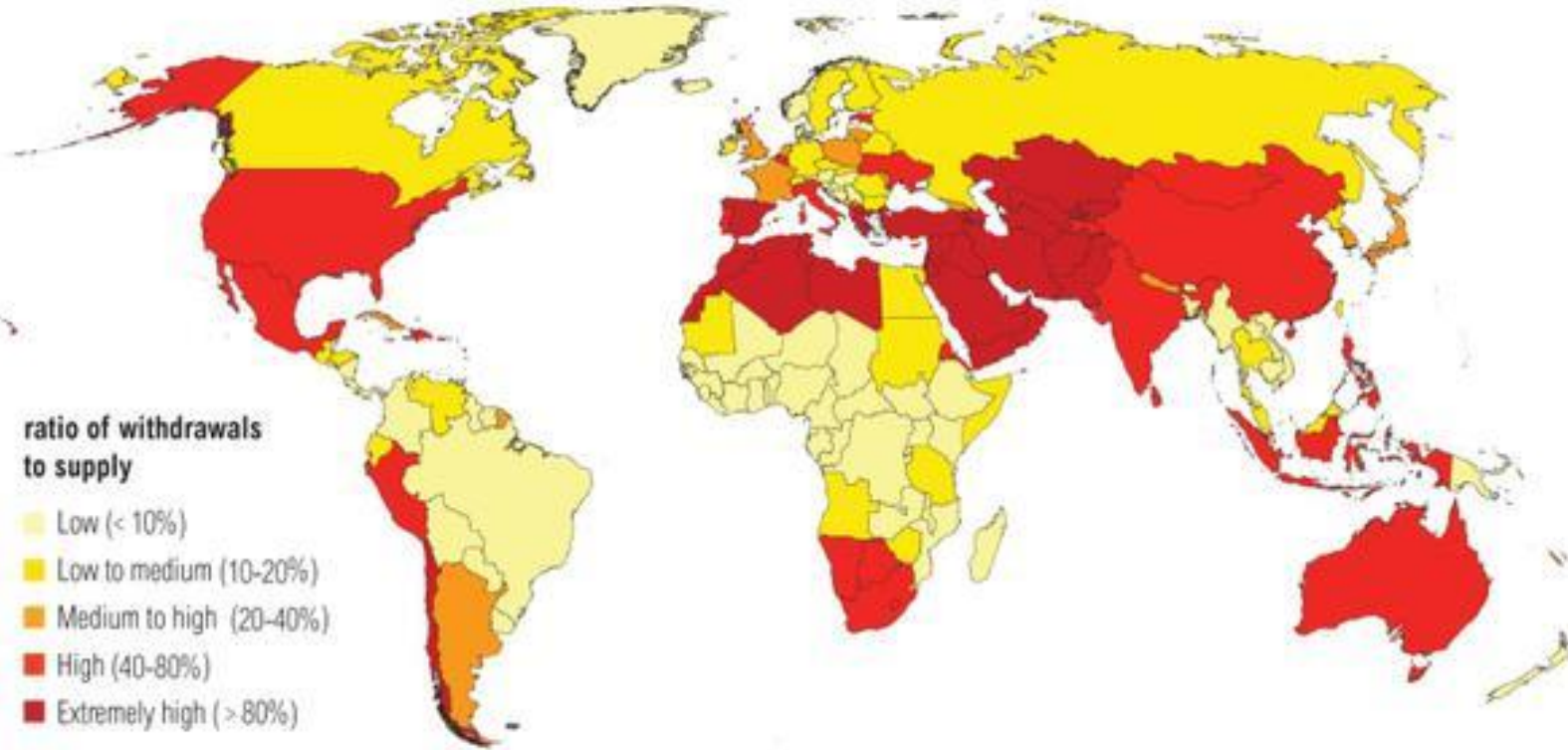


An aerial photograph of a river basin. The river is a vibrant blue-green color, winding through a landscape of dry, yellowish-brown earth. Two large, irregularly shaped islands of dense green forest are situated in the middle of the river. The island on the right is partially obscured by a bright orange and red fire, with thick white smoke rising from it. The overall scene suggests a stark contrast between a healthy ecosystem and the impact of climate change.

Climate Change in the Rio Grande Basin: adaptability and challenges

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Senior Research Scientist
Texas Water Resources Institute ·
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Water Stress by Country: 2040




ratio of withdrawals
to supply

- Low (< 10%)
- Low to medium (10-20%)
- Medium to high (20-40%)
- High (40-80%)
- Extremely high (> 80%)

NOTE: Projections are based on a business-as-usual scenario using SSP2 and RCP8.5.

For more: ow.ly/RiWop

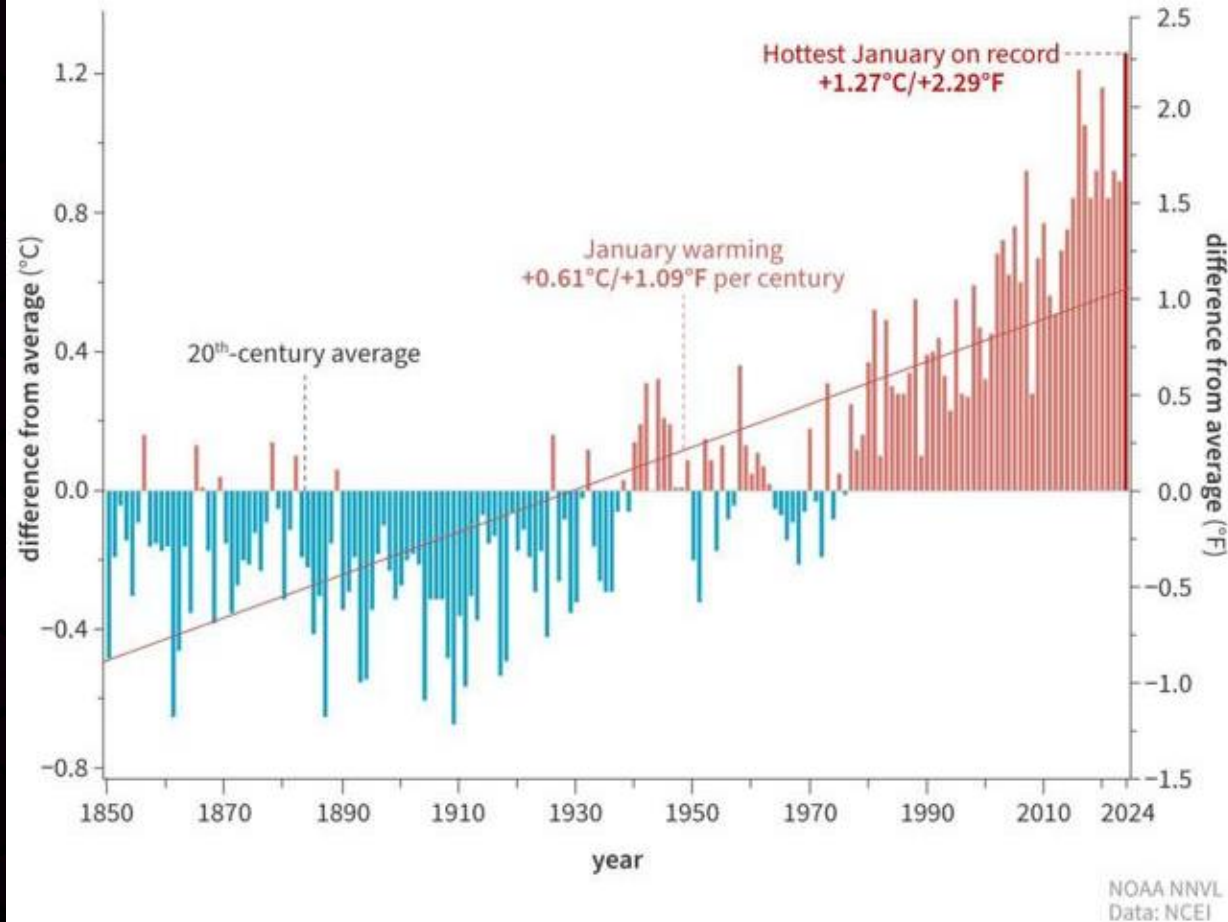
 WORLD RESOURCES INSTITUTE

Climate uncertainty

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Senior Research Scientist



January global temperatures compared to average (1850-2024)



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Senior Research Scientist



Water challenges in the US-Mexico border?

- Climate uncertainty.
- Reduced availability of surface water.
- Exhausted transboundary river systems since the 90's.
- Population growth and urbanization.
- The challenges of the basins go beyond Treaty considerations.



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Senior Research Scientist



Climate uncertainty



Climate crisis

Nasa images show extreme withering of Lake Mead over 22 years

The pictures from 2000, 2021 and 2022 offer a new view into its dramatically low water levels, now at just 27% capacity

Rosario Sanchez
Senior Research Scientist



Reduced surface water availability



This summer, the Rio Grande disappeared entirely from Santa Elena Canyon in Big Bend National Park, pictured on May 29, 2022. Visitors gawked at the conspicuous absence of the river whose arching path gave the region its name. Credit: Dylan Baddour



The dry bed of the Rio Grande pictured May 29, 2022, at Black Dike in Big Bend National Park. The river dried up for more than 100 miles this summer. Credit: Dylan Baddour

Status of the Basin

The Rio Grande is one of the 10 most stressed basins in the world (UNESCO, 2019),

The river has lost 83% of its natural flow (WWF 2022).

Provides water to 7 states of 2 countries.

Water to 15 million people

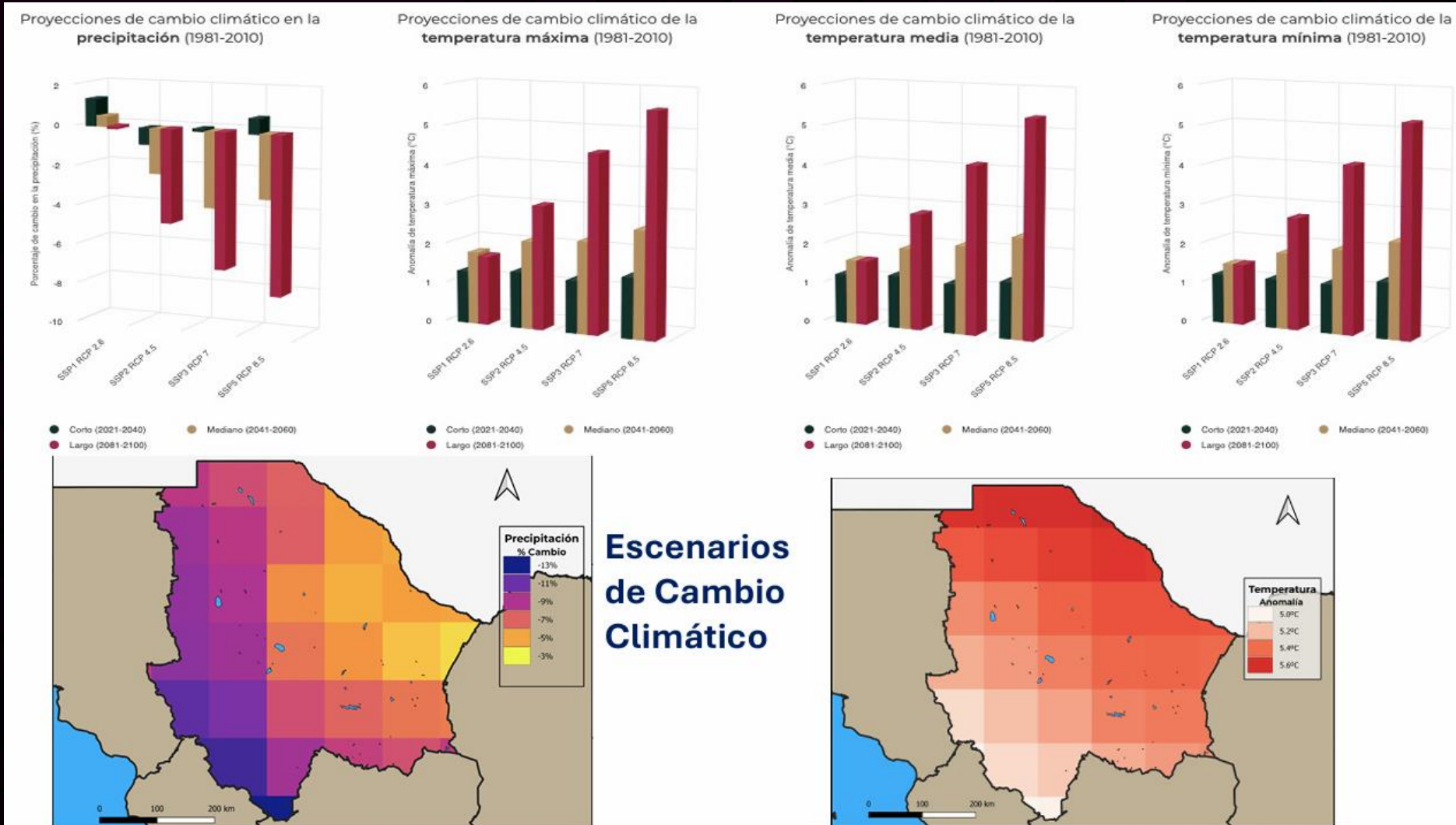
Annual precipitation will remain uncertain for the century (IPCC 2022).



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Rio Conchos: major tributary of the Rio Grande



Rosario Sanchez
Senior Research Scientist

Mario Lopez, 2024



Binational Treaties

1906 Convention (Upper Rio Grande)

1944 Water Treaty and 330 Minutes (Colorado River and Lower Rio Grande)

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1906 Convention: adaptable in allocations, but limited in scope

- 3% to Mexico and 97% U.S.
- Annual-scheduled deliveries
- Extraordinary drought provision:
reduction of deliveries to Mexico in the same proportion
as the U.S
- Reductions have been taken place 30% of the time and
more consistently since 2000s



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1944 Treaty

What is the opportunity and privilege of the 1944 Treaty?

ADAPTATION!!

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Senior Research Scientist



1944 Treaty: adaptable in allocations and in scope (Minute system)

Colorado River

- Annual deliveries (7% Mexico, 93% U.S)
- Extraordinary drought provision: reduction of deliveries to Mexico in the same proportion as the U.S
- Reductions to Mexico have been taken place since 2021. Minute 330- 19% reduction in 2025



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1944 Treaty

Lower Rio Grande

- Five- year cycles deliveries (annual averages)- (44% U.S 56% MX)
- Extraordinary drought provision: possibility to delay and get in debt by Mexico. **No reductions are contemplated.**
- Delays or deficits have happened three times since 1994.
- Still, the Minute system is an option....

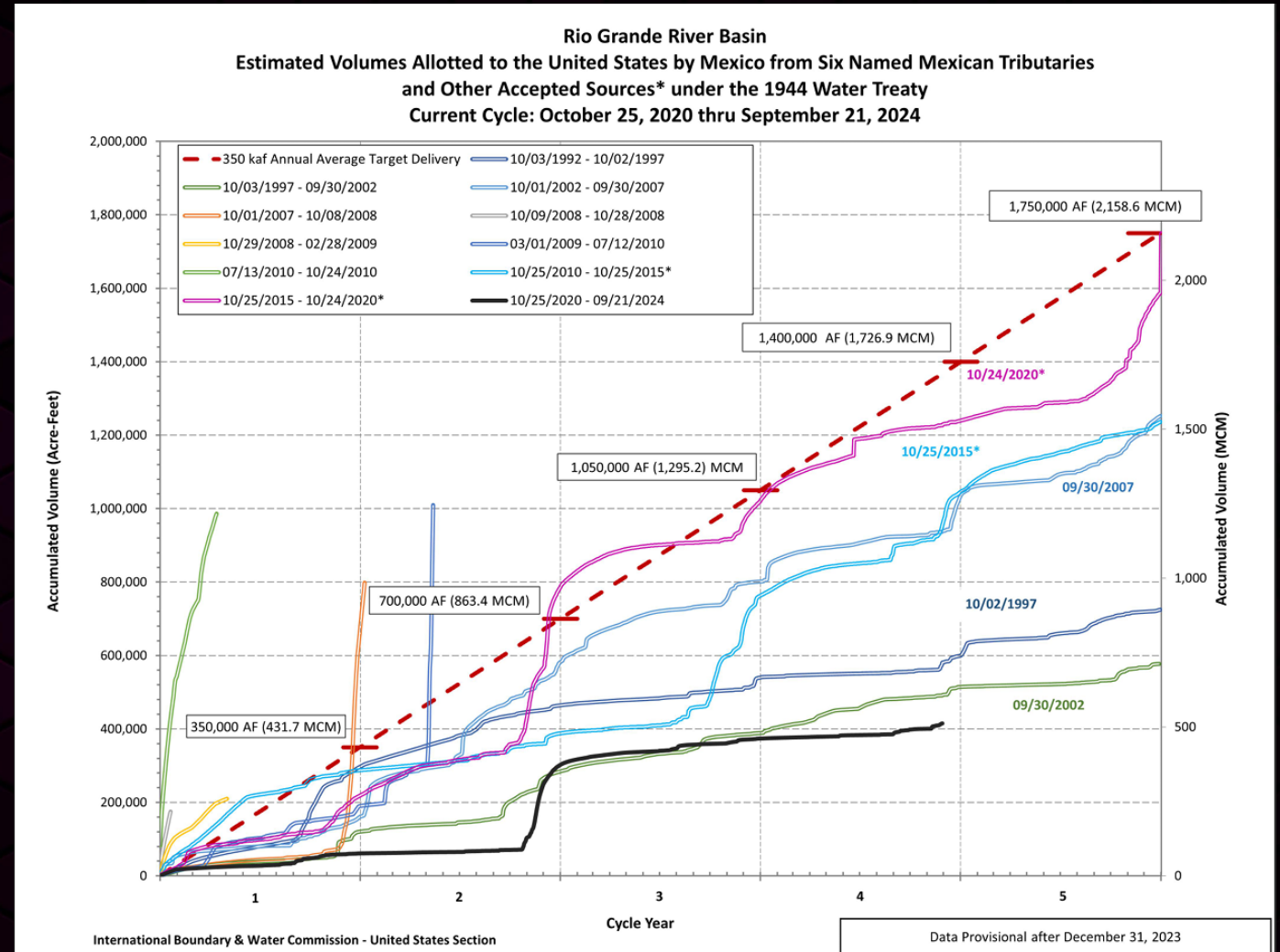


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Watershed Challenges Go Beyond Treaty Considerations

- Cycle 2020-2025 only 30% of allocations

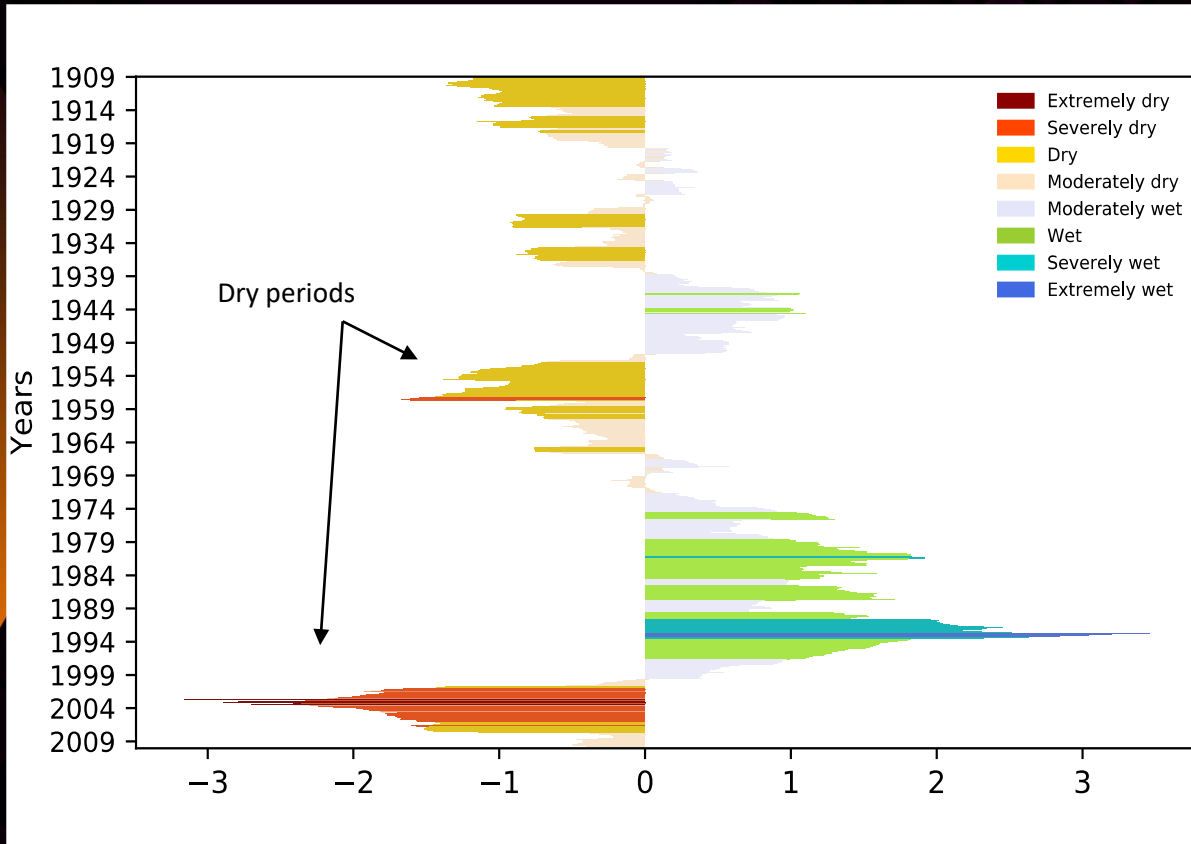


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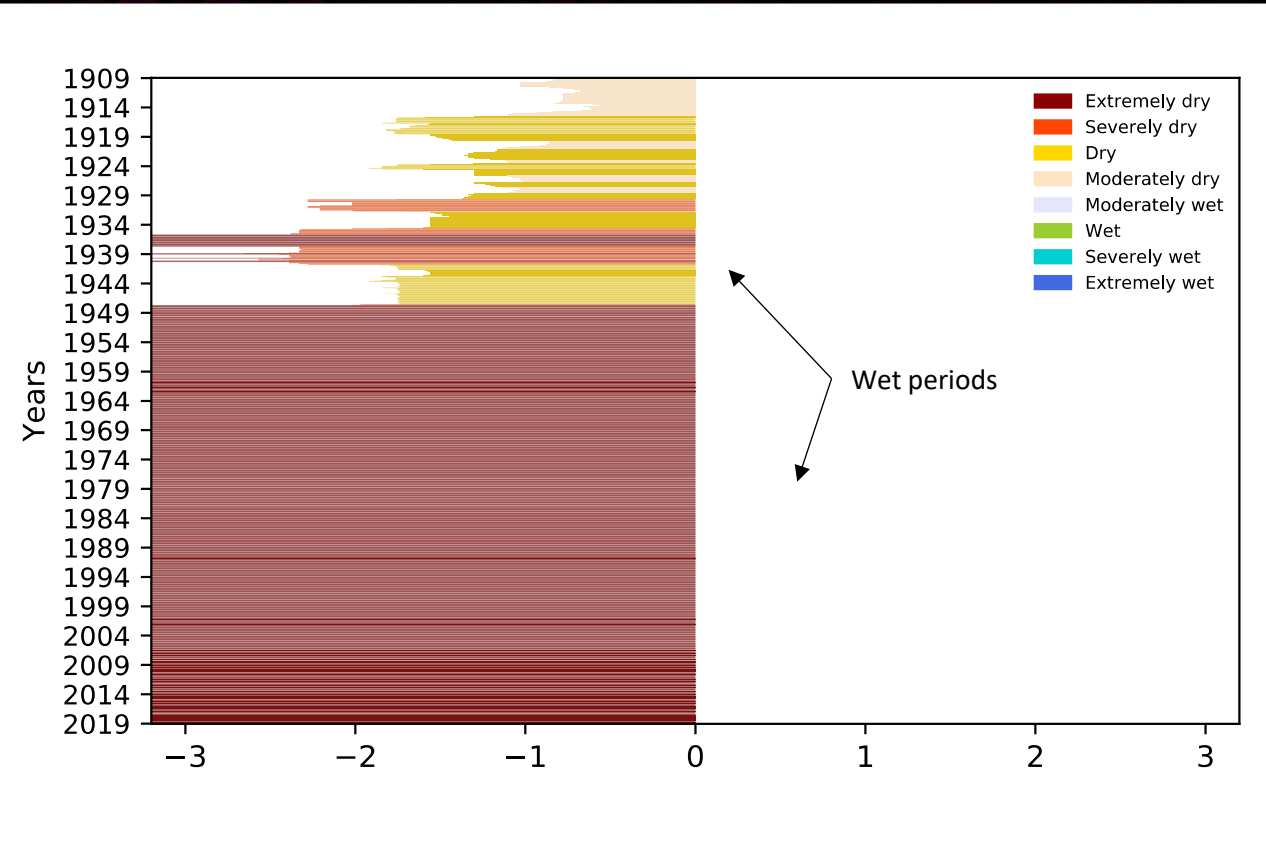


Induced or anthropogenic drought? The current state of the Rio Grande Basin

Natural Flow (No Human Intervention)



Current condition (with human intervention)



The way forward..

- The legal regime is in place to adapt to current drought conditions on the Rio Grande basin as it has happened on the Colorado river.
- Proactive and preventive actions should be the ordinary rule and not the exception.
- Climate is just another driver....
- *Major driver of change and adaptability still is the transboundary water management of the river.*



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Thank you

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