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CLIMATE ADAPTATION STRATEGY

Project Title: Protecting the water supply of residents in the Rio Grande watershed through enhanced forest management and funded with an innovative public financing mechanism.

Headline Title (2-5 words): Rio Grande Water Fund

Brief Summary (Abstract):

Santa Fe residents receive approximately half of their drinking water from two reservoirs located in the Sangre de Cristo Mountains. Both reservoirs are fed by snowmelt and rainfall from a protected area of the Santa Fe National Forest which until recently was covered by unnaturally dense ponderosa pine forests. In 2002, the citizens of Santa Fe, working with the US Forest Service, The Nature Conservancy and other non-governmental organizations, developed a plan to preserve clean drinking water from the forested watershed. Thinning the forest of the overgrowth of small trees and reintroducing healthy surface fire was implemented to pilot the approach. The hope was the combination of the two processes, thinning and burning, would prevent crown fire and thus prevent flooding and sedimentation of the reservoirs.

Success from this effort has led The Nature Conservancy to propose to use the model of the Santa Fe watershed project to expand forest restoration in northern New Mexico which supplies water to more than half of New Mexico's population. By working with larger cities in the Rio Grande watershed to provide funding for forest restoration through the Rio Grande water fund, greater funding can be generated leading to implementation of forest thinning and burning at the scale that is need for climate resiliency.

Project Location: Rio Grande and Rio Chama Valleys, and the Jemez and Sangre De Cristo Mountains

Partners Include: USDA Forest Service, The Nature Conservancy, Albuquerque Bernalillo Water Utility Authority, City of Santa Fe, US Army Corps of Engineers, NM Forest Industry Association, NM Association of Commerce and Industry, NM Forestry Division, Office of the State Engineer, Bureau of Indian Affairs, Sierra Club and 33 other agencies and stakeholder groups

Background: Water is life and livelihood. Nowhere is that more true than in New Mexico. The reality is that each year the size and severity of wildfires in New Mexico increases, along with subsequent post-fire flooding that degrades rivers, streams and other critical water sources. In addition, state and federal agencies spend hundreds of millions of dollars a year reacting to these fires, not including the lost revenue to business. Without action, New Mexico's future water security is at great risk. The Rio Grande Water Fund is a solution that can bring clean water to New Mexicans for generations to come. This innovative project will invest in the restoration of forested lands upstream so we can secure clean water for communities downstream.

Forested watersheds that experience mid- to high-severity wildfires have greatly diminished water storage functions—soil doesn't absorb and hold water, and runoff during rainstorms can cause flooding and debris flows. In addition, the large amounts of sediment that move into rivers and reservoirs during these floods and flows may disrupt water delivery and storage. Other important values, such as homes, property and community infrastructure, wildlife and fish, rural economies, tourism and outdoor recreation, are also at risk when forested watersheds are severely damaged by wildfire.

Proactive steps on a large scale are needed to protect the Middle Rio Grande, Rio Chama and their

Developed by the Landscape Conservation Initiative - April 2014

Photo Credits: C. D. Allen (USGS), C. Haffey (NPS)



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forested tributaries and headwaters—an area with roughly 1.7 million acres of fire-prone ponderosa pine and mixed conifer forest (see Figure 1). Models of debris flow risk after high-severity fire indicate that key water sources are at risk. Scientists recommend 1% to 2% of fire-adapted forest landscapes be treated each year—approximately 30,000 acres per year over the next 320 years—to change fire behavior. This is a ten-fold increase in the current rate of forest and watershed restoration (between 3,000 and 5,000 acres of treatment per year).

The Rio Grande Water Fund is the tool to collect and facilitate investment in this accelerated restoration work. A water fund allows government agencies, water users, community stakeholders and others to invest in the protection of the forests that supply their water. Similar funds have been established in Latin America and some Western cities, including a successful pilot effort in Santa Fe.

Project Goals: The **goal** of the water fund is to protect storage, delivery and quality of Rio Grande water in a warming climate, through landscape-scale forest restoration and resiliency treatments in tributary forested watersheds, including the headwaters of the San Juan Chama Project.

The **objectives** of the water fund are to:

- Restore watershed functions by improving the health of streams and riparian areas.
- Reduce forest fuels in areas identified as high-risk for wildfire and debris flow.
- Maintain the reduced wildfire hazard in treated areas.
- Mitigate the downstream effects of wildfires.
- Support forest products industries to use wood by-products from forest fuel reduction efforts.
- Secure sustainable financing from water users, government, investors and donors, and facilitate payments to upstream land managers.

Strategy Goals Implemented: Goal 1, Strategy 1.3; Goal 2, Strategy 2.1; Goal 6, Strategies 6.2 & 6.3

Climate Impacts Addressed: In the U.S. Southwest, global climate change, acting in concert with extant stressors such as urbanization and over-allocation of water resources, is changing ecosystems in measureable and sometimes dramatic ways. Effects observed to date include large-scale forest dieback, large and severe wildfires, and changes in the flow regimes of rivers and streams with attendant changes to riparian and aquatic ecosystems. Rising temperatures and changing precipitation patterns are pushing ecosystems across physiological and ecological thresholds, causing widespread mortality and, in some cases, major changes in composition, structure and function.

Status of Project Implementation Timeline, Milestones, Next Steps: The Rio Grande Water Fund will have its official launch in July 2014 with one demonstration project to showcase restoration treatments in a visible location near Albuquerque. A “comprehensive plan” to guide Water Fund activities is in draft form now and will be completed by the launch date. A process to award funding to forest restoration projects that protect critical water sources will be in place by the end of 2014, with funding disbursed to large-scale restoration projects before the 2015 field season. The water fund is seeking to raise up to \$15 million per year and will award its funds annually thereafter.

Project Outcomes:



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To date, the Rio Grande Water Fund has established an advisory board, commissioned studies, conducted a priority setting process, and drafted a comprehensive plan to guide its activities.

The Rio Grande Water Fund will scale up forested watershed restoration from 3,000 acres per year to 30,000 acres, over a five year period. Expected outcomes from scaling up are:

1. Water sources necessary for agriculture, industry and residential use will be protected from damaging wildfire and post-fire debris flows.
2. Communities and homes in the Rio Grande Valley will be protected from wildfire and post-fire flooding damage.
3. Jobs will be provided in rural New Mexico communities.
4. Wood will be used to create flooring, animal bedding, pellets for heat, electricity and other locally-sourced products.
5. Habitat will be improved for many forest-dependent species, from elk to salamanders, and for cold-water fish such as trout.
6. Traditional wood uses for rural communities, such as firewood and fence posts, will be available to meet local needs.
7. Tourism will be sustained as business closures from wildfire are reduced.
8. Outdoor recreation opportunities—skiing, rafting, hunting, fishing and more—will be maintained.
9. Storage of snow in forested watersheds, and retention of snowpack into the spring, may be improved, recharging groundwater, boosting forest resiliency, and possibly increasing stream flow (under study).
10. Business environment in New Mexico will be enhanced by this long-term plan for secure water for future generations.

Funding Sources: More than \$700,000 has been raised for the Rio Grande Water Fund to date, from diverse sources that include the Lowe's Charitable and Educational Foundation, USDA Forest Service, NM Interstate Stream Commission, County Governments, and corporate and private donors. In addition, \$2 million was recently provided by the USDA Forest Service and Natural Resources Conservation Service to scale up a cross-boundary restoration project in a water fund focal area.

The \$15 million needed per year will be raised from a combination of sources including user fees from municipal water utilities and irrigation districts, corporate and private donations, and federal, state, local and tribal funding.

Contact Info: Laura McCarthy, lmccarthy@tnc.org

Photos/ Attachments:

Photo/Figure Credits (do we have permission to print YES)

Suggested Photo Caption: A choice of alternatives. Unrestored forest on right, restored forest on left.



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Las Conchas Fire 2011 in the Jemez Mountains on the first day when the fire spread 43,000 acres in 12 hours. Credit, USGS



More than 65,000 acres of severely burned lands, such as those pictured here, remained after Las Conchas Fire. Credit: USACE



Flood markings after a relatively small thunderstorm 6 weeks after Las Conchas fire. Credit: USACE





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Debris washed out of the burned watersheds following 2 small thunderstorms and into Cochiti Reservoir, disrupting water supplies for Albuquerque for 40 days. Credit: USACE



Water samples from the Jemez River, before and after Las Conchas fire and monsoon rains. Credit: Valles Caldera National Preserve.



Dead brown trout from Rio San Antonio after Las Conchas fire and post-fire flooding. Credit: Valles Caldera National Preserve.





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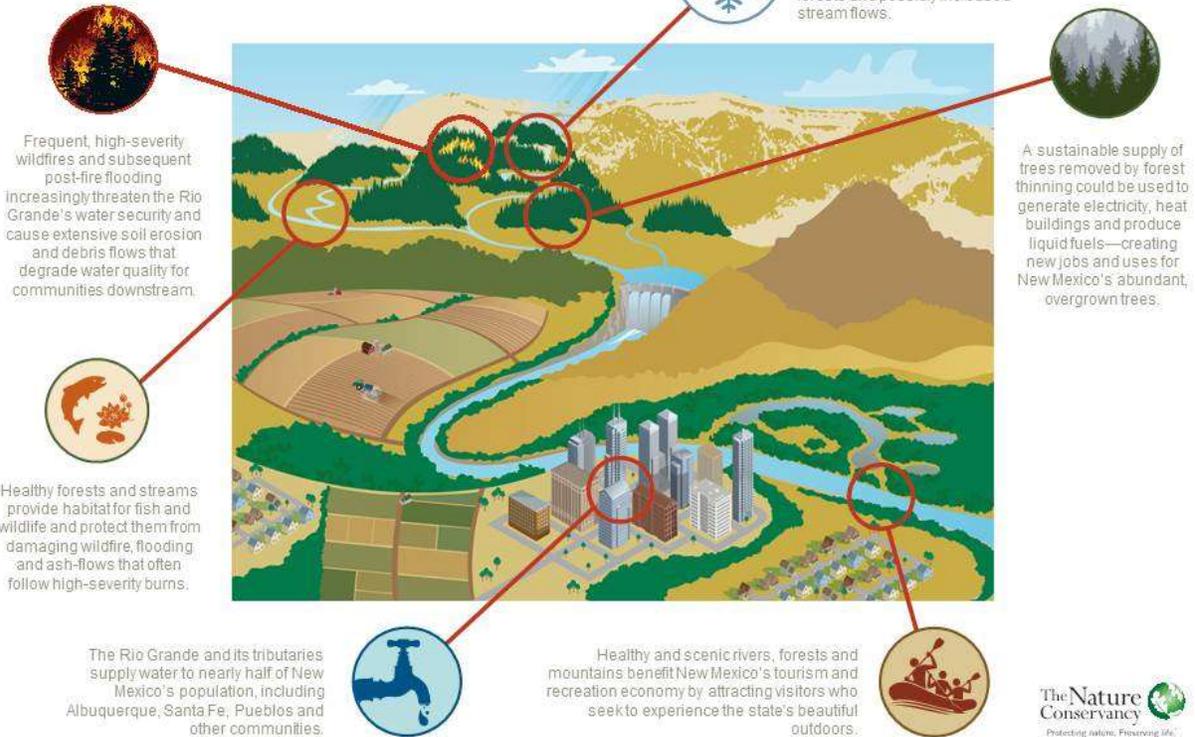
Typical overgrown ponderosa pine forest in the Rio Grande and Rio Chama Valleys and Jemez and Sangre de Cristo Mountains, with up to 2,000 tree stems per acre, compared to historical conditions of 100-120 trees per acre. Credit: Santa Fe National Forest



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Rio Grande Water Fund

Restoring essential forested lands upstream will ensure a continuous supply of clean water downstream





Example Submission

Project Title: “Assessing the vulnerability of species and ecosystems to projected future climate change in the Pacific Northwest”

Headline Title (2-5 words): Pacific Northwest Vulnerability Assessment

Brief Summary (Abstract): A collaborative project to assess the vulnerability of species and ecosystems to future climate change impacts in the Pacific Northwest.

Project Location: Washington, Idaho

Partners: This project is a collaboration among researchers, managers, and planners at the [University of Washington](#), [U.S. Geological Survey](#), [The Nature Conservancy](#), the [National Parks Service](#), the [U.S. Forest Service](#), the [Washington Department of Fish and Wildlife](#), the [University of Idaho](#), the [National Wildlife Federation](#), the [Oregon Department of Fish and Wildlife](#), and [Idaho Fish and Game](#).

Background: In the Pacific Northwest temperatures have increased by about 0.8 °C and models project warming of 1.8°C by the 2040s and 3.0°C by the 2080s . Precipitation is also projected to change, with general increases projected for the Pacific Northwest, and with a more intense seasonal precipitation cycle - autumns and winters may in fact become wetter and summers may become drier. Further, regional climate models indicate that extreme precipitation in western WA will increase and the snowpack in the Cascades will decrease. Although the trend in direction of change is broadly recognized, there is uncertainty associated with what actual extent of changes may occur through time and in local areas.

Project Goals: The goals of this project are to incorporate climate change information into management planning and implementation efforts by providing: (1) downscaled regional climate models (~1km), (2) simulated shifts in vegetation, (3) an extensive database of documented species vulnerabilities, (4) models of species range shifts for selected species, (5) summaries of the extent of uncertainty in the climate, vegetation, and species changes, and lastly (6) a collaboration of resource managers working to incorporated climate change information into management planning and implementation efforts.

Strategy Goals Implemented: Goal 2, Strategy 2.2, Action 2.2.1 Use vulnerability assessments to design and implement management actions at species to ecosystem scales.

Goal 2, Strategy 2.1, Action 2.1.3 Identify species and habitats particularly vulnerable to transition under climate change

Climate Impacts Addressed: Impacts on species and habitats



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Status of Project Implementation: Project is ongoing. Currently, over 570 species are in the database and nearly 200 are complete.

Project Outcomes: The Pacific Northwest vulnerability assessment includes two distinct components; first, a database that highlights and details the sensitivity of species and habitat in the study region. The estimated sensitivity of individual species will be based on the ability of the species to disperse and whether dispersal barriers exist, dependency on disturbance regimes (e.g. fire or flood), physiology (e.g., temperature, salinity), dependency on climatically-sensitive habitat requirements (e.g., alpine areas, shallow wetlands), whether the species is a generalist or specialist, and whether the species existence is tied to other specific species. The second component of the assessment involves modeling the potential effects of climate change on species and habitats. This includes: 1) downscaling the climate change projections, 2) simulating potential changes in vegetation, and 3) modeling potential effects on the distribution of 12 focal wildlife species using a hierarchical approach.

Funding Sources: USFWS, TNC, University of Washington, National Park Service, National Wildlife Federation, USGS

Photos/Attachments: www.climatevulnerability.org

Photo/Figure Credits (do we have permission to print):

Suggested Photo Caption: