



Preparing for a Changing Climate

Valle de Oro National Wildlife Refuge

About the Refuge

Valle de Oro National Wildlife Refuge is the Southwest's first urban wildlife refuge and the first U.S. Fish and Wildlife Service unit developed in accordance with the Standards of Excellence for Urban Refuges, a guiding strategy for engaging urban communities in wildlife conservation. This location serves as an essential ecological, educational, and recreational resource for the greater Albuquerque metropolitan area.

Upon the refuge's inception in 2012, FWS stated its dedication to cultivating a 21st century conservation ethic by reconnecting urban citizens to the natural world. FWS collaborated with other federal and regional entities to accomplish this mission and, since the refuge's dedication, have continued these partnerships to resolve other challenges. Together, the partners have designed important flood mitigation infrastructure, developed and found funding for alternative transportation routes, and researched climate change to advise and draft sound plans for the region's future.

Preparing for Climate Change in Central New Mexico

Across the United States, communities are increasingly wondering how a changing climate will affect the natural environments and physical infrastructure where they live, work, and play. Climate change has the potential to dramatically alter which plants and animals live in a region, as well as how cities develop and what roads, bridges, or other infrastructure may be at risk to extreme weather, droughts, wildfires, or floods.

The U.S. Fish and Wildlife Service's (FWS) mission is to conserve, protect, and enhance fish, wildlife, and plants



and their habitats for the continuing benefit of the American people. As such, FWS is dedicated to preparing for and mitigating the impacts of climate change to protect natural habitats and the benefits that healthy ecosystems provide for communities.

In the Albuquerque region, FWS is addressing climate change by:

- Participating in research to better understand how climate change may affect Central New Mexico
- Developing a new urban refuge, Valle de Oro National Wildlife Refuge (NWR), which helps FWS conserve and enhance native habitat, provides flood protection for surrounding communities, and provides opportunities for local residents to experience and learn about the natural environment
- Providing a transferrable model that FWS refuges around the U.S. can adopt

How Might Climate Change Affect Central New Mexico?

FWS collaborated with federal and regional partners to conduct research through the Climate Change Scenario Planning Project (CCSP), which studied potential temperature and precipitation changes, and projected associated impacts on area wildlife, in order to inform planning for the region's future.

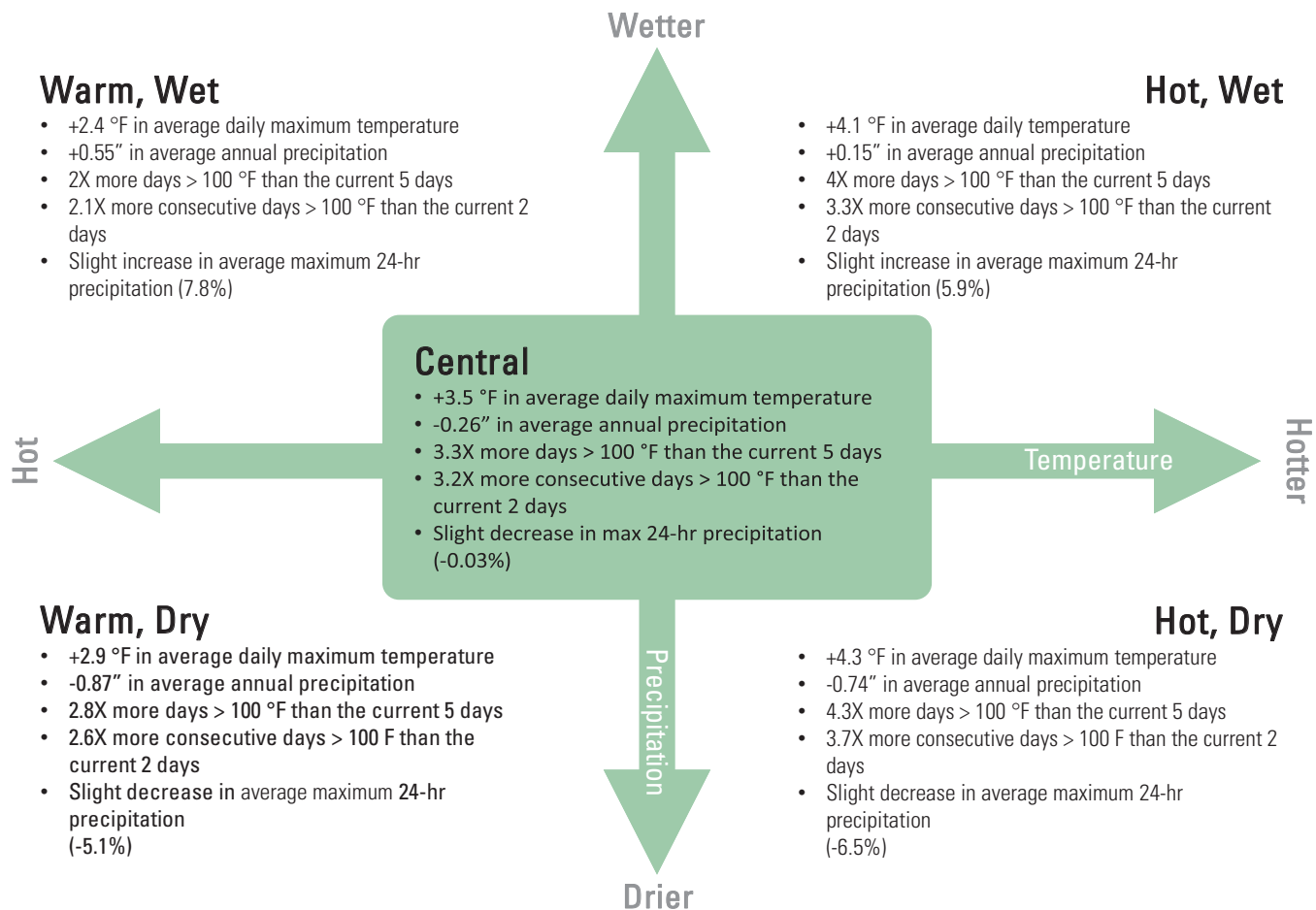
According to the CCSP's findings, by 2040, the Central New Mexico region will experience a 2.4 °F to 4.3 °F increase in annual average temperature and between a 13% decrease to 10% increase in average annual precipitation. Temperature changes are projected to be more pronounced in the summer and there will be more drought regardless of precipitation changes due to increased evaporation from higher temperatures.

Based on sophisticated modeling, climatologists also expect more and longer heat waves, less snowfall and snow cover, and more extreme, variable precipitation. This means that although there may be more drought in the future there may also be more heavy rain events and floods.

Temperature and precipitation strongly influence the number and distribution of species. These changes have profound implications for natural resources and habitat both on the refuge and region-wide. The potential effects of climate change on species and ecosystems include:

- Declines in species populations and shift in distribution
- Changes in plant and animal life cycles
- Increased invasion by exotic species
- Spread of pathogens and pests
- Further fragmentation of habitat and wildlife corridors

Possible Climate Futures for Central New Mexico: 2040



Increased drought and higher temperatures will lead to increased wildfire activity, colonization by invasive species, insect outbreaks, and overall reduction in river and stream flows. Hastened by these impacts, plant communities will transition from current woodlands and grasslands to the more arid Chihuahuan desert scrub. Lower stream flow will lead to channel narrowing and loss of riparian habitat, which is vital to the region's endangered and threatened species and water quality.

Invasive species, particularly the Salt cedar or tamarisk (*Tamarix* spp.), are associated with water drawdown, floodplain loss, and increased fire risk, which further degrades conditions in riparian areas. The species is able to establish in sites that are less suitable for native flora. As climate changes, tamarisk are likely to spread and outcompete native cottonwood species.

To better prepare the region for these events, the CCSP developed several climate futures using global climate models downscaled to the region. These

scenarios describe a range of possible temperature and precipitation changes (see above figure).

More information about the CCSP can be found at: www.volpe.dot.gov/NMScenarioPlanning

Urban Refuges Contribute to Local Preparedness

FWS is contributing to local preparedness to climate change and extreme weather by developing a new urban refuge, Valle de Oro NWR. The refuge is located in an increasingly urbanized area on a 570 acre former dairy farm five miles south of downtown Albuquerque. FWS acquired the refuge, in partnership with the Trust for Public Land, the Albuquerque Arroyo Metropolitan Flood Control Authority (AMAFCA), Bernalillo County, the State of New Mexico, and the U.S. Bureau of Reclamation to create an urban oasis for both wildlife and people, just minutes from downtown Albuquerque.

FWS is now working with partners and the surrounding community to finalize

Local Threatened and Endangered Species Affected by Climate Change

Climate change will further exacerbate risks to federally listed endangered and threatened species in the Middle Rio Grande primarily through the loss of riparian habitat. Among the species to be most affected are:

- Rio Grande silvery minnow (*Hybognathus amarus*)
- Southwestern Willow Flycatcher (*Empidonax traillii extimus*)
- Jemez Mountain Salamander (*Plethodon neomexicanus*)
- New Mexico Jumping Meadow Mouse (*Zapus hudsonius luteus*)
- Mexican Spotted Owl (*Strix occidentalis lucida*)
- Pecos Sunflower (*Helianthus paradoxus*)
- Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)

Contributing to National Climate Preparedness through the National Wildlife Refuge System

Valle de Oro NWR is a local example of FWS's efforts to address climate change across the country. FWS has adopted a strategic plan, called *Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change*, which details three related strategies:

1. Adaptation – Preparing or adjusting natural or human systems in response to changing climate conditions and ecosystems. For FWS, adaptation means planned, science-based management actions to help reduce the impacts of climate change on fish, wildlife, and their habitats.

2. Mitigation – Mitigation strategies to reduce the causes of climate change include using less energy, consuming fewer materials, and changing land management practices to store more carbon in natural ecosystems. FWS is undertaking mitigation by reducing the greenhouse gas emissions of its operations and transportation systems and by preserving the natural landscapes that store carbon.

3. Engagement – Reaching out to FWS employees, partners, stakeholders, and citizens to join forces and seek solutions to the challenges to fish and wildlife conservation posed by climate change.



designs and management plans for Valle de Oro NWR, which will include restoring the types of ecosystems that historically occurred in the area, including riparian forest, wetlands, and open meadows. The refuge will provide an opportunity for FWS to improve habitat for native wildlife and plants, and for Albuquerque residents to experience and learn about these natural habitats.

In addition to conserving habitat, Valle de Oro NWR will serve as an important piece of “green infrastructure,” playing a role in the region’s flood protection and storm water management. Historically, the refuge site contained natural drainage habitat features that slowed the movement of storm runoff from surrounding uplands and allowed sediment to drop out on the site before entering the Rio Grande. In the refuge’s acquisition and planning, FWS worked with AMAFCA to develop plans to restore these natural drainage features as part of AMAFCA’s drainage and water quality management plan.

In sum, Valle de Oro NWR will increase the region’s resiliency to climate change and extreme weather impacts in three primary ways:

1. **Preserve habitat:** The refuge will conserve, restore, and enhance crucial habitat, which will make it easier for native species to adapt or migrate due to changing environmental conditions.

2. **Mitigate flooding:** Climate models project that the Albuquerque region may experience more severe heavy

precipitation events, which may exceed the region’s flood management infrastructure capacity. Increasing the region’s natural drainage capabilities by restoring historic habitats will help store runoff from future storms.

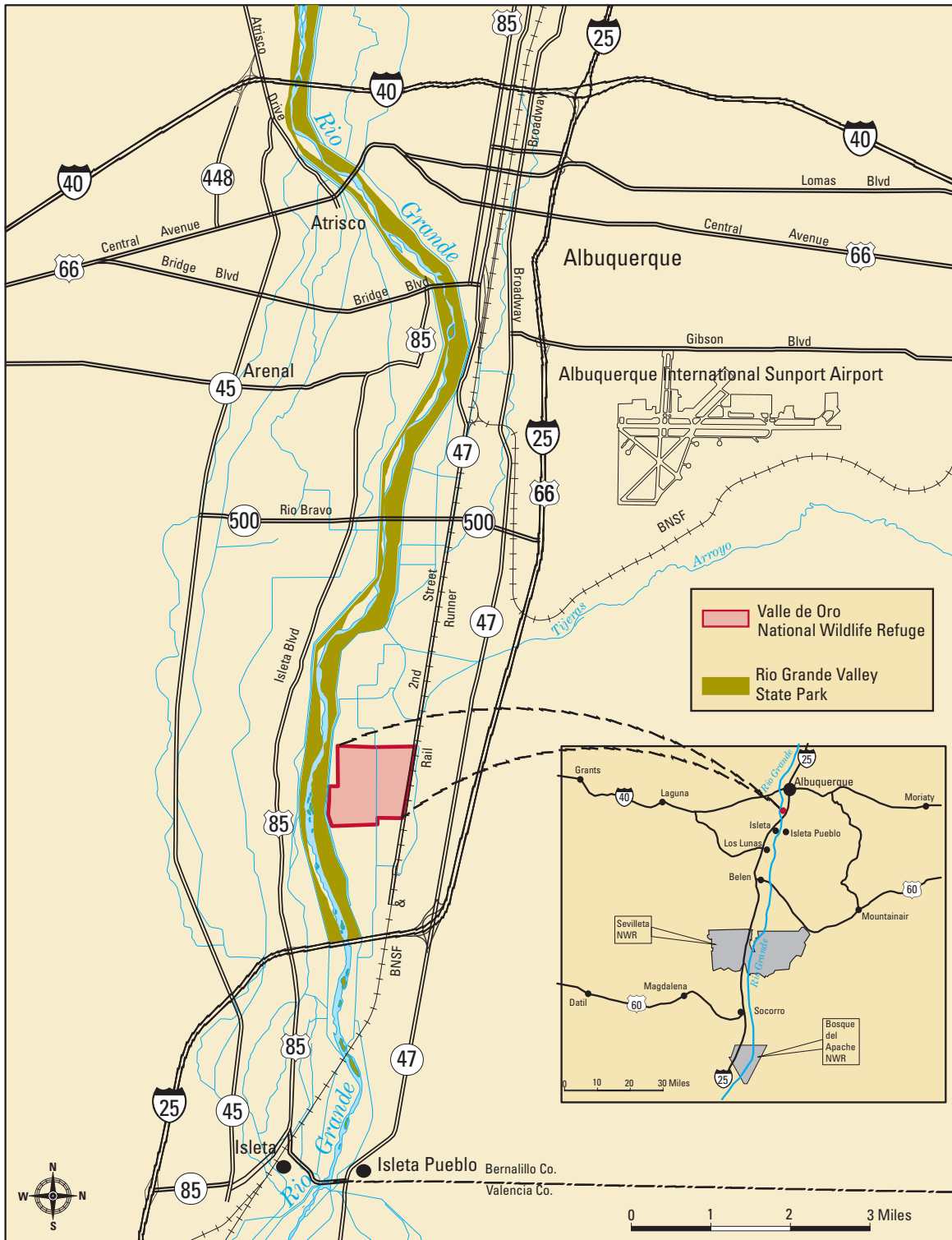
3. **Educate the public:** Developing a new refuge easily accessible to urban populations in New Mexico will help current and future generations connect to the natural world. Valle de Oro NWR will provide an opportunity for residents to learn about native habitats in New Mexico and how they may be affected by climate change. This can help the region prepare for and reduce the impacts of climate change and help the region adapt to its effects on the natural environment and local communities.

In addition to these activities, Valle de Oro NWR is working to reduce its contribution to greenhouse gas emissions by working with Bernalillo County and other local partners to develop green low impact development infrastructure, pedestrian and bicycle connections and transit routes that access the refuge.

Conclusion

At Valle de Oro NWR, FWS is achieving multiple goals to reduce and prepare for the impacts of climate change. FWS’s work restoring ecosystems and mitigating the effects of climate change in the Albuquerque region provides a model for how wildlife refuges around the country can pursue mutually beneficial climate change strategies with local partners.





Learn More About the Project

- www.fws.gov/refuge/valle_de_oro
- www.facebook.com/ValleDeOroNationalWildlifeRefuge
- www.amafca.gov/projects/valledeoro.html
- www.volpe.dot.gov/NMScenarioPlanning

Images:

Staff rounding up alligator snapping turtles, Alligator Gar Fry: USFWS Southwest
Swainson's egret: Steve Valasek
Central New Mexico Climate Futures: 2040: U.S. Department of Transportation, Volpe Center
Context Map: USFWS