Desert Landscape Conservation Cooperative

2012 Annual Report

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Desert LCC Coordinator & Science Coordinator

http://www.usbr.gov/dlcc/

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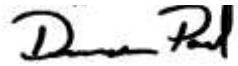
Letter from the Chair

This year has been a whirlwind of change and progress for the Desert Landscape Conservation Cooperative. We were joined by a new Coordinator Genevieve Johnson and a new Science Coordinator Aimee Roberson, both of whom have already made significant contributions to the identity and functions of this partnership. For the Desert Landscape Conservation Cooperative time is going by quickly but the partners and the staff have been very busy. You will read about many accomplishments and projects that are underway in this report.

I would like to turn your attention to what this LCC means to me. The naming of the LCC's is very important because it captures both the intent and the means to that end. We are a ***landscape-scale conservation*** focused entity that welcomes others with resources and overlapping missions together in a partnership to ***cooperatively*** build the capacity to accomplish science and on the ground ***conservation*** that would be beyond our individual organizations capacity. The concept of conservation through partnership is not new, it is has been demonstrated as an effective tool for over 20 years.

What make the LCC's unique is the emphasis on the larger issues that stress both human and wildlife populations. As climate changes, land managers and program administrators need to make informed decision that include impacts to river and stream flows, moisture availability for terrestrial wildlife habitat and agriculture, and the direct impacts of heat and drought. These climate based risks or stresses combine with invasive species and changing dynamics of land use practices to create an environment of significant uncertainty for planners, policy makers, program administrators and land managers. If we as a cooperative can begin to pool our resources and provide science based information that can be used to better understand the range of potential conditions, and specific consequences of change in our environments, that knowledge will lead to more robust planning for the long term viability of both human and wildlife resources. That, to me, seems like something we can all agree to work toward.

Sincerely,



Duane Pool, Desert LCC Chair

Rocky Mountain Bird Observatory

Background

Desert LCC Geography

The Desert LCC encompasses portions of Arizona, California, Nevada, New Mexico, and Texas, as well as a substantial portion of Northern Mexico. The area is topographically complex, including three different deserts (Chihuahuan, Mojave, and Sonoran), grasslands and valley bottoms, and isolated mountain ranges (also known as the "Sky Islands"). Elevations range from near sea level to over 10,000 ft. The richness of the topography leads to equally diverse species composition; the area supports habitat for many native plants, fish and wildlife species, including many endemic species that are extremely susceptible to climate change.

The Partnership

The Desert LCC partnership is directed through a Steering Committee currently comprised of 25 members representing diverse conservation and resource management interests. In October 2012, the Desert LCC changed leadership. Our out-going Steering Committee Chair, Larry Voyles, with Arizona Game and Fish Department, welcomed Duane Pool, of Rocky Mountain Bird Observatory as our new Chair. We also welcomed Armand Gonzales, with California Fish and Wildlife Department, as the Vice Chair.

The Desert LCC Steering Committee

Mission

Through collaborative partnerships provide scientific and technical support, coordination, and communication to resource managers and the broader Desert LCC community to address climate change and other landscape-scale ecosystem stressors.

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**
  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 tools) that will inform resource management decisions.

- **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.

- **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.

- **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.

Staff

The Desert LCC is one of two landscape conservation cooperatives that are jointly led by the Bureau of Reclamation and US Fish and Wildlife Service. The Desert LCC Coordinator, Genevieve Johnson, Bureau of Reclamation, began working with the Desert LCC in March 2012. The Desert LCC Science Coordinator, Christina Vojta retired in April 2012, having helped lead the Science Working Group for over a year. Mark Kaib (US Fish and Wildlife Service) and Carol Beardmore (US Fish and Wildlife Service - Sonoran Joint Venture) provided interim leadership on the Science Working Group as acting Science Coordinators. In October 2012, Aimee Roberson, US Fish and Wildlife, was hired as the Desert LCC Science Coordinator.

2012 Accomplishments

Science Development and Delivery

In 2012, with guidance from the Desert LCC Steering Committee, the Science Working Group developed a charter and completed a Comprehensive Science Needs Assessment for the partnership. In June 2012, the Steering Committee approved the Comprehensive Science Needs Assessment, which will help set priorities for funding of science needs beyond 2012.

Comprehensive Science Needs Assessment

Recommends 23 priority science needs for the Desert LCC

Provides strategic guidance for Desert LCC science investments

Incorporates existing technical documents and management plans of partners

Organized into database by topic area

The Science Working Group identified 553 science needs from 6 outreach meetings and workshops and 40 published technical documents and management plans related to resource assessments in the Desert LCC region. Members of the Science Working Group entered the 553 science needs into an online database that was created and maintained through our partnership with the Desert Managers Group. Each science need was assigned to one or more of the following topic areas identified by the Steering Committee: water, ecosystems, wildlife populations, wildlife habitat, soils, stressors, monitoring, cultural, and tools/communication. Each science need was also described from a list of approximately 40 sub-topics or keywords, such as connectivity, disease, human water, restoration, and vulnerability.

The Science Working Group recommended 23 priority science needs that fall into 4 categories: terrestrial, water, cultural, and monitoring. Desert LCC partners were then asked to identify current science projects or to identify opportunities for new science efforts that could fill the science needs. Over 60 projects were submitted from partners including the New Mexico State Engineers Office, Arizona Game and Fish Department, Bureau of Indian Affairs – Navajo Region, Desert Managers Group, Instituto Nacional de Ecologia, Native American Land Conservancy, Nevada Department of Wildlife, Northern Arizona University, QuadState Local Governments Authority, Sonoran Joint Venture, Texas Parks and Wildlife Department, US Forest Service Rocky Mountain Research Station, and US Fish and Wildlife Service.

After approving the Comprehensive Science Needs Assessment, the Steering Committee reviewed the projects list which was used to help direct funding for the Desert LCC. In 2012, the Bureau of Reclamation, through its WaterSMART Program, provided approximately $685,000 to states, universities, and nonprofit organizations on a 50/50 cost-share basis, for projects with a water nexus that met the priority science needs of the Desert LCC. Reclamation also provided approximately $200,000 in a new opportunity for federal partners to develop applied science

tools and information to meet Desert LCC science needs through interagency agreements with Reclamation (see Appendix A for more information on science awards).

In addition to Reclamation's competitive award process, the US Fish and Wildlife Service and US Geological Survey both provided approximately $130,000 to support scientific projects in the Desert LCC geography. These efforts leverage existing federal and non-federal dollars and will further advance science on Desert LCC priorities taken from the Comprehensive Science Needs Assessment and science strategy (see Appendix A for more information on science awards).

In 2012, the Desert LCC funded 14 projects totaling over $1.26 million and leveraging more than $1 million in additional federal and non-federal dollars. These projects directly benefit existing conservation partnerships, states, local communities, tribes, and international partners.

Linking Critical Management Questions to Science

The partnership is developing an approach to allow us to focus on a few management questions with broad relevance across the Desert LCC geography and amongst many conservation partners so we can strategically target our activities and resources to directly inform on-the-ground conservation linked to measurable outcomes. Thus, in December 2012, the Science Working Group identified six priority Critical Management Questions related to the priority science needs identified in the Comprehensive Science Needs Assessment that are of immediate relevance to conservation partnerships and programs. By identifying management questions of critical importance to resource managers, the Desert LCC is linking applied science directly to management needs. In 2013, these Critical Management Questions will be used to focus our efforts and help us to continue to define the Desert LCC's niche within the conservation community and to develop the relationships, annual processes and systems, and capacity to successfully fill it. Lessons learned from this effort will inform the development of an annual process for determining and selecting critical management questions to guide our annual work plans in 2014 and beyond.

Supporting our Partners

The Desert LCC maximizes effectiveness by developing and delivering science and decision support tools that directly inform conservation design and delivery and benefit people on the land.

Identifying critical management questions links applied science directly to immediate management needs.

The Big Bend Conservation Cooperative

The Desert LCC is working with the Big Bend Conservation Cooperative (, including the US Fish and Wildlife Service, National Park Service, US Geological Survey, and Texas Parks and Wildlife Department, plus numerous other partners from federal, state, non-profit, and private sectors in the US and Mexico to identify and support critical science that is directly applicable to conservation.

Photo credit: Tami A. Heilemann, DOI Office of Communications

In the face of severe drought and climate change, successful conservation in the southwestern US requires cooperation that transcends jurisdictional and resource boundaries. The Desert LCC is actively pursuing partnerships with the Big Bend Conservation Cooperative and its international partners to support science that enhances conservation of wildlife and other natural resources in the Big Bend region of the northern Chihuahuan Desert. During a recent visit to the Big Bend region, Assistant Secretary of the Interior Anne Castle touted the Big Bend Conservation Cooperative's efforts to conserve the Rio Grande watershed as a model of the kind of partnership that is the foundation of President Obama's America's Great Outdoors Rivers Initiative. Further highlighting the importance of the efforts of the Big Bend Conservation Cooperative, President Obama and former President of Mexico Calderon issued a statement about the importance of conservation in the trans-boundary Big Bend-Rio Bravo region and Secretary Salazar and his previous counterpart in Mexico, Secretary Elvira, have visited the area multiple times in support of conservation efforts.

Supporting our Conservation Partners

On October 24, 2011 Secretary Salazar and Mexican Environment and Natural Resources Secretary Juan Rafael Elvira Quesada announced a working plan that identifies the next steps for the continued coordination between the two countries in the protection and preservation of the transnational Big Bend/Rio Bravo region – North America's largest and most diverse desert ecosystem.

Following the announcement, the Secretaries and Ambassador to Mexico, Anthony Wayne, participated in a wildlife release of Rio Grande Silvery Minnows on the U.S. side of the border, demonstrating the results of successful coordination efforts in reaching a common conservation goal.

Projects funded in support of the Big Bend Conservation Cooperative inform efforts to re-establish the endangered Rio Grande silvery minnow, guide the Rio Grande Watershed Conservation project under the America's Great Outdoors initiative, and implement elements the

US Fish and Wildlife Service's International Conservation Strategic Plan. In 2011, The Desert LCC funded the project ***Assessing Actions to Improve Resilience of the Rio Grande through Big Bend National Park Using Remote Topography (Lidar) and Multispectral Imagery Data***. Implementation of this project is key to assessing and refining the effectiveness of critical, on-going river management actions to benefit the Rio Grande ecosystem, the Rio Grande silvery minnow, and the other native fish and wildlife it supports. Other projects funded by the Desert LCC that will inform conservation and natural resource management activities of the Big Bend Conservation Cooperative include ***Resource Management in a Changing Climate: Understanding the Relationship between Water Quality and Golden Alga Distribution in the Pecos River, New Mexico*** and ***Texas and Fish Data Compilation and Climate Change Assessment for Desert Landscape Conservation Cooperation Fishes***.

Arizona Game and Fish Department & Western Governors' Association Crucial Habitat Assessment Tool

The Arizona Game and Fish Department calls its Crucial Habitat Assessment Tool HabiMap™ Arizona (http://www.habimap.org/). This is a user-friendly, web-based tool that ensures the State Wildlife Action Plan information is accessible and useful to everyone and identifies crucial wildlife habitats and corridors. The agency has been working diligently over the last several years to fill key wildlife data gaps across the state, as well as provide leadership to identify a technical process for applying the common definitions of crucial habitats to this wildlife data in a compatible way throughout the western region. Their efforts support the ability of every state to identify priority habitats and provide that information in a compatible manner into the West-wide CHAT.

In 2012, the Desert LCC and the Southern Rockies LCC co-funded Arizona Game and Fish's ***A Landscape Approach for Fisheries Database Compilation and Predictive Modeling.*** This project will produce a defensible data set and decision tool for the conservation of fish and other aquatic and riparian species in Arizona, covering lands in both the Desert and Southern Rockies LCCs. The project will compile and geo-reference fish observation data into a Geographic Information System to develop a decision tool that can be used to forecast the spread of invasive species across the landscape.

Supporting our State Partners

The Western Governors' Association is an independent, nonpartisan organization of Governors representing 19 Western states, and three U.S.-flag Pacific islands. Western Governors agreed to have their agencies create a region-wide GIS mapping tool that identifies critical habitat, species and wildlife corridors. Crucial Habitat Assessment Tools (CHATs) are now publically available in several states, including California, Montana, Washington and Arizona. This mapping tool is the first of its kind in the entire country.

Fundraising for this initiative continues to be a high priority for Western states to increase their capacity to make crucial wildlife habitats and corridors available online in 2013, maintain and update that important information over the long term, and coordinate policy options and tools for preserving important areas.

Lessons learned from this effort will be shared with neighboring states.

In addition, USGS is working on ***Corridors, climate change, and conservation planning in the Desert Southwest*** to provide tools to evaluate the expected benefits of corridors in mitigating climate change effects. This project will use quantitative spatial analysis and principles from landscape ecology to determine where habitat corridors could most effectively connect large landscapes to potentially ameliorate certain effects of climate and land use change on biodiversity. It will also compare existing data on corridors to determine where there is consensus among sources, and where there are gaps.

The Gila Watershed Partnership


Photo credit: http://gilawatershedpartnership.com/photo_gallery

The Desert LCC funded ***Supporting Watershed Management Planning for People and the Environment in the Desert LCC***, a project lead by the University of Arizona to develop decision support tools for application to watersheds throughout the LCC. The project includes a baseline assessment of watershed conditions that includes potential impacts of climate change and scenarios to address impacts of future watershed management scenarios identified by stakeholders in the Upper Gila River Watershed. This will directly support community efforts to initiate a watershed plan.

Supporting our Local Partners

The Gila Watershed Partnership is a community based effort seeking to improve the health of the Upper Gila River Watershed in Arizona and New Mexico.

Members include multiple state agencies, federal agencies, Graham and Greenlee counties, towns of Thatcher, Pima, Duncan, and Clifton, the city of Safford, Freeport MacMoRan Copper and Gold, Inc., and many private citizens.

The Desert LCC also supported a project led by The Nature Conservancy titled ***Defining Ecosystem Water Needs of the Upper Gila River and Assessing the Impacts of Climate Change.*** This effort consider the probable ecosystem impact of proposed new water diversions, through the Arizona Water Settlements Act (New Mexico Unit), on hydrologic processes, riparian vegetation and aquatic habitat and associated wildlife species in the Upper Gila River in New Mexico under changing climate conditions.

Other projects that will directly benefit the Gila Watershed Partnership (http://gilawatershedpartnership.com/) include ***From Genotype to River Basin: The combined impacts of climate change on bio-control on a dominant riparian invasive tree/shrub (Tamarisk spp.)*** and ***Effects of Bio-control and restoration on wildlife in southwestern riparian habitats.*** Both of these complimentary projects will help resource managers plan for potential changes in tamarisk populations once the tamarisk leaf beetle enters the watershed. These studies look at the impacts of climate change and the leaf beetle on tamarisk and the associated impacts to amphibian, reptile, and avian communities.

The Navajo Nation

The USGS Arizona Water Science Center is leading the project ***Navajo Nation Climate Data Recovery***. This effort will address serious gaps in climate data in and around the Navajo Nation. Climate science researchers have identified the area as among the most climate-data poor in the region. Digitizing hardcopy climate data collected between 1988 and 1995 and entering that information into appropriate databases is a critical first step in providing needed information to tribal partners.

Supporting our Tribal Partners

The Navajo Nation covers over 70,000 km^2 in the Four Corners area of Utah, Arizona and New Mexico. Climate data from the Navajo Nation have been both sparse and sporadic during the past 100 years, and have been limited to daily data from a handful of National Weather Service Cooperative Observer sites.

Supporting our International Partners

Assessing the vulnerability of species or ecosystems to climate change and formulating appropriate management responses requires predictions of the exposure and sensitivity of the species or ecosystems to projected changes. Climate change will not have the same effects in all locations of the southwest– some areas will change quickly (hotspots) and others will change slowly (refugia). Communicating and working with partners in Mexico to identify both types of areas and monitoring the rate at which they are changing will be important.

Sonoran Joint Venture (SJV) and Point Reyes Bird Observatory (PRBO)

The Sonoran Joint Venture and Point Reyes Bird Observatory will develop a foundation for monitoring environmental change in the desert southwest by identifying where and what to monitor in order to evaluate climate-change impacts. ***Developing tools for detecting climate change impacts on birds and their habitats in the desert southwest and northwest Mexico*** leverages models already developed for California and that are in development for the SJV to identify the locations where the greatest changes in climate, habitats, and bird communities are predicted. The spatial extent of the project will include Bird Conservation Regions 34, 35, 36 and the results for all of AZ, NM and TX. The project will provide a web tool that can be used by managers to identify

climate change impacts and adaptation opportunities, thereby improving capacity for making conservation decisions for wildlife populations and habitats using birds as indicators. This information will be readily transferable to a future regional node for the Southwest that will encompass Mexico.

Four Forest Restoration Initiative (4FRI)

The Desert LCC is supporting the efforts of our partners in 4FRI (http://www.fs.usda.gov/main/4fri/home). 4FRI is a collaborative, accelerated restoration program that will restore watershed health and function, improve wildlife habitat, conserve biodiversity, protect old-growth, reduce the risk of uncharacteristic wildland fire and promote reintroduction of natural fire, and restore natural forest structure and function so that forests are more resilient to climate change. 4FRI builds on years of collaboration in the Arizona Governor's Forest Health Council and that council's landmark document, *Statewide Strategy for Restoring Arizona's Forests*. Northern Arizona University and staff from the Salt River Project are ***Assessing Evapotranspiration Rate Changes for Proposed Restoration of the Forested Uplands of the*** DLCC. This project will assess the hydrological responses of forest thinning through detailed measurements and modeling of evapotranspiration to determine if new forest restoration treatments provide significant and lasting changes in evapotranspiration which benefit other components of the hydrologic budget. Managers will be able to use the information to predict impacts of vegetation manipulations on surface and groundwater availability.

Supporting Landscape Restoration Efforts

On a scale never attempted before, Four Forest Restoration Initiative is a collaborative effort to restore forest ecosystems on 2.4 million acres of ponderosa pine forest in four National Forests in northern Arizona. The vision of 4FRI is restored forest ecosystems that support natural fire regimes, functioning populations of native plants and animals, and forests that pose little threat of destructive wildfire to thriving forest communities, as well as support sustainable forest industries that strengthen local economies while conserving natural resources and aesthetic values.

4FRI was made possible by the collaborative efforts of the State of Arizona, U.S. Forest Service, the Council on Environmental Quality and many other local, state, and federal organizations, as well as the input of Arizona citizens.


Photo credit: http://www.fs.usda.gov/main/4fri/collaboration

Protected Areas Database

The existing Protected Areas database that encompasses the Desert LCC has been found to be particularly prone to boundary and database errors that affected its potential use. The USGS Southwest Biological Science Center is developing ***a Protected Areas Digital Spatial Data for the Desert LCC*** to provide a single, seamless, error-free Protected Areas dataset for the full geographic scope of the Desert LCC.

Protected Area will be categorized as defined by the USGS-GAP program (in the US) and the International Union for the Conservation of Nature (IUCN; for both the U.S. and Mexico). The spatial dataset will include metadata that is compliant with the Federal Geographic Data Committee's Content Standards for Digital Geospatial Metadata.

Building Tools for Resource Management Partners

The Desert LCC has identified opportunities to improve existing datasets and efforts within the region that will increase the ability of resource managers to make informed decisions.

1) *A Protected Areas spatial database that shows land ownership, management designations and conservation status for lands in the United States and Mexico.*
2) *Standardizing and promoting protocols for mapping springs, seeps, and aquatic resources across the Desert LCC region.*

Mapping Springs, Seeps, and Aquatic Habitat

The Pinetop Fisheries Office/New Mexico State Ecological Services Office, US Fish and Wildlife Service, in cooperation with the Desert Fishes Council, will be hosting 2-3 workshops in 2013 to train people to conduct the Springs Stewardship Institute's spring assessment protocol and promote it as a standardized method. This will facilitate standardized data collection across the landscape that can contribute to a broad scale inventory and assessment of springs, seeps, and aquatic resources throughout southern New Mexico, western Texas, and northern Mexico and build off the Desert LCC 2011 ***Springs and Seeps Inventory, Assessment and Management Planning Project*** being completed by Sky Island Alliance in partnership with multiple Federal managers, Arizona Game and Fish Department, Pima County and Association of Governments, Sonoran Institute, The Nature Conservancy, Bat Conservation International, and the University of Arizona. This project will also support efforts in the Gila Watershed Partnership and Big Bend Conservation Cooperative.

Collaboration and Communication

Integrating National Programs

Steering Committee member, Louise Misztal, agreed to act as a liaison for the Desert LCC Steering Committee during the **America's Great Outdoors** regional conference calls in an effort to build on existing efforts and increase collaboration between the two groups. The America's Great Outdoors Initiative was launched by President Obama to develop a 21st Century conservation and recreation agenda with the premise that lasting conservation solutions should rise from the American people (www.americasgreatoutdoors.gov).

The Steering Committee approved Genevieve Johnson and Aimee Roberson to represent the Desert LCC on the Southwest and South Central **Climate Science Center** (CSC) Stakeholder Advisory Committees. Genevieve attended a meeting in June, where the committee agreed on the importance of coordinating the science needs and projects from the LCCs and the other CSCs with the Southwest CSC Science Plan. Genevieve and Aimee also attended science planning meetings for the South Central CSC to coordinate the science needs of the Desert LCC into the South Central CSC Science Plan.

Partnering with Local Communities

The Steering Committee formed an additional working group to increase collaboration and communication with local governments. The **Local Governments Working Group** will help meet the goals of the Desert LCC by providing value-added support in identifying the science needs of local governments as they relate to climate change and ecosystem stressors. This group will also help communicate with the diverse and numerous local governments in the LCC geography.

During the Steering Committee October 10-12, 2012 the Desert LCC agreed to help provide guidance and expertise to the **Dona Ana/El Paso County Conservation Cooperative**. The mission of the group is to help El Paso achieve its goal of becoming the most livable city in the United States and gain international recognition as the most successful city in preserving its unique Chihuahuan Desert character in the surrounding native region. Conserving the desert habitat that is adjacent to and outside protected areas and on public lands has been identified as a high priority at El Paso Comprehensive Plan public meetings. The LCC will provide guidance to the Cooperative on developing a regional strategic plan to protect the Chihuahuan Desert within their defined boundaries.

Monitoring and Evaluation

The Steering Committee specifically identified the need to establish a new Data Cataloging task force. This task force will work towards a process for identifying coordinated data collection, data analysis and information management, and data dissemination using tools such as the Desert LCC SharePoint site. This step will help the LCC meet the monitoring tasks outlined in the 2013

Annual Work Plan. The Steering Committee also supported the overall concept of a data portal and a data steward that could potentially be shared with another LCC.

Outreach and Education

The Desert LCC and Nature Serve hosted the **Mojave-Sonoran Deserts Natural Communities Vulnerability Assessment** Adaptation Strategy Workshop on August 1-2, 2012 in Phoenix, AZ. The goal of the workshop was to identify management strategies that can be readily implemented in managed lands of the Sonoran and Mojave deserts to promote adaptation of natural communities and associated species to climate change.

The USGS is supporting science "round tables," which will gather scientists and resource managers together to identify known science related to a specific science topic, identify needed science in relation to specific management questions, build partnerships and communicate results throughout the Desert LCC. This innovative process is expected to narrow the gap between science and management, and facilitate more effective science delivery to managers. The Science Working Group helped further refine the Desert LCC science need priorities to guide USGS in hosting Science Roundtables for the LCC. The first roundtable is scheduled to occur in 2013 and will focus on one of the six critical management questions selected by the Science Working Group and approved by the Steering Committee.

The Steering Committee agreed to establish a Communications Working Group that will finish the development of a Desert LCC Communication Plan. The Communication Plan will identify key audiences, communication resources, communication objectives and messages associated with each LCC goal, and specific tasks to move the LCC towards accomplishing its goals and objectives as described in the annual work plan.

Organizational Accomplishments

The Desert LCC held five Steering Committee meetings, three conference calls and two in-person meetings. In October, the Steering Committee elected a new Chair (Duane Pool, Rocky Mountain Bird Observatory) and Vice-chair (Armand Gonzales, California Department of Fish and Wildlife). We would like to thank our out-going Chair, Larry Voyles (Arizona Game and Fish Department) for his service and leadership in standing up the LCC over the past two years.

At a joint meeting with the Science Working Group, the Steering Committee developed and approved the 2013 Annual Work Plan. The plan was produced through breakout groups that provided prioritized task recommendations for each of the Desert LCC goal areas, followed by full group discussion of the overall plan. The plan will be used to guide the actions of the LCC in 2013 and 2014.

The Administrative Working Group developed specific proposals regarding size, structure, and membership for the Committee and opportunities beyond the Committee for broader

participation in the LCC. These proposals were adopted by the Steering Committee and incorporated into the Desert LCC's Governance Document.

Throughout the year, the Desert LCC Coordinator and Science Coordinators met with various partners to promote discussion of potential collaborative efforts within the landscape. Discussions included:

- Calls to assess the science and management implications of seeps and springs science with USGS, University of Arizona, Sky Island Alliance, and Spring Stewardship Institute.
- Calls with the National LCC Coordinators and the Joint Fire Science Program (JFSP) Manager about the possible use of the JFSP internet platform for fire science proposal review and science tracking accountability system to enhance future science applications and delivery.
- Meetings and calls with Western Regional Partnership (WRP) meeting to inform the use of Department of Defense funds for acquisition or easement of land that would allow the military to maintain readiness by managing the land for conservation uses in the Mohave Desert and southern Arizona and New Mexico.
- Meetings with staff of Arizona and New Mexico National Wildlife Refuges to brief them on the LCC.
- Meetings and calls with neighboring LCCs to discuss future possibilities for collaboration.
- A Southern Rockies LCC Steering Committee and US Fish and Wildlife Service surrogate species presentation meeting held in Phoenix, AZ.
- A Sonoran Joint Venture board meeting to brief them on the LCC.
- Meetings and calls with Reclamation staff to brief them on the LCC and find ways to incorporate Reclamation programs into the LCC.

Together, we are ensuring high quality science reaches people who are actively working to conserve our natural and cultural resources.

Appendix A: 2012 Applied Science Awards

Desert LCC Projects Supported by the Bureau of Reclamation

Supporting Watershed Management Planning for People and the Environment in the DLCC
Project Lead: University of Arizona
Reclamation Funding: $150,000 / Applicant Funding: $150,000

The University of Arizona and the Gila Watershed Partnership will develop decision support tools for application to watersheds throughout the DLCC. The decision support tools proposed are 1) a baseline assessment of watershed conditions that includes potential impacts of climate change and 2) scenarios to address impacts of future watershed management scenarios identified by stakeholders. These assessments and scenarios will inform stakeholders in the Upper Gila River Watershed about projected impacts of water resources decisions and support their efforts to initiate a watershed plan. Project deliverables will assist the DLCC region with a step-by-step guide to developing baseline assessments and scenarios for human and environmental water needs in the context of climate change.

From Genotype to River Basin: The combined impacts of climate change on bio-control on a dominant riparian invasive tree/shrub (Tamarisk spp.)
Project Lead: Desert Botanical Garden, Inc.
Reclamation Funding: $149,269 / Applicant Funding: $151,911

The Desert Botanical Garden, the Biological Pest Control Program, the Riparian Invasive Research Lab and Northern Arizona University will determine how the tamarisk leaf beetle combined with climate change will affect tamarisk populations throughout the DLCC region. The project will determine 1) if climate warming coupled with the tamarisk leaf beetle will reduce the negative impact of tamarisk on water resource management in western North America, 2) assess whether some tamarisk populations are more susceptible to the combination of climate change and tamarisk leaf beetle and 3) evaluate how genetic change in the tamarisk beetle species will enable beetle colonies to expand in the lower Colorado River Basin and extend the period of active feeding, thereby changing riparian vegetation in this region.

Defining Ecosystem Water Needs of the Upper Gila River and Assessing the Impacts of Climate Change
Project Lead: The Nature Conservancy
Reclamation Funding: $129,887 / Applicant Funding: $132,871

The Nature Conservancy will define ecosystem water needs and assess the impacts of climate change and proposed new water diversions, through the Arizona Water Settlements Act (New Mexico Unit), on hydrologic processes, riparian vegetation and aquatic habitat and associated wildlife species in the Upper Gila River in New Mexico. The project will synthesize existing

scientific literature and ecological analyses to evaluate the probable ecosystem impact of diversions under changing climate conditions.

A Landscape Approach for Fisheries Database Compilation and Predictive Modeling
Project Lead: Arizona Game and Fish Department
Reclamation Funding: $99,661 / Applicant Funding: $108,584

The Arizona Department of Game and Fish and the University of Washington will produce a defensible data set and decision tool for the conservation of fish and other aquatic and riparian species in Arizona, covering lands in both the Desert and Southern Rockies LCCs. The AZGF will also offer neighboring states the expertise and knowledge gained in this project. The project will compile and geo-reference fish observation data into a Geographic Information System. This new spatial database will then be used to develop a decision tool that can be used to forecast the spread of invasive species across the landscape.

Aligning Ecological Restoration and Community Interests through Active Experimentation
Project Lead: Alamosa Land Institute, Alamosa Creek and the Canada Alamosa Community
Reclamation Funding: $35,113 / Applicant Funding: $35,113

The Alamosa Land Institute and Canada Alamosa Community will develop new information about local needs and ecological conditions in the agricultural community of Canada Alamosa and test the effectiveness of traditional resource management practices combined with restoration techniques supporting sustainable economic development. The Alamosa Land Institute will analyze existing example projects and the potential for demonstrating efficiency of restoring a riparian buffer within the existing Alamosa Creek channel and along irrigation ditches, planting field distractor crops and wind breaks and supporting habitat for pest predators. The project will result in the development of a model that can be used for scientific and agency support for local land managers to develop additional resource management tools that are designed to maximize ecosystem services.

Effects of Bio-control and restoration on wildlife in southwestern riparian habitats
Project Lead: Arizona State University
Reclamation Funding: $90,337 / Applicant Funding: $90,469

Arizona State University, Northern Arizona University, Utah Division of Wildlife Resources, University of California and Western Foundation of Vertebrate Zoology will determine if the introduction of the bio-control agent (tamarisk leaf beetle, Diorhabda spp.) as an insect consumer and defoliator of salt cedar influences wildlife populations and communities via alterations to food resources and/or habitat. The investigators will take advantage of an existing program that introduced the beetle over the past two years by tracking changes in amphibian, reptile and avian communities in both the Desert and Southern Rockies LCCs.

Assessing Evapotranspiration Rate Changes for Proposed Restoration of the Forested Uplands of the DLCC
Project Lead: Northern Arizona University
Reclamation Funding: $135,332 / Applicant Funding: $136,734

Northern Arizona University and staff from the Salt River Project will assess the hydrological responses of forest thinning through detailed measurements and modeling of evapotranspiration. The primary research question is if new forest restoration treatments provide significant and lasting changes in evapotranspiration which benefit other components of the hydrologic budget. The validated modeling approaches for estimating ET that will be produced by the project will be useful to land managers for predicting impacts of vegetation manipulations on surface and groundwater availability.

Modeling Woody Plant Regeneration and Debris Accumulation under Future Streamflow and Wildfire Scenarios in the DLCC
Project Lead: US Forest Service, Rocky Mountain Research Station
Reclamation Funding: $51,840 / Applicant Funding: $52,000

The US Forest Service, Rocky Mountain Research Station will evaluate the effects of climate change and wildfire scenarios on the density of woody vegetation, snags and wood debris in the Middle Rio Grande basin, covering lands in both the Desert and Southern Rockies LCCs. They will develop a tool that may be applied to other regions to project changes in tree density, snag density and amounts of woody debris over time. The information from this project will allow managers to make decisions regarding fuel reduction activities and water delivery with an awareness of how these decisions will affect the vulnerability of riparian obligate wildlife species.

The Impact of Ecosystem Water Balance on Desert Vegetation: Quantification of historical patterns and projection under climate change
Project Lead: US Geological Services - Southwest Biological Science Center
Reclamation Funding: $98,244 / Applicant Funding: $118,109

The US Geological Survey, Southwest Biological Science Center will explore climate change impacts on vegetation across the Desert and Southern Rockies LCCs using historical monitoring data collected from 23 sites across the Sonoran, Chihuahuan, Mojave and Colorado Plateau deserts for 30-50 years. This data will then be combined with ecosystem water balance model simulations to establish features of water availability critical for plant species response. Results will allow managers to identify species and communities at risk under future climate scenarios based on predicted changes in plant water availability.

Vulnerability of Riparian Obligate Species in the Rio Grande to the Interactive Effects of Fire, Hydrological Variation and Climate Change
Project Lead: US Forest Service - Rocky Mountain Research Station
Reclamation Funding: $89,940 / Applicant Funding: $89,933

The Grassland, Shrubland, Desert Program of the U.S. Forest Service, Rocky Mountain Research Station intends to evaluate the interactive effects of fire and climate change on the presence and long-term persistence of native and non-native species within Rio Grande riparian and wetland habitats of the Desert and Southern Rockies LCCs. Decision support tools and maps will be produced that will help resource managers identify conditions and locations where biodiversity will be most affected by future changes and identify needs with respect to species conservation and invasive species management.

Desert LCC Projects Supported by the US Geological Survey

Corridors, climate change, and conservation planning in the Desert Southwest
Project lead: Jason Kreitler, USGS Western Geographic Science Center
Funding: $57,000

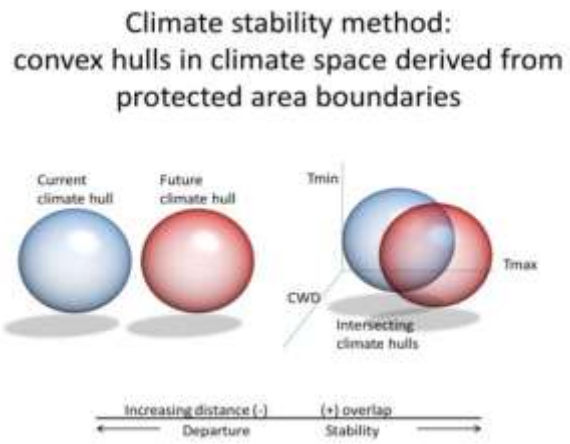
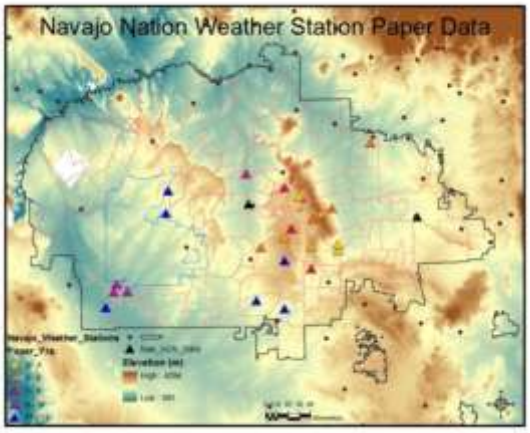


Photo Credit: Jordan Zylstra.

In the desert southwest biodiversity is facing a changing landscape due to human population growth, expansion of energy development, and from the persistent effects of climate change among other threats. The 2012 Desert LCC science needs document recognized the importance of modeling and predicting habitat area, fragmentation and corridor network connectivity for a broad range of wildlife taxa. Tools and methods from conservation planning are available to address some of these issues, but tools to evaluate the expected benefits of corridors in mitigating climate change effects are only in their infancy. This USGS project will use quantitative spatial analysis and principles from landscape ecology to determine where habitat corridors could most effectively connect large landscapes to potentially ameliorate certain effects of climate and land use change on biodiversity. It will also compare existing data on corridors to determine where there is consensus among sources, and where there are gaps. Specific outcomes and deliverables will include: (1) a new corridor map created from regionally derived parameters and Circuitscape (www.circuitscape.org); (2) an assessment of climate stability of existing protected areas within the Desert LCC where existing data are available; and (3) a prioritization of corridors for mitigation of climate change effects. The project is expected to be completed by October 2013.

Navajo Nation Climate Data Recovery
Project Leads: Bruce Gungle and James Leenhouts, USGS Arizona Water Science Center
Funding: $51,500



The Navajo Nation covers over 70,000 km2 in the Four Corners area of Utah, Arizona and New Mexico. Climate data from the Navajo Nation have been both sparse and sporadic during the past 100 years, and have been limited to daily data from a handful of National Weather Service Cooperative Observer sites. Climate science researchers have identified the area in and around the Navajo Nation as among the most climate-data poor in the region, and the need to remedy this situation has been identified by both the Desert LCC and the Southern Rockies LCC. This USGS project will digitize hardcopy climate data collected between 1988 and 1995, including portions of 25 volumes of fan-fold line-printer computer printouts, with 10 columns of variables per page. The legacy weather data will be entered into appropriate databases and delivered to the Arizona State Climate Office, Navajo Nation, and the Desert and Southern Rockies LCCs. The project is expected to be complete by January 30, 2013.

Development of Protected Areas Digital Spatial Data for the Desert LCC
Project Lead: Terence Arundel, USGS Southwest Biological Science Center
Funding: $25,000

The Desert LCC identified the need for a Protected Areas spatial database that showed land ownership, management designations and conservation status for lands in the United States and Mexico. However, the existing Protected Areas database was found to be particularly prone to boundary and database errors that affected its potential use. This USGS project will develop a single, seamless, error-free Protected Areas dataset for the full geographic scope of the Desert LCC. This will involve acquiring numerous spatial layers from Federal, State, and NGO organizations which are responsible for administering and/or managing areas that have a designated protected status. Protected Area will be categorized as defined by the USGS-GAP program (in the U.S.) and the International Union for the Conservation of Nature (IUCN; for both the U.S. and Mexico). The spatial dataset will include metadata that is compliant with the Federal Geographic Data Committee's Content Standards for Digital Geospatial Metadata.

Desert LCC Projects Supported by the U.S. Fish and Wildlife Service

Developing tools for detecting climate change impacts on birds and their habitats in the desert southwest and northwest Mexico

Project Leads: Sonoran Joint Venture (SJV) and Point Reyes Bird Observatory (PRBO)
Funding: $51,000

Assessing the vulnerability of species or ecosystems to climate change and formulating appropriate management responses requires predictions of the exposure and sensitivity of the species or ecosystems to projected changes. This collaborative effort by the Sonoran Joint Venture, Desert Landscape Conservation Cooperative, and Point Reyes Bird Observatory will develop a foundation for monitoring environmental change in the desert southwest by identifying where and what to monitor in order to evaluate climate-change impacts.

Climate change will not have the same effects in all locations of the southwest– some areas will change quickly (hotspots) and others will change slowly (refugia). Identifying both types of areas and monitoring the rate at which they are changing will be important. Extending models we have already developed for California and that are in development for the SJV we will identify the locations where we predict the greatest changes in climate, habitats, and bird communities. The spatial extent of the project will include Bird Conservation Regions 34, 35, 36 and the results for all of AZ, NM and TX. Large portions of Bird Conservation Region 34 are already being modeled through an ongoing project with the SJV and the proposed project will benefit from the time and effort PRBO and partners have spent compiling environmental and avian occurrence data as well as developing our initial models.

The work will leverage large investments made by PRBO and partners of the California Avian Data Center to apply existing cyber infrastructure and modeling approaches to this region. We will provide a web portal where users can view predicted distributional changes in bird, habitat, and climate under future climate conditions. We will also provide training on the use of the final products via one or more webinars, and by participation in associated worshop(s) if those are funded by other sources.

The overall goal of this project is to provide a web tool that can be used by managers and in workshops for identifying climate change impacts, identifying adaptation opportunities, and improving capacity for making conservation decisions for wildlife populations and habitats using birds as indicators. We will compile, document and curate the source data and the products generated as part of this proposal in the California Avian Data Center, and will make them readily transferable to a future regional node for the Southwest that will encompass the desert southwest and Mexico.

Mapping springs and seeps and aquatic habitat in the Desert LCC

Project Leads: Pinetop Fisheries Office/New Mexico State Ecological Services Office, US Fish and Wildlife Service, in cooperation with the Desert Fishes Council
Funding: $49,000

This project will be focused on hosting 2-3 workshops in 2013 to train people to conduct the Springs Stewardship Institute's spring assessment protocol and promote it as a standardized method. This will facilitate standardized data collection across the landscape that can contribute to a broad scale inventory and assessment of springs, seeps, and aquatic resources throughout southern New Mexico, western Texas, and northern Mexico.