness study areas that have not yet received congressional decision regarding their long-term status. About 57% of the sites are on lands managed by public agencies, typically for multiple use purposes, and the remaining 32% have no guaranteed management protection.

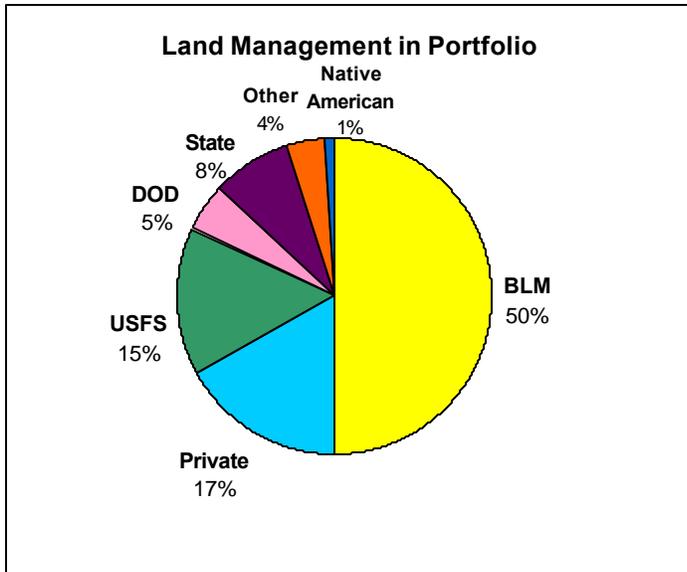


Figure 1.  
Great Basin ecoregion portfolio sites

- Portfolio sites
- Great Basin ecoregion boundary
- Roads and highways
- County lines
- States
- Rivers and streams
- Water bodies



Map Created: June 04, 2001  
Modification and revision of portfolio site data and boundaries are ongoing.



*The BLM oversees management for 50% of the lands selected for conservation attention, the USFS for 15%, the state for 8% and DOD for 5%. Approximately 17% of the lands are in private ownership.<sup>6</sup>*

## SELECTING PRIORITY SITES FOR ACTION

Ninety-four portfolio sites were identified as functional landscape scale sites and the remaining 264 as functional sites. Functional landscape sites are larger, have more habitat, have more habitat diversity, and larger populations of known and unknown species. They also have a high degree of ecological intactness, and have most or all of their key components, patterns and processes (or they can be feasibly restored). In contrast, portfolio sites categorized as functional sites typically are smaller, with fewer conservation targets at one or two geographic scales and include fewer ecological system groups.

It is easy to see that even if The Nature Conservancy were to initially focus on just the larger functional conservation sites, there would still be more work to be done than any one group could accomplish on its own. Thus, one of the final steps in the ecoregional planning process was to set site-based priorities. A strategy team comprised of protection and science staff convened to rank the landscape sites according to their conservation value, complementarity, threats, feasibility, and leveraging opportunities. The following are guidelines used to evaluate each of these factors.

<sup>6</sup> Please see [Great Basin: an Ecoregion-based Conservation Blueprint, v.2001a](#) for details on the sites, protection status of the lands within the sites, and conservation targets that can be found within those sites.

- ❖ **Conservation value** refers to the number, scale, and diversity, as well as to the health of targets at each of the potential conservation areas. Priority was given to sites with targets at multiple spatial scales, both terrestrial and aquatic targets, and more targets present. Priority also was given to sites with higher biodiversity health based on size, condition, and landscape context criteria.
- ❖ **Complementarity** is the principle of selecting action sites that are most different from sites that are already conserved, thus they complement or add to existing conservation areas. An area is considered already conserved if its targets have high biodiversity health and low threat rankings. Priority was given to sites with targets under-represented in existing areas with conservation management.
- ❖ **Threat** is a measure of both urgency and degree of actions that may destroy or significantly degrade targets. A cursory threats assessment using information compiled during expert interviews was done. Priority was given to sites with greater severity and immediacy of threats.
- ❖ **Feasibility** refers to staff capacity of TNC and partners to abate threats, the probability of success, and the financial costs of implementing needed actions. Priority was given to sites where conservation was considered attainable by these measures.
- ❖ **Leverage** is the ability to affect conservation at other sites by undertaking conservation action at one site. Priority was given to sites where higher leverage opportunities are thought to exist.

Based on the team's preliminary assessment, 20 top priority action sites have been identified from the Great Basin portfolio. These sites are Beaver Dam Wash/Bull Valley Mountains, Blue Lakes-Badlands, Canyon Mountains, Carson Range Front, Carson River, Carson Sink, Deep Creek Range, Great Salt Lake, Little Sahara Sand Dunes, Long Valley, Meadow Valley, Mono Lake, Pine Valley Mountains, Pyramid Lake-Lower Truckee River, Rainbow Canyon, Ruby Mountains, Ruby Valley, Tunnel Spring Mountains, Utah Lake and White River Valley.

## **USING THE BLUEPRINT**

The Great Basin ecoregion blueprint is a guide for directing conservation work; it does not itself outline specific strategies for action. Threats to conservation targets and the important ecological processes needed to sustain those targets and the strategies needed to abate those threats will need to be more rigorously elucidated in site conservation planning stages. The Great Basin blueprint and other ecoregion plans serve to identify important areas of biodiversity, to establish a baseline picture from which to measure mission success, to identify common threats and strategies that cross over multiple sites, to identify important potential partners and stakeholders

for future collaborative conservation work, to roughly estimate the level of conservation effort required to protect the biodiversity present in that ecoregion and, importantly, to prioritize where we engage in conservation action first. As new information is forthcoming and circumstances change to alter the conservation value of different areas, so too will the blueprint for action change. The planning team will periodically revisit the ecoregional plan to incorporate new information on changing landscapes and to refocus our conservation work.

## **THE ROAD AHEAD:**

### **SITE CONSERVATION PLANNING AND TAKING CONSERVATION ACTION**

To truly conserve the Great Basin's portfolio of sites identified through the ecoregional planning process, we will need to make strategic decisions about appropriate conservation actions, first at priority sites and then at all the remaining sites. We will achieve mission success only by protecting all sites in the portfolio, since they collectively capture both the uniqueness and representativeness of the Great Basin ecoregion. The site conservation planning process is a relatively simple, straightforward and proven procedure for developing conservation strategies and measuring the effects of those strategies. In fact, The Nature Conservancy has been engaged in site conservation planning and taking conservation action at several Great Basin priority sites for some time now through our community-based landscape scale projects. Those sites include Truckee River/Pyramid Lake, Carson River, Muddy River/Meadow Valley, and Oasis Valley/Amargosa River in Nevada, and Great Salt Lake in Utah. We will initiate additional community-based landscape scale projects at additional priority action sites over the next few years and we will aggressively work to implement the land protection, threat reduction, stewardship, and research strategies outlined in site conservation plans.

Additionally, the Conservancy will work to build stronger partnerships with key public agencies and private entities at sites that largely encompass public lands as well as at our community-based project sites. The priority public land sites are sites where other public and private conservation entities are already working to protect Great Basin areas through ongoing and improving ecological management practices. The Conservancy will dedicate staff to more fully engage public agency partners at multiple areas. As with the community-based projects, conservation plans for public lands sites also will be developed to identify and implement on-the-ground conservation strategies to abate critical threats and enhance biodiversity health.

The Great Basin blueprint sets forth an ambitious agenda for 358 conservation areas encompassing more than 28 million acres of lands and waters. Over the coming years, The Nature Conservancy will boldly work to protect these critical habitats that collectively capture the rich diversity of the Great Basin’s plants, animals, and ecological communities.

## **ACKNOWLEDGEMENTS**

The Nature Conservancy is deeply indebted to many individuals, agencies, and academic institutions for collaboratively assisting us by providing data and guidance in the creation of the Great Basin blueprint. Although space prevents our listing each of the 172 individuals who contributed their time and knowledge, we greatly appreciate everyone’s effort.<sup>7</sup> We thank the following agencies and institutions, in particular, for their participation: Bureau of Land Management, U.S. Forest Service, U.S. Fish and Wildlife Service, Department of Defense, Nevada Division of Wildlife, Utah Division of Wildlife Resources, University of Nevada–Reno, Utah State University, California Natural Diversity Database, Nevada Natural Heritage Program, and Utah Conservation Data Center.

Funding for the Great Basin’s ecoregional planning effort was provided to TNC’s Nevada Field Office by the Department of Defense Legacy Resource Management Program, the President’s Office of The Nature Conservancy, and Patagonia, Inc.

The Great Basin ecoregion conservation planning teams consisted of TNC representatives from the three states and regional office, as well as members from other institutions. The core team included:

Graham Chisholm	TNC, California Field Office, formerly Nevada Field Office
Ted Floyd	Great Basin Bird Observatory
Teri Knight	TNC, Nevada Field Office
Craig Mayer	TNC, California Field Office
Jan Nachlinger	TNC, Nevada Field Office
Kei Sochi	TNC, Nevada Field Office

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<sup>7</sup> For a listing of all individuals, agencies, and institutions who contributed knowledge of the Great Basin’s biology and land management, please see [Great Basin: An Ecoregion-based Conservation Blueprint, v2001a](#).

Julie Steincamp	formerly University of Nevada, Reno/Biological Resources Research Center
Christine Tam	TNC, California Field Office
Joel Tuhy	TNC, Utah Field Office
John Walker	formerly University of Nevada, Reno/Biological Resources Research Center
Pam Weiant	formerly TNC, California Field Office
Nathan Welch	formerly TNC, Nevada Field Office

Additionally, at various stages of the planning process, the following individuals participated as part of special teams assisting with specific tasks:

Alyce Brandigan	University of Nevada, Reno
Pat Comer	TNC, Western Conservation Science Center
Robin Cox	TNC, California Field Office
Dan Dorfman	TNC, Western Conservation Science Center
Bob Elston	University of Nevada, Reno/Biological Resources Research Center
Kerry Green	TNC, Utah Field Office
Michael Heiner	TNC, Western Conservation Science Center
Jonathan Higgins	TNC, Freshwater Initiative
John Humke	Western Regional Office
Shannon Kimball	Independent
Gwen Kittel	TNC, Western Conservation Science Center
Mary Lammert	TNC, Freshwater Initiative
Cari Leversee	University of Nevada, Reno
Dave Livermore	TNC, Utah Field Office
Steve McCormick	Home Office, formerly California Field Office
Brian McMenemy	University of Nevada, Reno/Biological Resources Research Center
Jim Moore	TNC, Nevada Field Office
Jennifer Perot	TNC, Freshwater Initiative
Joel Peterson	TNC, Utah Field Office
Donald Sada	Desert Research Institute, formerly Independent
Rob Scanland	TNC, Nevada Field Office