# Desert LCC Funded Projects 2011-2012

| # | Project Name and Lead (Year Funded) | Project Goal | Partners |
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| 1 | **Metacommunity Dynamics of Gila River Fishes**<br>Dr. Keith Gido<br>Kansas State University<br>(2011) | If dispersal dynamics of native and nonnative fishes can be predicted by life history strategy, this research will provide a general framework for conservation that considers how community interaction and responses to extreme events (e.g., those predicted by climate change) are influenced by fragmenting populations. By developing decisions support models, hosting workshops, and presenting our findings to regional stakeholder groups, we aim to provide conservation and water resource agencies critical information they can use to inform conservation plans. | University of New Mexico<br>The Nature Conservancy<br>Gila National Forest<br>Bureau of Land Management, Las Cruces District Office<br>New Mexico Department of Fish and Game |
| 2 | **Predicting Effects of Climate Change on Riparian Obligate Species in the Southwestern United States**<br>Dr. Matthew Johnson<br>Northern Arizona University<br>(2011) | A central scientific challenge is to generate quantitative predictions of how changes in water availability will affect the amount and quality of riparian wildlife habitat. This project will result in a decision support tool that provides scientific information needed required to restore, enhance and mitigate effects of climate change on riparian vegetation and associated wildlife as well as identify those areas that may be of greatest risk to predicted change. | Arizona Game and Fish Department<br>USGS Western Fisheries Research Center<br>University of Arizona<br>The Nature Conservancy<br>National Park Service, Southern Colorado Plateau Network |
| 3 | **Springs and Seeps Inventory, Assessment and Management Planning Project**<br>Trevor Hare<br>Sky Island Alliance<br>(2011) | Work collaboratively with land and resource managers to identify priority watersheds for spring and seep assessments in the Sky Island region of southeastern Arizona, and conduct inventories and assessments using trained volunteers, professional staff and partner personnel. Development of this volunteer monitoring program will provide a model for monitoring climate sensitive resources with limited funding. Develop a regional database for housing and serving | Pima County Association of Governments<br>Pima County<br>Santa Cruz County<br>Coronado National Forest<br>Bureau of Land Management, Tucson Office |

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| | | historic and newly acquired data from cooperating agencies. Utilize assessments of spring and seep management in conjunction with managers and experts to develop climate change adaptation strategies, decision-support tools and recommendations for management of priority areas. | |
| **4** | **Resource Management in a Changing Climate: Understanding the Relationships Between Water Quality and Golden Alga Distribution in the Pecos River, New Mexico and Texas**<br>Dr. Reynaldo Patiño<br>Texas Cooperative Fish and Wildlife Research Unit<br>Dr. Chris Taylor<br>Texas Tech University<br>(2011) | Golden alga (*Prymnesium parvum*) is a harmful algal species that can release toxins fatal to fishes, bivalves, crayfish, and gilled amphibians, resulting in immense ecological and economic impacts. This project will enhance understanding of environmental conditions, specifically water quality variables, which promote or regulate golden alga bloom formation in the Pecos River system. Managers will benefit from identifying specific attributes that promote golden alga bloom development and potential toxicity to aquatic species of concern. | Texas Parks and Wildlife Department<br>New Mexico Department of Game and Fish<br>US Fish and Wildlife Service, Texas Office |
| **5** | **Utility Guide to Rainwater/Stormwater Harvesting as an Adaptive Response to Climate Change**<br>Susanna Eden<br>Water Resources Research Center, University of Arizona<br>(2011) | Relatively little guidance exists on how public utilities and agencies can evaluate the suitability and cost-effectiveness of water harvesting strategies to provide tangible and significant benefits to the community. This project will develop a prototype guidance tool for public utilities and agencies to use to evaluate the suitability and cost-effectiveness of rainwater and stormwater capture at various scales for multiple benefits to the community. | City of Tucson<br>Pima County Regional Flood Control District<br>University of Arizona Cooperative Extension, Cochise County<br>The American Rainwater Catchment Systems Association (ARCSA)<br>Sonoran Institute |
| **6** | **Data Provision and Projected Impact of Climate Change on Fish Biodiversity within the Desert LCC**<br>Dr. Dean A. Hendrickson<br>Dr.Sahotra Sarkar<br>University of Texas, Austin | We will produce data and decision support tools for the conservation, restoration, and management of U.S. priority freshwater fishes in drainages shared by the U.S. and Mexico by compiling and normalizing biodiversity data for all fishes occurring in internationally shared drainages of the DLCC, exclusive of the Colorado and Gila drainages. We will then | Great Plains LCC<br>US Fish and Wildlife Service<br>University of New Mexico |

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| | (2011) | focus on the Río Grande drainage where we will model current distributions of selected special interest fishes and project the models into the future under three different climate change scenarios. The results will demonstrate how changing climates will impose directional pressures that will likely tend to shift species distributions. | |
| **7** | **Remote Acquisition of High Quality Topography (LIDAR) and Multispectral Imagery Data for the Rio Grande through Big Bend National Park: A Critical Need for Climate Change Mitigation Planning**<br>Mark Briggs<br>World Wildlife Fund<br>(2011) | Use LIDAR imagery to generate vegetation maps and terrain models for the 100-mile reach of the Rio Grande through Big Bend National Park and combine information with one-dimensional flow routing model and monitoring of tributary sediment to enhance ability to quantify future geomorphic and riparian vegetation changes, assess flood risk, evaluate habitat for key species, formulate climate-adapted responses and evaluate exotic plan eradication efforts. | Big Bend Conservation Cooperative<br>Big Bend National Park<br>US Fish and Wildlife Service<br>Utah State University<br>US Geological Survey<br>Sul Ross State University<br>State of Texas Upper Rio Grande Basin to Bay Expert Science Team<br>Rio Grande Joint Venture<br>Texas Parks and Wildlife Department |
| **8** | **A Landscape Approach for Fisheries Database Compilation and Predictive Modeling**<br>Bill Stewart<br>Arizona Game and Fish Department<br>(2012) | Produce a defensible data set and decision tool for the conservation of fish and other aquatic and riparian species in Arizona by synthesizing and refining fisheries data and models at the watershed scale, including information on species distribution and abundance and landscape-scale species distribution models. Information collected will be used as part of Arizona Game and Fish Department's and the Western Governors' Association Crucial Habitat Assessment Tool (CHAT) and set the foundation on which managers can assess the impacts of water use, biological invasions, and climate change on biological resources in Arizona. Provide expertise and personnel to New Mexico for shared Species of Greatest Conservation Need. | New Mexico Game and Fish Department<br>Western Governors' Association<br>Desert Fish Habitat Partnership<br>University of Washington<br>Arizona Department of Environmental Quality |

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| **9** | **Supporting Watershed Management Planning for People and the Environment in the Desert Landscape Conservation Cooperative Region: A Demonstration in the Upper Gila River Watershed**<br>Dr. Sharon B. Megdal<br>Water Resources Research Center, University of Arizona<br>William Brandau<br>Arizona Cooperative Extension<br>(2012) | Develop and demonstrate a methodology for developing baseline assessments and forward-looking scenarios needed to support watershed planning and management that incorporates both human and environmental water needs in the Upper Gila River Watershed. The project will develop 1) a methodology to assess baseline watershed conditions for watersheds within the Desert LCC region, using the Gila Watershed as a demonstration watershed; 2) publication of Extension and peer reviewed articles; 3) a methodology for creating planning scenarios that incorporate expected climate and land use/land cover change impacts on the vulnerability and resiliency of environmental resources and human water uses (to include development of planning scenarios for the Gila Watershed); and 4) a guidebook describing how to develop assessments of baseline watershed conditions and planning scenarios from start to finish. | Gila Watershed Partnership<br>Graham County, AZ<br>Greenlee County, AZ<br>City of Safford, AZ<br>Town of Pima, AZ<br>Greenlee County Cattlegrowers<br>Heart and Horn Ecological Services, LLC<br>Arizona Department of Environmental Quality<br>Environmental Defense Fund |
| **10** | **The Combined Impacts of Climate Change on Bio-control on a Dominant Riparian Invasive Tree/Shrub (*Tamarisk spp.*)**<br>Kevin Hultine<br>Desert Botanical Garden, Inc.<br>(2012) | 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. | Colorado Department of Agriculture<br>University of California, Santa Barbara<br>Northern Arizona University<br>The Walton Family Foundation<br>USDA, Northern Plains Agricultural Research Laboratory |
| **11** | **Defining Ecosystem Water Needs of the Upper Gila River and Assessing the Impacts of Climate Change**<br>David Gori<br>The Nature Conservancy<br>(2012) | 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 | University of New Mexico<br>Northern Arizona University<br>University of Kansas<br>State of New Mexico Department of Fish and Game |

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| | | and ecological analyses to evaluate the probable ecosystem impact of diversions under changing climate conditions. | USFWS, New Mexico Ecological Services Field Office<br>New Mexico Interstate Stream Commission |
| **12** | **Aligning Ecological Restoration and Community Interests through Active Experimentation**<br>Connie Maxwell<br>Alamosa Land Institute, Alamosa Creek and the Canada Alamosa Community<br>(2012) | 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. 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. Develop a model that can be used for scientific and agency support for local land managers to maximize ecosystem services. | USFWS, New Mexico Ecological Services Field Office<br>NRCS<br>Local land owners<br>Monticello Canyon Association<br>Monticello Ditch Association<br>New Mexico Community Foundation |
| **13** | **Effects of Bio-control and restoration on wildlife in southwestern riparian habitats**<br>Heather L. Bateman<br>Arizona State University<br>(2012) | Determine if the introduction of the bio-control agent (tamarisk leaf beetle, Diorhabda spp.) as an insect consumer and defoliator of salt cedar, in conjunction with riparian restoration, influences wildlife populations and communities via alterations to food resources and/or habitat. Relate biocontrol changes in habitat structure and composition to wildlife communities (avifauna and herpetofauna) along the Virgin River. Relate changes in food resources to wildlife diet composition along the river. | Northern Arizona University<br>Utah Division of Wildlife Resources<br>University of California, Santa Barbara<br>Western Foundation of Vertebrate Zoology<br>USFWS, Arizona Ecological Services Office<br>U.S. Fish and Wildlife Service, Nevada Fish and Wildlife Office<br>U.S. Geological Survey<br>Arizona Game and Fish Department<br>The Walton Family |

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| **14** | **Assessing Evapotranspiration Rate Changes for Proposed Restoration of the Forested Uplands of the DLCC**<br>Abe Springer<br>Northern Arizona University<br>(2012) | 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. | Four Forest Restoration Initiative<br>Ecological Restoration Initiative<br>Salt River Project |
| **15** | **Modeling Woody Plant Regeneration and Debris Accumulation Under Future Streamflow and Wildfire Scenarios in the DLCC**<br>Max Smith and Deborah Finch<br>USFS, Rocky Mountain Research Station<br>(2012) | The U.S. 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 and 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. | |
| **16** | **The Impact of Ecosystem Water Balance on Desert Vegetation: Quantification of Historical Patterns and Projection under Climate Change**<br>John Bradford<br>USGS, Southwest Biological Science Center<br>(2012) | 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. | |
| **17** | **Vulnerability of Riparian Obligate Species in the Rio Grande to the Interactive Effects of Fire, Hydrological Variation and Climate** | 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 | |

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| | **Change**<br>Megan Friggins and Deborah Finch<br>USFS, Rocky Mountain Research Station<br>(2012) | species within Rio Grande riparian and wetland habitats. 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. | |
| **18** | **Developing tools for detecting climate change impacts on birds and their habitats in the desert southwest**<br>USFWS<br>(2012) | Expand the development of 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. | Sonoran Joint Venture<br>Pacific Coast Joint Venture<br>Point Reyes Bird Observatory |
| **19** | **Mapping springs and seeps and aquatic habitat in the Desert LCC**<br>USFWS<br>(2012) | Expand inventory and assessment of springs, seeps, and aquatic resources (e.g., USGS, Spring Stewardship Alliance, Sky Island Alliance) to map springs and seeps throughout southern New Mexico, western Texas, and northern Mexico using a consistent protocol. | Pinetop Fisheries Office/New Mexico State Ecological Services Office<br>Desert Fishes Council |
| **20** | **Corridors, climate change, and conservation planning in the Desert Southwest**<br>Jason Kreitler<br>USGS Western Geographic Science Center<br>(2012) | 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. 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. | |
| **21** | **Navajo Nation Climate Data Recovery**<br>Bruce Gungle and James Leenhouts | This 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 | Navajo Nation |

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| | USGS Arizona Water Science Center<br>(2012) | 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. |
| **22** | **Development of Protected Areas Digital Spatial Data for the Desert LCC**<br>Terence Arundel<br>USGS Southwest Biological Science Center<br>(2012) | This 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. |