

**Operations Plan
for the
Desert Landscape Conservation Cooperative**

2011

Introduction

The Desert Landscape Conservation Cooperative (LCC) is a self-directed, non-regulatory regional partnership formed and directed by resource management entities as well as interested public and private entities in the Mojave, Sonoran, and Chihuahuan Desert regions of the southwestern United States and northern Mexico. The Desert LCC, one of the 21 LCCs created pursuant to Secretarial Order 3289 to address the impacts of climate change on America's water, land and other natural and cultural resources, is focused on acquiring and sharing information to support the development of landscape level strategies for understanding and responding to climate change impacts and other large scale ecosystem stressors such as land use change, decrease in water availability, invasive species, and wildfire.

This Operations Plan describes the strategic direction of the Desert LCC. This is a visionary document and is designed to be fully implemented over the next 5 years. It will be reviewed annually and updated, as necessary, by consensus of the Steering Committee. This is one of three foundation documents for the Desert LCC. The Governance Document outlines the mission, goals, structure and decision making process, and the Annual Work Plan outlines specific tasks and funding for the ensuing year and metrics and timelines for monitoring the effectiveness of the Desert LCC.

Description of the Desert LCC

The Desert LCC encompasses the three major deserts of southwestern North America: the Mojave, Sonoran, and Chihuahuan Deserts. The LCC also includes isolated mountain ranges known as the "Sky Islands" or the Madrean Archipelago, as well as the New Mexico-Texas Highlands. Administratively, the Desert LCC encompasses all or parts of 27 American Indian reservations, Mexican aboriginal lands, parts of five states of the United States (California, Nevada, Arizona, New Mexico, and Texas) and all or parts of 10 states of the Republic of Mexico (Baja California, Sonora, Chihuahua, Sinaloa, Durango, Coahuila, Nuevo Leon, Zacatecas, Nayarit, and San Luis Potosí).

Elevations range from below sea level to over 11,000 ft., and the richness of the topography leads to a diverse array of ecosystems and equally diverse species composition. The area encompassed by the Desert LCC includes habitat for a variety of native plants, fish and wildlife species that use grasslands, shrublands, woodlands, riparian and wetland vegetation, and montane coniferous forests. The region has numerous endemic species and high concentrations of federally or state listed species as well as many species of economic and recreational interest.

Culturally, the Desert LCC is extremely varied and includes western, Hispanic, tribal, and indigenous cultures. Many cultural groups utilize native vegetation and wildlife resources to sustain long-established forms of livelihood and carry out traditional practices. The U.S. federal government has a unique trust responsibility to American Indians to protect tribal trust resources and maintain the integrity of reservations. Tribal connections to the landscape extend beyond reservation boundaries to encompass aboriginal lands used for various purposes since before European contact. Across all cultures, a unifying theme is the need for water to sustain human life and maintain activities of cultural and economic significance.

The major river systems shared by the U.S. and Mexico are the Lower Colorado and the Rio Grande. Other river systems of significance within the Desert LCC include the Mojave, Amargosa, Gila, San Pedro, Verde, Santa Cruz, Mayo, Cuchajaqui, Yaqui/Bavispe, Sonora, and Conchos Rivers. Water is extremely limited in the Desert LCC, so these river systems are highly valuable to both human and natural environments. In addition, all three deserts contain a variety of lakes, wetlands, isolated springs, cienegas, and oases that support high concentrations of wildlife, including numerous endemic species. The aquatic habitats within the three deserts support 179 native fish species, of which 54 are federally listed.

Desert LCC Goals

Support, facilitate, promote and add value to landscape scale conservation to build resource resilience in the face of climate change and other ecosystem stressors through the following:

- **Science Development and Delivery**
- **Collaboration and Communication**
- **Monitoring and Evaluation**
- **Outreach and Education**

1. Science Development and Delivery

Identify science needs of LCC partners related to climate change and ecosystem stressors at broad spatial scales, and facilitate the development, integration and application of scientific information (including decision support systems) that will inform resource management decisions.

2. Collaboration and Communication

Promote and facilitate collaboration and communication among conservation partnerships and entities to support and add value to their efforts to respond to climate change and other stressors and to integrate scientific information into resource management plans and conservation projects.

3. Monitoring and Evaluation

Provide expertise and opportunities to enhance and add value to climate change and other monitoring programs of various partners through such activities as coordinated data collection, data analysis and information management, and data dissemination, when such actions are mutually agreed to by the partners involved.

4. Outreach and Education

Provide information and application tools that educate and apprise resource managers and the public about the effects of climate change and ecosystem stressors.

Strategic Direction

Goal 1: Science Development and Delivery

Science development and delivery will be undertaken in collaboration with partners, including the Southwest Climate Science Center as well as research entities in both the U.S. and Mexico. Also, the Desert LCC will actively seek opportunities to incorporate traditional ecological knowledge.

The proposed approach for meeting the goal of providing science delivery to Desert LCC partners consists of the following strategic actions:

- 1) *Identify regional and LCC-wide science needs of the Desert LCC partners*
- 2) *Compile a broad scale inventory of existing information that can be used to meet science needs*
- 3) *Identify and/or develop new science products that will inform resource management needs*
- 4) *Identify and/or develop climate change vulnerability assessments for species and ecosystems*
- 5) *Identify and leverage the development of climate change adaptation strategies*
- 6) *Identify and leverage the development of decision support systems that would benefit partners*

Within each of these strategic actions, the Desert LCC Steering Committee will establish priorities that reflect current capacity and resources. The Steering Committee has overall responsibility for science delivery, but will delegate various aspects to the working groups. The Steering Committee may establish additional task teams to assist with specific technical details. The strategic actions of science delivery are discussed more fully under the subsections that follow.

Strategic action 1: Identify Broad Scale Science Needs of Desert LCC partners

In July, 2010, the Scoping Team for the Desert LCC established an interim science sub-committee to conduct a rapid assessment of Desert LCC science needs. Members of the sub-committee were scientists and managers from a variety of natural resource agencies and non-governmental organizations. The rapid assessment of science needs was based on three sources of information: 1) fifteen published or distributed reports and documents from natural resource agencies and partnership groups in the Southwest; 2) input from partners at five outreach meetings hosted by the Desert LCC Scoping Team; and 3) the “top 5” science needs of each of the sub-committee members. The sub-committee collated over 100 science needs and organized these into 10 topic areas. The list of science needs will be retained and added to a comprehensive science needs assessment in 2012.

In 2011, the Desert LCC Steering Committee established a permanent Science Working Group with membership selected to represent a broad range of science expertise. The

Science Working Group will conduct a more comprehensive science needs assessment that incorporates a broader range of resource topics and science needs. For example, the rapid assessment did not identify any science needs for cultural resources, and contained very few science needs related to human and economic impacts. The comprehensive assessment will provide the opportunity to correct this shortfall.

In addition to expanding the range of topics, the Science Working Group will evaluate the criteria developed by the interim science sub-committee for ranking the science needs, and determine whether modifications are needed. The rapid assessment provided an opportunity to test the effectiveness of the criteria.

Strategic Action 2: Compile a Broad Scale Spatial Inventory of Existing Conditions

Numerous agencies, tribes, and organizations within the Desert LCC have already collated data on the existing conditions of natural resources, socio-cultural resources, and ecosystem stressors. Some datasets are internal to a specific agency or organization and are not readily available to all partners of the Desert LCC. Other inventories are widely available but are specific to only a portion of the Desert LCC. For example, the Bureau of Reclamation compiles current reservoir data (water quality, water temperature, reservoir elevations, releases, inflows, evaporation, tec.) collected throughout the Colorado and Rio Grande river basins by multiple organizations (i.e. U.S. Geological Survey (USGS), Natural Resources Conservation Service (NRCS), Corps of Engineers, state water agencies and water districts) into its hydrologic database (HDB). Additionally, the Bureau of Land Management (BLM) is conducting rapid ecoregional assessments of the Mojave and Sonoran Ecoregions and The Nature Conservancy (TNC) has completed an ecoregional assessment of the Mojave Ecoregion. All of the data collected through these and other efforts are a resource to the LCC and could be models for future condition assessments. The Steering Committee, through the Science Working Group, will oversee the process of identifying and collating inventories of existing conditions both spatially and in databases, and will make them available to Desert LCC partners. Examples of inventories that could benefit partners include:

- Areas managed for natural resource benefits
- Lists of priority species and habitats identified by partners
- Cultural resources, especially those vulnerable to climate change
- Rivers and permanent streams
- Existing wildlife corridors
- Road systems
- Major vegetation types
- Major land ownerships
- Air quality information
- Barriers to wildlife movement

Based on the comprehensive science needs assessment, the Science Working Group will identify additional layers that could be useful to partners. These could include:

- Vegetation maps at finer resolution than what is currently available
- Distribution maps of priority species
- Soil types and erosion potential

- Ground water maps
- Land ownership
- Irrigation/well permits

Strategic Action 3: Identify and/or develop new science products that will inform resource management needs

To the extent possible, the Science Working Group will use information developed by existing partnerships or institutions to fill the identified science needs. The use of existing information will enhance data sharing across partnerships and will enable the Steering Committee to target new efforts on high priority products that have not yet been developed by any partnerships.

Any of the Desert LCC partners can choose to fund science needs. In FY11, the Bureau of Reclamation (Reclamation) committed funds to develop new science products through a Funding Opportunity Announcement.

Strategic Action 4: Identify and/or Develop Climate Vulnerability Assessments

A climate change vulnerability assessment identifies natural and cultural resources that are likely to be most affected by climate change and also identifies the reasons for vulnerability, including the interactions between climate and existing stressors.

To the extent possible, the Desert LCC should use existing climate vulnerability assessments developed by scientists and partner groups. For example, the North American Bird Conservation Initiative (NABCI) has already conducted a climate vulnerability assessment for all birds of the United States; the BLM is engaged in Rapid Ecological Assessments; and Reclamation is assessing climate impacts to water supplies across the west through the West-Wide Climate Risk Assessments; the USGS is conducting a similar assessment for the Colorado River. Traditional ecological knowledge may also play a key role in vulnerability assessments.

The Desert LCC has been granted national FWS funding, in the form of an existing cooperative agreement with NatureServe, to develop a vulnerability assessment of plant communities and ecosystems in the Mojave and Sonoran Deserts (U.S. and Mexico). The focus will be on protected areas within these two deserts, including national parks, wilderness areas, national wildlife refuges, state protected areas, and protected areas in Mexico. The Science Coordinator and an advisory team will work with NatureServe during the development of the vulnerability assessment, and the Science Working Group will provide input at various stages in the development.

Strategic Action 5: Identify and/or Develop Climate Change Adaptation Strategies

One of the purposes of LCCs is to identify science-based approaches for responding to broad scale ecological stressors, including climate change. By developing climate change adaptation strategies, the Desert LCC can provide partners with potential solutions that could be applied across multiple land ownerships.

Two of the ongoing projects mentioned above include the development of adaptation strategies. The national cooperative agreement with NatureServe includes development of adaptation strategies for climate-vulnerable plant communities and ecosystems in the Mojave and Sonoran Deserts of the U.S. and Mexico while the Colorado River Basin Study will address strategies to address the projected imbalance between water supply and projected demand. The Science Coordinator and an advisory team will provide input on the development of adaptation strategies that are relevant to resource managers within the Desert LCC.

Strategic Action 6: Identify or Develop Decision Support Systems

The Desert LCC plans to pull together the expertise of its various partners and leverage the development and dissemination of decision support systems to increase the conservation effectiveness of a wider range of resource managers and partnership groups, both within its boundaries and with other LCCs. Examples of decision support systems that will be needed by partners within the Desert LCC include:

- Climate adaptation strategies
- Management scenarios
- Climate-smart modifications to conservation approaches
- Identification of international wildlife corridors and crucial wildlife habitats

The development of several decision support systems is already underway. For example, the Western Governors' Association (WGA) has sponsored the Western Corridor Initiative which will provide a seamless Decision Support System for wildlife corridors and crucial wildlife habitats across 18 western states. As signatories to the June 2009 Memorandum of Understanding regarding coordination among federal agencies and states for this effort, the Department of Interior, Department of Energy, and Department of Agriculture recognize the importance of wildlife corridors and crucial habitats and have mutually agreed to assist the WGA in this effort and to work in coordination with the member states to create the state-based decision support systems.

As a second example, the Southern Arizona Buffelgrass Coordination Center is developing a decision support model for buffelgrass management to enable managers to make decisions on how to best allocate resources to prevent the spread of buffelgrass. This is a multi-agency project with the primary work conducted by the USGS.

The Climate Assessment for the Southwest (CLIMAS) program at the University of Arizona has developed a number of decision support systems, and currently has more under development. The Climate Information Delivery and Decision Support System (CLIDSS) will eventually provide access to a number of existing systems such as the Forecast Evaluation Tool and Arizona DroughtWatch, as well as several new systems.

The Science Working Group will identify the broad range of decision support systems that are currently available or under development and ensure that partners are aware of these systems through workshops, webinars, and Desert LCC documents. The USGS will likely be a key partner in development of decision support systems related to climate and species. Several USGS Science Centers within or adjacent to the Desert LCC have existing or draft

decision support systems that can inform management decisions regarding large river management, alternative energy development, invasive species management, and the recovery and conservation of both terrestrial and aquatic species.

Goal 2: Collaboration and Communication

Strategic Action 7: The Desert LCC will collaborate and provide a forum for communication among partners and existing partnerships.

One of the purposes of the Desert LCC is to facilitate collaboration and communication across partnerships to foster broad scale responses to climate change and ecosystem stressors. Partnerships within the Desert LCC have been established for many reasons, including water conservation and delivery, conservation of a specific geographic area, recovery or management of a particular species or a group of species, and protection of specific cultural resources. Each of these partnerships has expertise and data that is unique to the specific mission, but this information can potentially add to a broader understanding of how species, ecosystems, and cultural resources are likely to respond to changing climates and ecosystem stressors. The Desert LCC will recognize individual partner missions while identifying areas of mutual interest in the conservation of land, water, air, terrestrial and aquatic ecosystems, wildlife and habitats, and cultural resources. The LCC will collate information and make it available to all interested parties through a data portal. The Steering Committee may also choose to sponsor partnership workshops that are uniquely tailored for one or more of the three deserts and for the Colorado River.

Some of the regional partnerships may serve as the foundation for watershed and ecoregional subgroups to the LCC's Steering Committee, especially those that were established for the conservation of one of the deserts or a significant region within a desert, or for the Colorado River. These and other regional partnerships will bring value to the LCC, just as the LCC adds additional value to the existing partnerships.

Goal 3: Monitoring and Evaluation

Strategic Action 8: Incorporate current information from existing monitoring programs into Desert LCC plans and operations.

Many partners within the Desert LCC have programs for monitoring the status and change of selected indicators pertaining to their mission or management focus. In particular, the National Park Service I&M networks, the U.S. Fish and Wildlife Service (FWS) Refuge I&M networks, the National Weather Service River Forecast Centers, the NRCS SNOTEL network, the BLM Assessment, Inventory and Monitoring Strategy, the Long Term Ecological Research Network, the North American Bird Conservation Initiative, and the National Phenology Network, have expertise in sampling design and protocol development as well as a wealth of monitoring data. The combined expertise and monitoring results of these various programs could potentially provide a broad scale perspective of change across the Desert LCC in the context of climate change and other stressors. The Desert LCC provides a forum for partners to collaborate across monitoring programs when such collaboration is mutually desirable. Examples of monitoring information that could be useful to a broad suite of LCC partners include:

- Change in a variety of climate metrics
- Change in size, genetic diversity, or occupancy rates of populations of selected species
- Change in amount or quality of priority habitats,
- Change in the extent or rate of spread of selected invasive species
- Change in the discharge of springs
- Long-term impacts from renewable energy development

Goal 4: Outreach and Education

Strategic Action 9: Develop a suite of communication tools to educate resource managers and the public about the effects of climate change and adaptation strategies.

At the outreach meetings attended by Desert LCC partners during 2010, partners frequently expressed a need for communication tools to help educate both their natural resource managers as well as the public about climate change and adaptation strategies. The Desert LCC will enable partners to pool their efforts and expertise to develop communication tools that meet these needs. This collaboration will help reduce costs to individual partners while ensuring that the communication tools provide a consistent message to managers and the public. The Desert LCC will develop culturally-relevant tools to reach a diverse public, and will also offer some forms of communication in both English and Spanish.

The role of outreach and education requires substantial time commitments to be effective. Therefore, the Steering Committee may recommend establishing a permanently funded Outreach and Education Coordinator position.

Key Products

The Steering Committee will prioritize these strategic actions and will develop Annual Work Plans to guide the development of priority products. Implementation of each Annual Work Plan will require resources from a variety of LCC partners.

Possible products include:

- Lists of priority species, habitats, cultural resources, and water resources based on the climate vulnerability assessments and the priorities of Desert LCC partners
- A spatial database of the inventories listed under Science Delivery
- A communications plan
- A bi-lingual, public-accessible website
- An informational brochure on climate change effects in the LCC for the general public

Monitoring the Effectiveness of the Desert LCC

Each year the Desert LCC will develop an Annual Work Plan as described above. The Annual Work Plan, as approved by the Steering Committee, will provide a set of metrics and a method of monitoring the effectiveness of the Desert LCC. Monitoring outcomes will

guide future revisions of the Operations Plan and may also motivate the need for additional planning documents. Potential monitoring measures include:

- Science products provided
- New leveraging of cross-agency funds
- New collaborative initiatives
- Education materials: fact sheets, webinars, workshops

Funding Support

Reclamation and FWS will provide financial support to the Desert LCC by funding the following:

- LCC Coordinator and Science Coordinator
- Overhead for permanent positions (office, phones, etc.)
- Travel
- Science support
- GIS support

Reclamation and FWS, along with other partners, may choose to provide additional support for other positions and activities identified by the Steering Committee, such as an Outreach and Education Coordinator, a data portal, or educational materials.