Basin Report: Rio Grande

The Rio Grande Basin, located in the southwestern United States, provides water for irrigation, households, environmental, and recreational uses in Colorado, New Mexico, and Texas, as well as Mexico. Reclamation projects within the basin include the Closed Basin Project, Colorado; the San Juan-Chama trans-mountain diversion project, between Colorado and New Mexico; the Middle Rio Grande Project, New Mexico; and the Rio Grande Project, in New Mexico and Texas. These projects support approximately 200,000 acres of irrigated agriculture, which produces alfalfa, cotton, vegetables, pecans and grain, for municipalities, tribes, and industry. Reclamation's facilities provide critical water and power for industry and communities, including Albuquerque and Las Cruces, New Mexico; El Paso, Texas; and Ciudad Juarez, Mexico. The Rio Grande Basin supports critical habitat for the Rio Grande silvery minnow and the southwestern willow flycatcher – designated as endangered under the Endangered Species Act. To protect these critical resources, Reclamation and stakeholders must continually evaluate and report on the risks and impacts of climate change and identify appropriate adaptation and mitigation strategies by utilizing the best available science.

Future Changes in Climate and Hydrology

Reclamation's 2016 SECURE Water Act Report identifies climate challenges the Rio Grande River Basin could likely face:

- Climate projections suggest that temperatures throughout the Rio Grande are projected to increase by roughly 5–6 °F during the 21st century.
- Climate projections suggest that annual precipitation in the Rio Grande Basin will remain variable over the next century.
- Warmer conditions are projected to transition snowfall to rainfall, decreasing April 1st snowpack and April-July runoff in the Rio Grande Basin.

Future Impacts for Water and Environmental Resources

Historical and projected climate changes have potential impacts for the basin:

- Spring and early summer runoff decreases may translate into water supply reductions for meeting irrigation demands, adversely impacting hydropower operations and increasing winter flood control challenges.
- Warmer conditions might result in increased stress on fish such as the silvery minnow, increased water demands for instream flows for ecosystems and increased invasive species infestations.
- The Rio Grande Basin is heavily reliant on ground water for municipal and rural uses. Warmer conditions might increase evaporation and decrease runoff, which will likely result in less natural groundwater recharge. Larger decreases in groundwater levels are projected due to surface-water shortages, which will increase incentives for groundwater pumping.

Rio Grande River Basin Water Resource Studies

Adequate and safe water supplies are fundamental to the health, economy, and ecology of the United States, and global climate change poses a significant challenge to the protection of these resources. Reclamation is taking a leading role in assessing risks to western U.S. water resources and is dedicated to mitigating risks to ensure long-term water resource

sustainability. To accomplish this, Reclamation has conducted or initiated four climate impact and basin studies since 2011 in the Rio Grande River Basin under its WaterSMART program:

- **Upper Rio Grande Impact Assessment** - Reclamation conducted the Upper Rio Grande Impact Assessment to determine baseline risks to water supplies and demands to establish a foundation for more in-depth analyses and the development of adaptation strategies. The study was conducted by the Bureau of Reclamation in partnership with Sandia National Laboratories and the U.S. Army Corps of Engineers.
- **Lower Rio Grande Basin Study** - Reclamation partnered with the Rio Grande Regional Water Authority (RGRWA), which is represented by 53 member entities, to fund the study. The study area encompasses 122,400 square miles along the United States/Mexico border from Fort Quitman, Texas, to the Gulf of Mexico.
- **Santa Fe Basin Study** - Reclamation partnered with the City of Santa Fe and County of Santa Fe to fund the study. The study area focuses on the Santa Fe River Basin in northern New Mexico, but also includes water sources in New Mexico and southern Colorado that provide water supply to the City of Santa Fe and Santa Fe County. These sources include the Upper Rio Grande, Reclamation's San Juan-Chama Project, and local groundwater supplies.
- **Pecos River Basin Study** - Reclamation partnered with the New Mexico Interstate Stream Commission to fund the study. The study focuses on the Fort Sumner Underground Water Basin (Fort Sumner Basin), within the Pecos River Basin, New Mexico, and also includes a general assessment of climate-change impacts and potential adaptation strategies in the entire Pecos Basin of New Mexico.

Adaptation and Coordination

Where opportunities exist, Reclamation participates in coordinated adaptation actions in response to climate stresses, as well as changes in land use, population growth, invasive species and other stressors. These activities include extending water supplies, water conservation, hydropower production, planning for future operations, and supporting rural water development. Specific examples of coordination and adaptation in the Rio Grande River Basin include:

- **United States Geological Survey National Water Census: Upper Rio Grande Basin Focus Area Study** – This study seeks to improve estimates of selected water budget components to assess water availability and use in the Upper Rio Grande Basin of Colorado, New Mexico, and Texas.
- **Middle Rio Grande Endangered Species Collaborative Program**, which includes 16 federal, state, and local governmental entities, Indian tribes and Pueblos, and nongovernmental organizations representing diverse interests.
- The **Lower Rio Grande Basin Study**, conducted in partnership with the Rio Grande Regional Water Authority (RGRWA), which includes 53 member entities.