

Rio Grande

Rio Grande Irrigation, Vitality, and Ecosystem Restoration (RIVER)

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Outline

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Mission Statement

The mission of RIVER is to ensure the health and sustainability of the Rio Grande watershed to enhance natural biodiversity while also promoting sustainable use. We hope to minimize use of the river and increase biodiversity by 30% by 2050 while also ensuring equitable access among communities.

Background & History

Background: ([Source](#))

- 4th longest river in the U.S.
- Over 1,900 miles long
- Originates in Southern Colorado and flows through New Mexico and Texas
- Ends into the Gulf of Mexico
- 10th most endangered river in the world
- 80% of the water taken from river is used for irrigation

History: ([Source](#))

- 1830s: center of border dispute between South Texas & New Mexico
- 1884: officially became the border between Mexico and the U.S.
- 1899: Chamizal Dispute over area between El Paso and Ciudad Juárez
- 1978: Established as a Wild & Scenic River
- 1997: Declared an American Heritage River



Agreements

	Rio Grande Basin	
1906 Convention- US and Mexico	1938 Rio Grande Compact- CO, NM, TX	1944 Treaty- US and Mexico
US: <ul style="list-style-type: none">- must annually deliver 60,000 AF (acre-foot) of water to be used in Juarez Valley- ... under regular conditions... reduced during periods of drought	Equitable water distribution between the 3 states' rights and needs	Mexico: <ul style="list-style-type: none">- must deliver 350,000 AF (acre-foot) annually to the US- 6 major tributaries that feed into the Rio Grande: Mexico has the rights to $\frac{2}{3}$
	Measure and monitor water use, resolve disputes, and coordinate water management efforts among the 3 states	US: <ul style="list-style-type: none">- Right to all flows from Rio Grande tributaries in the US- 6 Mexican tributaries: US has rights to $\frac{1}{3}$
		Created the International Boundary and Water Commission (IBWC)

Management & Oversight



- ★ **The International Boundary and Water Commission (IBWC)** ([source](#))
 - Jointly run by the US and Mexico
 - Operates and maintains flood control levees, storage reservoirs, diversion dams, and wastewater treatment plants on the U.S.-Mexico border
- ★ **Environmental Protection Agency (EPA)**
 - Water quality monitoring and assessment (National Water Quality Inventory and Clean Water Act), and programs to prevent and control pollution from various sources
 - Ex: 2025 funding for 11 projects to reduce air pollution, improve water quality, and waste management ([source](#))
- ★ **U.S. Bureau of Reclamation (USBR)** ([source](#))
 - Water management, infrastructure development, flood control, environmental restoration, and interstate cooperation
- ★ **Federal, state, local**

Problem 1 - Forest Fires



Background ([source](#))

- The 2011 Las Conchas fire burned 150,000 acres
- Caused by a tree falling on a power line during extreme heat and drought and spread rapidly
- After, rain washed soot and ash into the Rio Grande River

Impacts ([source](#))

- Post fire erosion = increased turbidity
- Increased turbidity + suspended solids = increased fish mortality
- Decrease in fish and aquatic macroinvertebrates (indicator species) = decreased water quality



Problem 1 - Solutions

Solution 1: Fuel Reduction

- We will use strategies such as controlled and prescribed burns, as well as mechanical thinning to reduce the amount of flammable vegetation in the forests surrounding the Rio Grande River
- If a forest fire is to occur, there will be less fuel allowing the fire to be more easily contained

Solution 2: Upstream Forest Health Management

- We will implement techniques such as reforestation, invasive species removal, and logging to focus specifically on forest health upstream of the Rio Grande
- By promoting good forest health upstream, the water downstream that so many people rely on will become cleaner and readily available for use

Problem 2: Overuse

Background

- Used for irrigation in agricultural developments
- Populations along the river are increasing as is use
- Owned by irrigators who refer to use as “water rights”

Impacts ([Source](#))

- Climate Change is leading to increased sublimation
- Cottonwood Tree populations dwindle and invasive species like Salt Cedar increase
- Decrease in insects lead to endangerment of Southwestern Willow Flycatcher
- Only had 2 years in the last decade with a “full supply” of water



Problem 2 Solution



1. Dams Along the River

- Could control amount of water diverted to each agricultural area
- Setting limits on water withdrawals
- Set 5 small dams along the river

2. Crop Optimization Strategy ([source](#))

- Shifts agricultural focus to less water-intensive crops and transforming some land into restored wildlife habitat
 - Could compensate farmers to boost incentive
 - Match price of crops lost due to restored wildlife land

3. New “Water Rights” System

- Prioritizes the environment and local communities
- Work with native tribes that live along the river ([source](#))

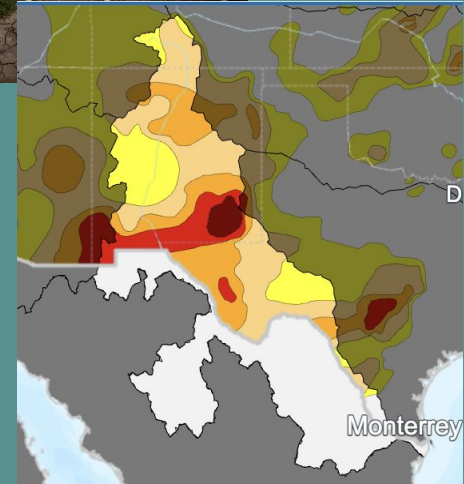
4. Cross-Border Cooperation ([Source](#))







- 1944 Treaty split up river evenly among U.S. and Mexico
- Priority of river should be given to vulnerable communities regardless of nationality
- 40% of the water use should be given to vulnerable communities along river first



Problem 3 - Drought

- **Increasing population** -> more use
 - Not enough time to recharge
- **Drought** (increase of drier seasons from climate change)
 - Farmers are solely dependent on Rio Grande for crops
 - High value crops -> citrus, vegetables, sugar cane need irrigation water
 - Cotton, corn, and sorghum can be produced in dryland, but without irrigation water the yields are cut in half
 - **\$496 million** direct impact of crop loss
 - **\$994 million in indirect** (fuel, labor, machinery, etc)
 - **Loss of 8,400 full-time jobs** ([source](#))
 - Have to capture endangered silvery minnow and small fish + transport them to wetter areas
- **Rio Grande Valley**
 - Cattle ranchers sell cattle -> no grass or hay to feed
 - Crops can't be planted -> too dry ([source](#))
- **Mexico is falling behind on water payments to the US**
 - Farmer protest in Mexico 2020 ([source](#))



Legend		
Drought & Dryness Categories		
	D0 - Abnormally Dry	% of Rio Grande Region
	D1 - Moderate Drought	0%
	D2 - Severe Drought	0%
	D3 - Extreme Drought	0%
	D4 - Exceptional Drought	0%
	Total Area in Drought (D1-D4)	0%

Problem 3 Solution

- **Water Conservation ([source](#))**
 - Upgrade water infrastructure to minimize leaks and losses
 - Conserve water during wet seasons to use for dry seasons
- **Groundwater use-** use for drinking water- reduces pressure off river
- **Treat rainwater and distribute (reclamation) ([source](#))**
 - For safe drinking water
 - However, requires new delivery infrastructure, money, and increase in cost of water for residents
- **2021 Rio Grande Regional Water Plan ([source](#))**
 - Addresses drought resilience, water quality management, ecosystem protection, water supplies for agriculture, industry, and environment
- **Purple Water**
 - **Sewage water used for agriculture-** saves 35-45% of water ([source](#))
- **Agricultural changes**
 - Cattle ranchers can make agreements to send livestock to different farm location during dry season to ease the pressure
 - Change the crops you grow to more drought resistant produce
 - Cons: costly



Conclusion/Recommendation

Government:

- Government aid during drought period
- Revisit the 1944 treaty given the changes in environment due to climate change
- Get community feedback before implementing new policies
- Cap the sizes of farmland
 - No new farms/farms cannot exceed a certain acreage

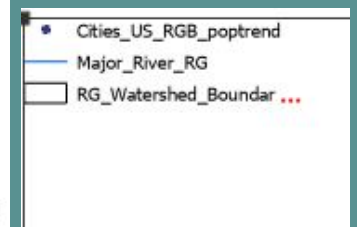
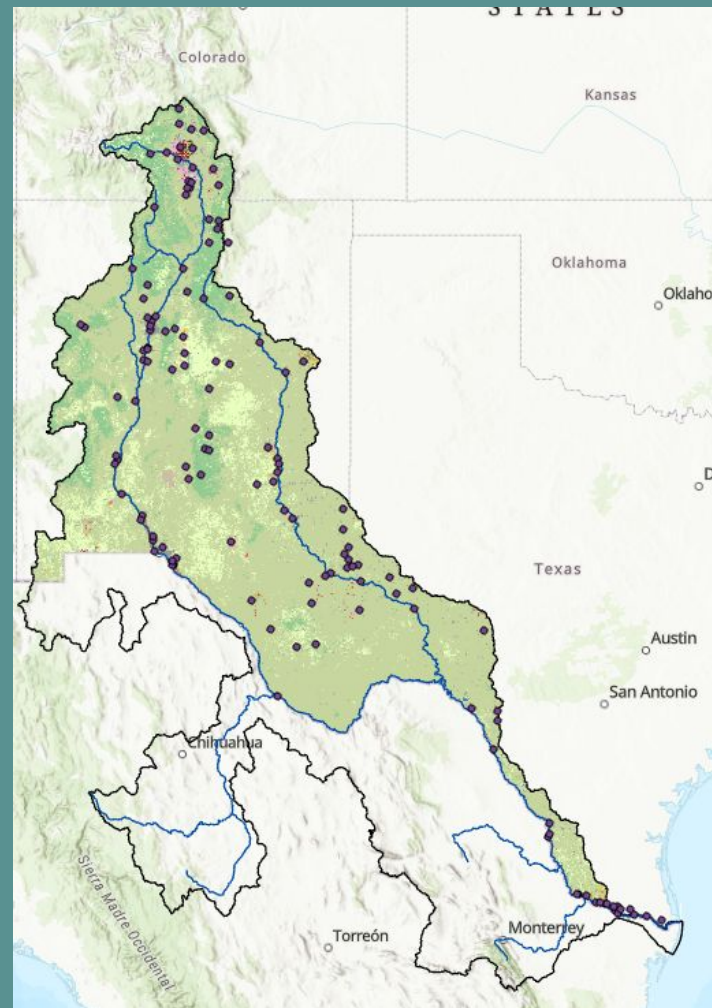
Infrastructure:

- Build reservoirs for water collection
- Funds raised for water reclamation infrastructure
- Build more pumps that use Purple Water for agriculture

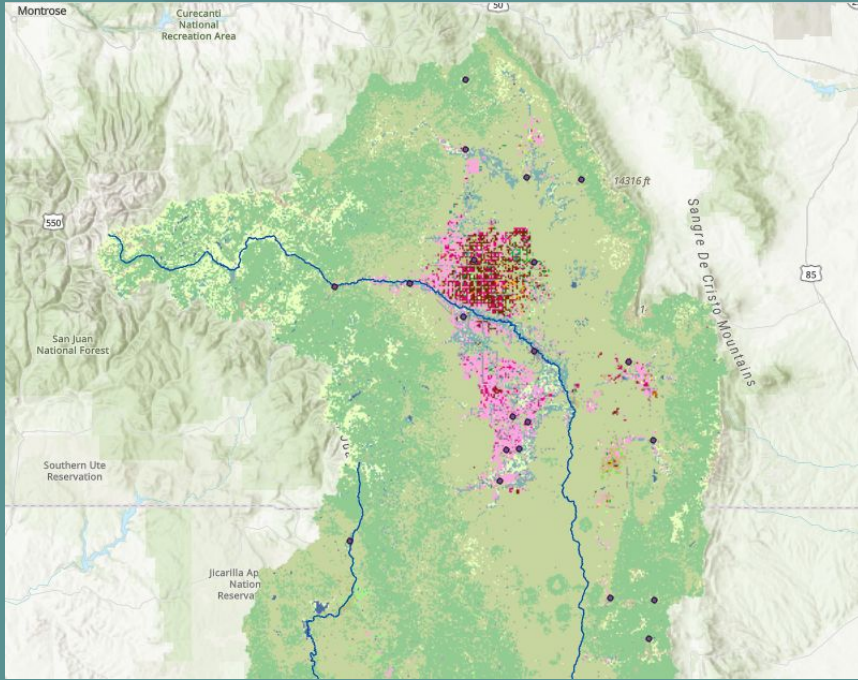
Biodiversity:

- Upstream forest replenishment -> water filtration and cooling of environment
- Protect minnow and small fish populations through relocation before drought
- Restore agricultural land to restored wildlife habitat

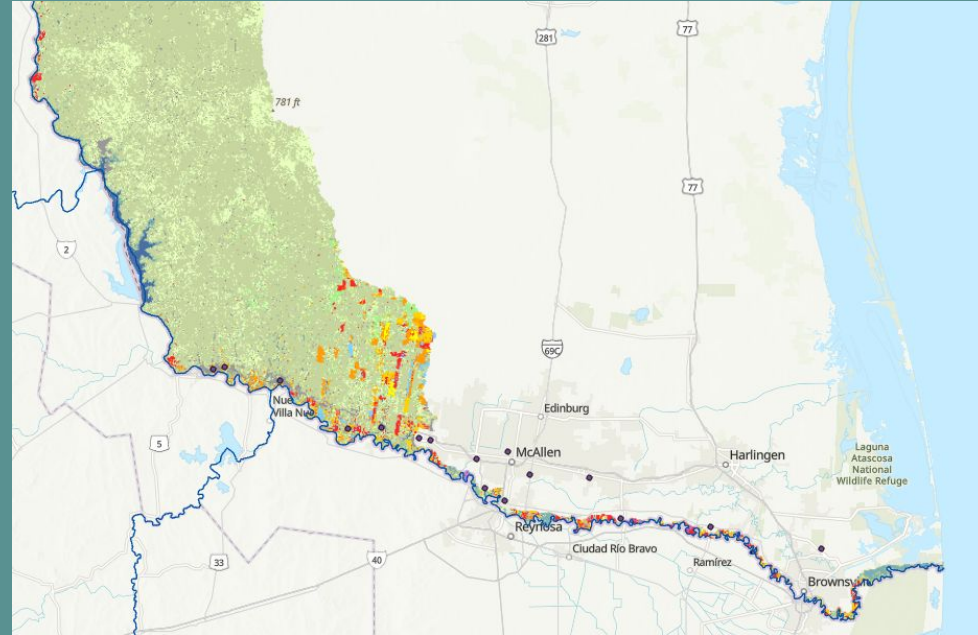
River basin boundary, Rio Grande River, farmland, populated cities



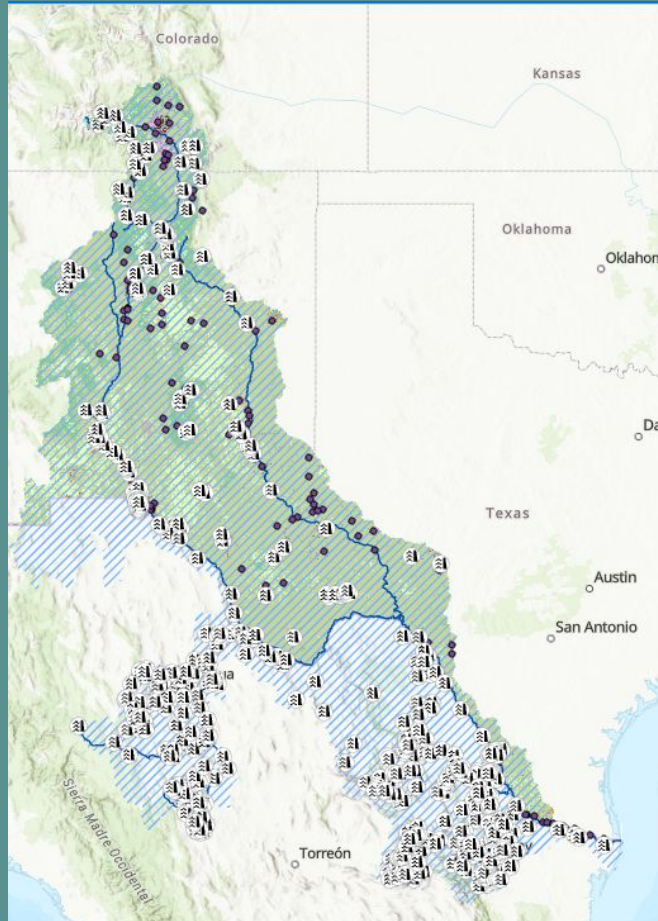
US top of river



Mexico bottom of river



Dams



- Dams_RG
- Cities_US_RGB_poptrend
- Major_River_RG
- RG_Watershed_Boundar ...