



## WCS Climate Adaptation Fund Grants List

### Grants Awarded in 2014

#### Playa Lakes Joint Venture

WCS Grant: \$147,017; Project Budget: \$355,693  
*Playa Restoration on U.S. Forest Service National Grasslands: A Climate Adaptation Demonstration Project in the Western Great Plains*

Playas are the dominant wetland type in the western Great Plains. They are both centers of biodiversity and the primary recharge mechanism for the Ogallala aquifer, the water source for most of the region's agricultural production. In a drying climate fewer playas will be wet, making playa restoration an urgently needed response to climate change, preserving hydrological and ecological functionality. This project will restore the hydrological function of a network of playas, improve the connectivity between playas across a five million acre landscape and create resiliency in a warmer, drier climate.

#### World Wildlife Fund, Chihuahuan Desert Program

WCS Grant: \$248,594; Project Budget: \$545,021  
*Freshwater Restoration and Climate Adaptation in the Big Bend Region of the Northern Chihuahuan Desert*

Human and climate impacts along the Rio Grande/Bravo river and local tributaries in the Big Bend region have altered the conveyance of water and sediment, resulting in reduced water availability and deteriorated native aquatic and riparian habitat. Climate forecasts for this region describe a warmer climate characterized by droughts of greater frequency, intensity and duration. Dramatic reduction in stream corridor water availability, with consummate loss of many native riparian and aquatic species, is likely. This project will work along small tributaries to reestablish dense stands of coyote willow that will slow flow velocities, promote sediment aggradation, and increase local recharge of riparian water tables.

#### The Nature Conservancy, North Carolina

WCS Grant: \$130,900; Project Budget: \$280,837  
*Pocosin Restoration in the Southeastern Coastal Plain*

The Nature Conservancy is partnering with the U. S. Fish and Wildlife Service to restore 1,325 acres of southeastern shrub bog wetlands, (known as 'pocosins') to re-establish more natural, seasonally-saturated conditions. Threatened by altered precipitation regimes and increased wildfire associated with climate change, historic methods of ditching and drainage has exacerbated periods of low rainfall, resulting in the loss of organic pocosin soil to oxidation and catastrophic wildfire. By installing adjustable water control structures, they will create management conditions that reverse the pattern of subsidence towards one of soil accretion and carbon sequestration.

#### The Nature Conservancy, Eastern New York

WCS Grant: \$136,061; Project Budget: \$272,529  
*Neversink River Floodplain Forest Restoration*

Restoring floodplains and their riparian forests has been identified as a key climate change adaptation strategy and functional floodplain riparian systems have great potential to increase the resilience of these systems and their associated species to climate change. This project will plant approximately 11,000 trees native trees that have been identified for their expected climate resilience on over 40 acres of floodplains degraded due to past agricultural activities. In addition, restoration activities will include adding pit and mound microtopography to mimic conditions that would normally be found in a more mature forest and create differences in soil moisture levels and microhabitats.

### **National Wildlife Federation**

WCS Grant: \$241,002; Project Budget: \$484,657

#### *Conquest Beach Living Shoreline Project*

The National Wildlife Federation will restore 1,350 linear feet of eroding shoreline using a suite of 'living shoreline' techniques that will maintain ecological processes, reduce erosion, and restore lost marsh and shoreline habitats impacted by current and projected sea-level rise and coastal flooding. With limited resources available to mitigate the impacts of climate change there is a growing emphasis on demonstrating cost-effective risk reduction strategies like these.

### **Methow Salmon Foundation**

WCS Grant: \$237,160; Project Budget: \$690,760

#### *Methow Beaver Project*

Wildfires are remaking north central Washington's watersheds at an unprecedented scale providing a visible preview of the potential of climate change. In addition, hydrologists are predicting more rain, less snow, and steady snowpack loss in the mountains of the Northwest in the years ahead. However, stand-replacing fires are also opening areas for beaver re-colonization. Willows and aspens re-sprout vigorously, and dead trees no longer demand water for growth. This project will seed beavers into fire-impacted areas to create wetland "sponges," storing precipitation in these watersheds that previously would have been held as snow.

### **Sky Island Alliance**

WCS Grant: \$240,865; Project Budget: \$492,517

#### *Enhancing Resilience to Catastrophic Fire in the Sky Islands*

Severe fires followed by intense monsoon precipitation alter streams, springs and entire watersheds in rapid and sometimes catastrophic ways throughout the Sky Island Region of southern Arizona. This project combines site-specific strategies that protect and rehabilitate key habitats and corridors for wildlife and pollinators with watershed-scale strategies that moderate the transition of fire-affected ecosystems while maintaining essential functions. Through installation of erosion-control structures at the tops of high fire-prone watersheds using manual techniques and trained volunteers, Sky Island Alliance will rehabilitate high-priority springs and riparian wildlife habitat degraded by post-fire erosion.

### **The Wilderness Society, Crown Roundtable and Blackfoot Challenge**

WCS Grant: \$104,445; Project Budget: \$423,528

#### *From Forests to Faucets: Building Watershed Resilience across the Crown of the Continent (Crown) through Public-Private Lands Partnerships*

Climate-induced hydrology changes that have led to reduced snowpack and earlier spring flood events are of particular concern in Western Montana's Crown of the Continent ecosystem. In response to these impacts, this project will work to expand voluntary drought response measures and irrigation efficiency among private water rights owners and communicate the value of these programs to resource managers across the landscape. Improved water management will help to maintain critical flows in rivers and tributaries of the Blackfoot and Upper Clark Fork rivers, will improve water quality and stream functionality, and retain significantly more water for vulnerable aquatic species during periods of drought.

### **The Nature Conservancy, Montana**

WCS Grant: \$222,920; Project Budget: \$448,100

#### *Implementing Headwaters Restoration in Climate Resilient Basins in the Upper Missouri*

Adapting restoration practices to meet changing climatic conditions, The Nature Conservancy in Montana is focusing on headwater stream systems with the greatest potential to maintain late summer flows and cool stream temperatures. Using elevation and incoming solar radiation as driving variables, high-flow potential basins, which are resilient to climate change with respect to stream temperature and discharge have been identified and selected for restoration. By implementing a suite of proven, novel restoration approaches, this project will measurably enhance hydrologic and ecological function of streams, rivers, riparian areas, and wetlands.

### **Huron River Watershed Council**

WCS Grant: \$178,158; Project Budget: \$356,315  
*Preparing a Great Lakes River System for a Changing Climate*

The Huron River in Michigan is home to species assemblages that fill a diversity of niches necessary to maintain a functioning ecosystem. Many of these species have environmental tolerances that will help them persist as climate changes if actions are taken now to buffer against the impacts of climate change and maximize the health of the system. The Huron River Watershed Council will implement a suite of strategies that will result in improved flow management at dams, reduced fishing pressure, restored instream habitat and protected riparian vegetation that together will create conditions to allow species to adapt to a variety of climate change challenges.

### **The Nature Conservancy, Texas**

WCS Grant: \$250,000; Project Budget: \$500,000  
*Targeted tree thinning in sky island mesic canyons*

After decades of fire exclusion, sky islands in Texas, and throughout the Southwest, have very dense forests. These forests are already suffering from climate-induced stresses such as drought, insect outbreaks, and severe wildfires, all of which could intensify in a hotter and drier climate. Mesic canyons are the coolest and wettest parts of the sky islands. These canyons will harbor the largest number of species in the future because their sheltered topography moderates climate extremes. This project will focus thinning efforts in and around mesic canyons, reducing the stresses and enhancing the resilience of these natural refugia to climate change.

### **Sustainable Resources Institute, Inc**

WCS Grant: \$140,000; Project Budget: \$280,000  
*Climate-Informed Scrub Oak Restoration on the Florence County Forest, Wisconsin*

Scrub oak forests in Florence County, Wisconsin have experienced 90% mortality due to a combination of drought and other stressors, which are expected to intensify in the future. Adaptation strategies to prepare for these impacts include soil amendment with wood ash and biochar to improve the ability of the forest to tolerate increased drought stress, particularly in sandy soils with low water-holding capacity. Sustainable Resources Institute, will restore nearly 400 acres of former scrub oak forest, providing the first ever demonstration of wood-based soil amendments in a forested ecosystem in the region.

### **Lomakatsi Restoration Project**

WCS Grant: \$218,347; Project Budget: \$438,394  
*Restoring Oak Resilience at the Table Rocks, Rogue River Basin, Oregon*

Lomakatsi Restoration Project will implement mitigation practices on approximately 400 acres of oak habitats threatened by increasing summer drought and a high likelihood of uncharacteristically severe fire. Existing oak ecosystems across the Pacific Northwest are found in less than 5 to 50% of their historic distribution. Because of this many plant and animal species associated with this habitat are at risk. Protecting existing oak woodlands and restoring threatened areas is critical to reversing the declines of those species. Treatments will include vegetation density reduction through selective ecologically-based thinning and prescribed fire application, invasive species removal and herbaceous understory restoration.



## Grants Awarded in 2013

### American Rivers

WCS Grant: \$240,580; Project Budget: \$481,160  
*Headwater Meadow Restoration in the West*

The majority of California and western Nevada's fresh water comes from the Sierra Nevada, falling in winter as snow that slowly melts in spring, delivering enormous amounts of clean water to both people and wildlife. Temperature increases due to climate change, however, are reducing the depth of this snowpack and accelerating snowmelt. In response, American Rivers will restore headwater meadows using the latest climate science to identify the best locations to employ their efforts. Hydrology data will be collected throughout their project to inform design parameters that address a range of climate uncertainty, ensuring the long-term sustainability of the restored systems.

### L-A-D Foundation

WCS Grant: \$97,135; Project Budget: \$328,481  
*Enhancing the Adaptive Capacity of Ozark Woodland*

The L-A-D Foundation will implement prescribed fire treatments for shortleaf pine woodlands on 300 acres to adaptively restore and maintain a community type that is projected to do well under predicted future climate conditions. Through initiation of prescribed fire treatments on a 1,600-acre expanse of igneous and dolomite glades and woodlands with high natural integrity, this project will enhance the capacity of glade endemic species to adapt.

### Trout Unlimited

WCS Grant: \$249,110; Project Budget: \$949,987  
*Southern Appalachian Coldwater Reconnection Project*

Trout Unlimited's Southern Appalachian coldwater reconnection project will complete aquatic organism passage restoration projects on strategic coldwater streams for the long-term viability of Southern Appalachian brook trout and associated aquatic species. The project will be guided by new catchment-level climate sensitivity data coupled with population patch and genetics data to focus reconnection projects in the areas most resilient to climate change impacts and most beneficial to increased aquatic organism passage.

### The Nature Conservancy, South Carolina

WCS Grant: \$97,625; Project Budget: \$196,071  
*Establishing Living Shorelines in South Carolina*

A "Living Shoreline" uses a variety of structural and organic materials to provide shoreline protection and it provides better protection to vulnerable habitats and human communities in the face of climate change. This project will test a variety of methodologies and materials to further the understanding and use of living shorelines as an alternative to hardened shorelines as a climate adaptation strategy in the South Atlantic coastal region.

### San Diego Zoo, Institute for Conservation Research

WCS Grant: \$198,400; Project Budget: \$405,498  
*Coastal sage scrub ecosystem adaptation*

Historically, land use change was the primary threat to coastal sage scrub habitat, reducing available habitat for wildlife, introducing invasive plant species and altering the fire regime. Climate change is predicted to intensify all of these problems with increased fire frequency favoring exotic, invasive plants species over natives. This may lead to coastal sage scrub being replaced by an exotic grassland with more frequent fires. This project will promote ecosystem resilience to climatic perturbations and to predicted increases in fire frequency by reducing invasive cover and by planting coastal sage species.

### The Nature Conservancy, New York

WCS Grant: \$225,778; Project Budget: \$684,663  
*Building Climate Resilience in the Lake Champlain Basin*

Climate change is expected to impact aquatic ecosystem health due to extreme high flows and resulting scour in the Ausable River Watershed, making the incorporation of climate scenarios into streamflow projections and culvert design improvements imperative. This project will replace and redesign 8 culverts, opening at least 40 miles of currently disconnected habitat on Ausable River tributaries. The results of this work will serve as a model for future climate change improvements to culverts throughout the Northeast.

### **California Invasive Plant Council**

WCS Grant: \$159,578; Project Budget: \$319,318  
*Strengthening resiliency in Sierra Nevada meadows*

Using climate modeling integrated into CalWeedMapper, an online decision-support tool designed to guide landscape-level prioritization, the California Invasive Plant Council will target early invasions of exotic plant species with the highest potential for future spread and impact. Through extensive partnerships with the Forest Service, county Weed Management Areas, and local watershed groups, top-priority exotic plant populations will be eradicated before they invade and weaken the system.

### **Grand Canyon Trust**

WCS Grant: \$54,000; Project Budget: \$133,121  
*Water as a foundation for climate resilience*

Spring ecosystems are some of the most biodiverse in the American Southwest and provide the key water sources necessary for wildlife to move between and among habitats in this semi-arid region of the country. Unfortunately, many spring ecosystems have become degraded due to their incorporation into livestock operations. In response, The Grand Canyon Trust will pilot three new approaches for restoring spring composition and function on an 850,000-acre expanse of land owned by Grand Canyon Trust and public grazing leases administered by the United States Forest Service and Bureau of Land Management.

### **The Nature Conservancy, California**

WCS Grant: \$97,900; Project Budget: \$265,388  
*Restoring the Upper Pajaro Corridor*

Using innovative designs that benefit wide-ranging wildlife and prepare the Upper Pajaro River's floodplain for the consequences of a rapidly changing climate, The Nature Conservancy of California will re-establish native riparian woodland and wetlands, restoring a critical corridor. This project will catalyze climate change awareness through the engagement of local communities in implementation.

### **The Nature Conservancy, Indiana**

WCS Grant: \$84,425; Project Budget: \$181,825  
*Increasing resilience in southern Indiana forests*

Prolonged late summer drought-stress, when precipitation is expected to be at a minimum and temperatures at their highest, will likely have the greatest effect on mesic tree species, which are dominating dry forests in Indiana. Fire suppression has further increased the vulnerability of these forests to future climate regimes. This project aims to reduce the dominance of mesic trees within the forest understory in favor of trees more resilient to prolonged droughts. The results of this work will be used to advance discussions on the creation of climate resilient forests with private and public land stewards.

## Grants Awarded in 2012

### National Wildlife Federation

WCS Grant: \$250,000; Project Budget: \$840,205  
*Climate Smart Coastal Impoundments*

The Mid-Atlantic region is facing sea-level rise at three to four times the rate of the global average. Coastal impoundments, which provide fresh and brackish water habitat for multiple species, are at significant risk of being destroyed, threatening species that depend on this habitat. In response, this project will create coastal impoundment habitat inland and upland of an existing threatened impoundment, sharing the lessons learned about the habitat values of their conservation actions across the East coast.

### Trout Unlimited

WCS Grant: \$209,800; Project Budget: \$1,193,314  
*Securing and Expanding Coldwater Refugia*

Warming temperatures threaten a wide range of coldwater- dependent species. Freshwater habitats in five Virginia and West Virginia watersheds were prioritized for restoration based on their projected resilience to climate change, as well as their recognition as ecological hot spots for aquatic and terrestrial biodiversity. This project will restore impaired pool and cover habitat in coldwater streams by accelerating natural wood recruitment and improving stream flow through the obliteration of 15 miles of obsolete road.

### The Nature Conservancy Minnesota

WCS Grant: \$236,500; Project Budget: \$687,280  
*Adaptation Forestry in Minnesota's Northwoods*

Forests of the upper Midwest are expected to experience warmer and drier conditions in the future, threatening the survival of existing native tree species. This project will restore 2,000 acres of recently harvested forestland using a combination of native tree species that are likely to persist under future climatic conditions. Pioneering in taking a first step in helping northern forests transition to an uncertain future, this effort aims to ultimately influence the adaptive capacity of millions of acres in the Great Lakes region.

### The Nature Conservancy, Central Appalachians

WCS Grant: \$249,800; Project Budget: \$2,213,990  
*Enhancing Adaptation in Red Spruce Ecosystems*

The red spruce-northern hardwood ecosystem of West Virginia is valuable habitat, so ensuring the ability of this habitat to withstand predict climatic changes, this project will increase the size, functionality and connectivity of red spruce forest stands through land acquisition, silvacultural manipulation, tree planting, and understory spruce release with timber stand management. Through these efforts, 1,050 acres will be placed in permanent protection and an additional 840 acres of red spruce forest will be restored.

### National Wildlife Refuge Association

WCS Grant: \$172,000; Project Budget: \$486,000  
*Habitat Connectivity and Resilience in Florida's Northern Everglades*

The Florida Everglades has been named a globally significant biodiversity hotspot and provides water to 8.3 million people, making conservation and restoration of this area essential. This project will apply climate adaptation models to more than 50,000 acres of new conservation lands, negotiating easements and acquisitions, using climate science to define future habitat management and restoration actions. Building these activities with landowners and public agencies, this work aims to support the implementation of a broader vision for the new 800,000-acre Everglades Headwaters National Wildlife Refuge and Conservation Area, an important landscape for climate adaptation.

### The Conservation Fund

WCS Grant: \$162,050; Project Budget: \$369,100  
*Blackwater National Wildlife Refuge Climate Adaptation Project*

Blackwater National Wildlife Refuge is one of the largest protected marsh complexes in the Northeastern U.S. With 30,000 acres of tidal marsh, it is a vital part of the Chesapeake Bay's wildlife network. Sea level rise and marsh erosion brought about through climate change are drowning these marshes, threatening this vast, critical habitat. By planting 50 acres of switchgrass to stabilize the soil and eliminating trees just upland of the current transition zone, this project will facilitate agricultural fields and forests to become vital tidal wetlands.

### **The Nature Conservancy Oregon**

WCS Grant: \$210,241; Project Budget: \$446,684  
*Incorporating Climate Change into Tidal Wetland Restoration*

Oregon estuaries contain highly productive wildlife habitats that have undergone dramatic and detrimental conversion to farmland, ports and coastal towns. Using downscaled climate change data, this project will undertake restoration activities on the Kilchis River Preserve and the recently restored tidal marsh on the Miami River, applying new restoration designs to address the effects of climate change, including breaching levees to provide access to tidal and flood waters, re-establishing historic tidal channels and sloughs, and installing large wood and other habitat-forming features to promote soil accretion.

### **Conserve Wildlife Foundation of New Jersey**

WCS Grant: \$51,000; Project Budget: \$107,500  
*Constructing Upland Vernal-pool Habitat to Manage for Sea Level Rise*

Vernal pools are isolated, ephemeral wetlands that provide critical habitat for a wide range of species. Climate change induced sea-level rise is projected to inundate significant portions of these ecosystems. To mitigate these risks, this project will create a complex of vernal pools on the Cape May Peninsula to increase connectivity of these habitats, while fostering migration of species toward upland areas.

### **Greater Yellowstone Coalition**

WCS Grant: \$51,700; Project Budget: \$106,750  
*Linking Aquatic and Terrestrial Climate Change Adaptation*

Regional climate modeling suggests the Madison River watershed in Southwest Montana is likely to experience a significant temperature increase, impacting both aquatic and terrestrial species. To prepare for these changes, this project will restore the headwater reaches of tributaries identified as future coldwater refuges. These same tributaries are cited to become critical connectivity corridors for terrestrial species. Riparian vegetation and cover will be enhanced to facilitate successful movement of species between fragmented patches of wildlife habitat.

### **The Trust for Public Land**

WCS Grant: \$250,000; Project Budget: \$569,500  
*Protecting and Strengthening Resiliency in the White Mountains*

The White Mountain to Moosehead Lake region of New England is the pivotal east-west connector between 12 million acres in the Adirondacks and Vermont and 14 million acres in Maine. Widely recognized as an enduring landscape providing critical refugia for multiple species, this project will use the latest climate science data to inform conservation easement terms and ecological reserve design on more than 18,000 new acres of protected land.

### **The Pacific Forest Trust**

WCS Grant: \$200,750; Project Budget: \$609,500  
*Creating a Connected Conservation Network for Climate Adaptation*

The Klamath-Cascade Region of California provides an array of habitats for diverse ecological communities with forest diversity alone providing 30 conifer species, a global maximum. In addition, the watersheds in this region are the source of drinking water for 25 million Californians. Using conservation easements to create new, strategically located protected areas on private commercial forestlands, this project will improve ecosystem functionality and adaptive capacity of these forests as climate changes.

### **Sky Island Alliance**

WCS Grant: \$92,038; Project Budget: \$303,827  
*Enhancing Adaptive Capacity of Wildlife in the Sky Island*

Region Natural springs in arid ecosystems occupy a small fraction of the landscape and yet support high levels of productive biodiversity, providing much needed refugia for migratory birds, reptiles and amphibians. This project will restore ecological function to nine high-priority springs through removal or rebuilding of spring box structures, rehabilitation of native vegetation by hand-planting of riparian trees, sedges, and wetland grasses, installation of erosion control structures, and protective structures to prevent livestock or human trampling.



## Grants Awarded in 2011

### Trout Unlimited

WCS Grant: \$140,000; Project Budget: \$498,525  
*Upper Bear River Reconnect and Flow Restoration Project*

Many native fish and other aquatic and riparian species of the interior West are well-equipped to survive extremes of temperature and precipitation, but they need intact, connected habitats to do so. This project will restore over seven miles of braided river and riparian habitat, reconnecting the East Fork of the Bear River in Utah to its main stem.

### The Nature Conservancy, Virginia

WCS Grant: \$149,744; Project Budget: \$728,649  
*Implementing Climate Change Adaptation Strategies on Virginia's Eastern Shore*

Climate change adaptation strategies will be demonstrated on Virginia's Eastern Shore to inform the expansion and restoration of the Chincoteague National Wildlife Refuge. Projects will restore a functional oyster reef, improve 300 linear feet of living shoreline, create 7,000 square feet of tidal salt marsh and enhance more than an acre of existing, emergent wetlands. Once demonstrated, these types of interventions can be readily replicated along the Eastern seaboard.

### Grand Canyon Trust

WCS Grant: \$150,000; Project Budget: \$303,100  
*Restoring Beaver in Southern Utah: Keystone Engineer for Climate Change Adaptation*

Beavers can radically alter streams and valley bottom ecosystems through their dam building activities. The water storage ponds created by beavers generate a diversity of habitats and replenish aquifers, making this species a critical ally in helping natural communities adapt to predicted increases in temperature, drought severity and extreme precipitation events in an era of climate change. This project will reintroduce beavers in up to 87 stream segments in Southern Utah as well as track the benefits to ecosystems from the beavers' activities.

### Hawaiian Silversword Foundation, Inc.

WCS Grant: \$250,000; Project Budget: \$521,200  
*Kanakaleonui Bird Corridor Upslope Restoration*

Hawaii's mid-elevation forests, where most of its native bird species are found, have been warming at a faster rate than regional projections. The birds will need to move upslope to cooler areas to escape from mosquitoes that transmit avian malaria. This project aims to restore 525 acres of forested habitat in the Kanakaleonui Bird Corridor and surrounding lands to provide forest birds a continuous area of native forest that will allow them to move to higher elevations.

### Scenic Hudson

WCS Grant: \$50,679; Project Budget: \$101,928  
*Protecting and prioritizing freshwater tidal wetland migration zones along the Hudson River*

Sea level rise presents the most immediate climate change impact to the Hudson River Estuary ecosystem. This project will execute private land acquisition strategies, creating new protected areas around key tidal habitats and facilitating upslope migration and adaptation to expected sea level rise. Approximately 419 acres of privately owned tidal wetlands and intact upland floodplains will be transferred to state protection. The project will also conduct landowner outreach and land acquisition activities to protect up to an additional 1,000 acres of tidal wetlands and adjacent upland migration zones.

### The Nature Conservancy, Colorado

WCS grant: \$164,900; Project Budget: \$356,821  
*Enhancing resilience of wetland habitats to increase the adaptive capacity of Gunnison sage-grouse*

This project will restore and enhance 500-800 acres of priority brood-rearing habitat for Gunnison sage grouse using techniques that can be readily replicated in other locations. Wetland and riparian areas in three sagebrush shrubland locations will be enhanced to increase adaptive capacity of this imperiled species and other wildlife in the Gunnison Basin. The results of this work will be shared through the Gunnison Climate Working Group and the Southwest Climate Change Initiative.