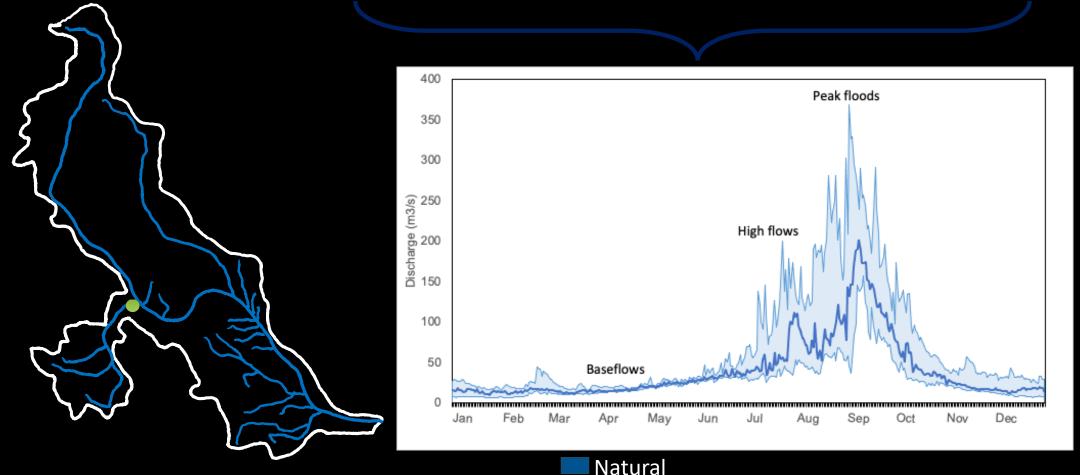
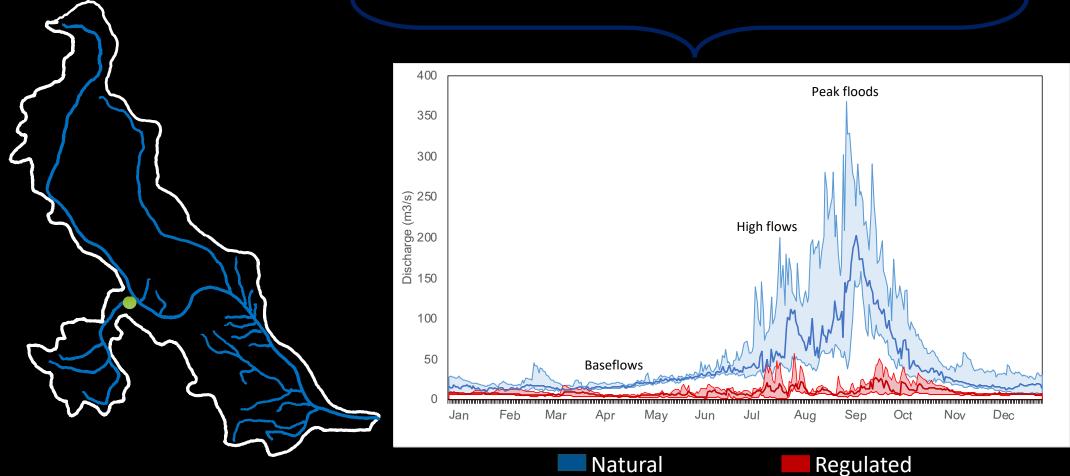


# Unraveling the power of the natural flow regime



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## Unraveling the power of the natural flow regime



The River basin's identity (flow regimes)

Ecosystem responses

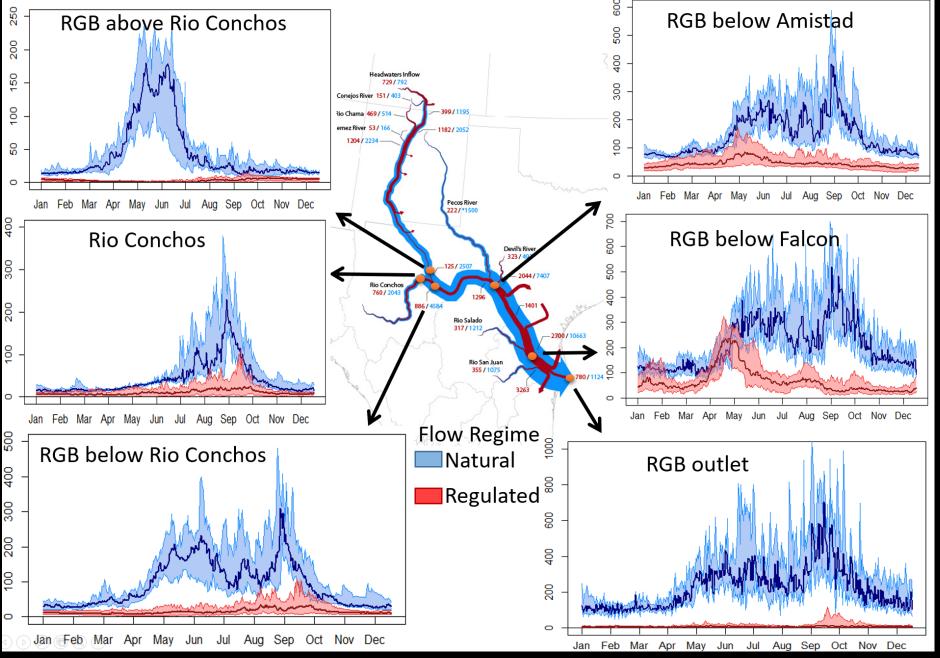
Seasonal and interannual hydrologic variability

River basin resilience

### 1. The River basin's identity

-Daily naturalized flow database for 110 years

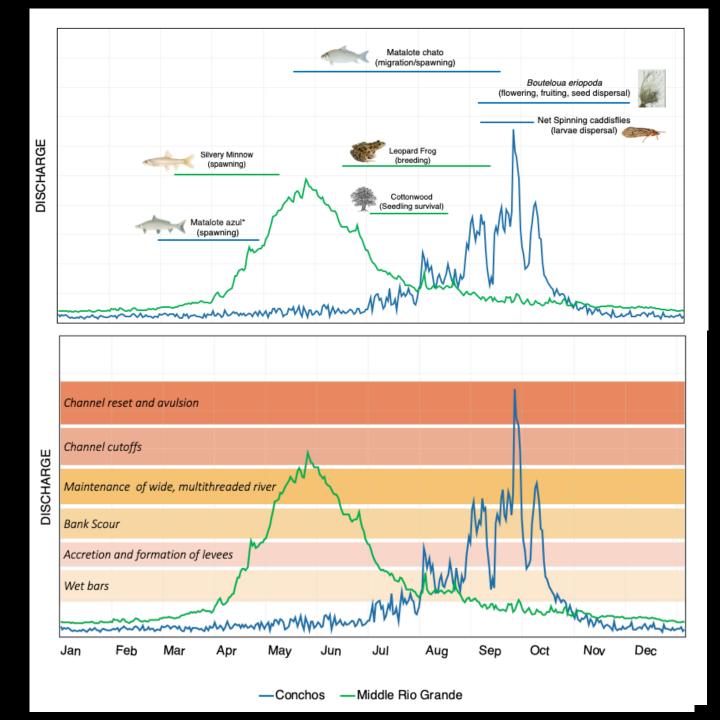
-Hydrologic river classification E.g. snowmelt, monsoon, bimodal,



Blythe, T., and Schmidt, J. (2017). Estimating the natural flow regime of rivers with long-standing development: the northern branch of the Rio Grande. J. Water Resources Research. Submitted Gonzalez-Escorcia, Y.A. (2017). Determining the Natural Flow in the Transboundary Rio grande/Bravo Basin. Master Thesis. Instituto Politecnico Nacional, University of California, Davis. Davis, CA.

### 2. Ecosystem responses

- Identification of biological and geomorphic responses to flow
  - Environmental flow recommendations



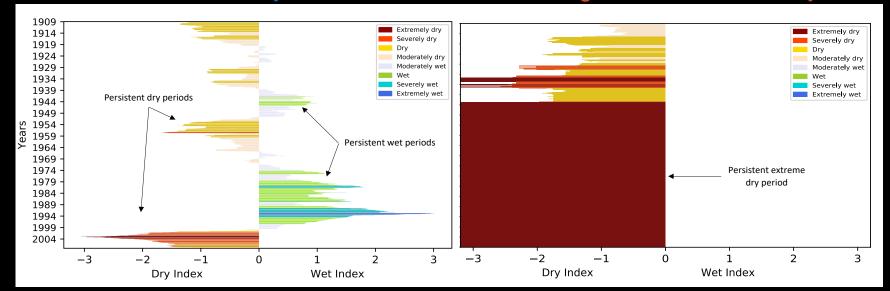
Dry and Wet period analysis

Gauge: Ojinaga

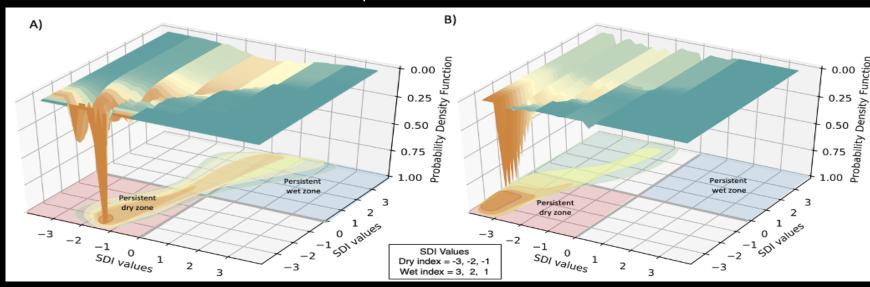
3. Hydrologic variability and River basin resilience

#### Natural Streamflow System

#### Regulated Streamflow System



#### Resilience quantification and visualization



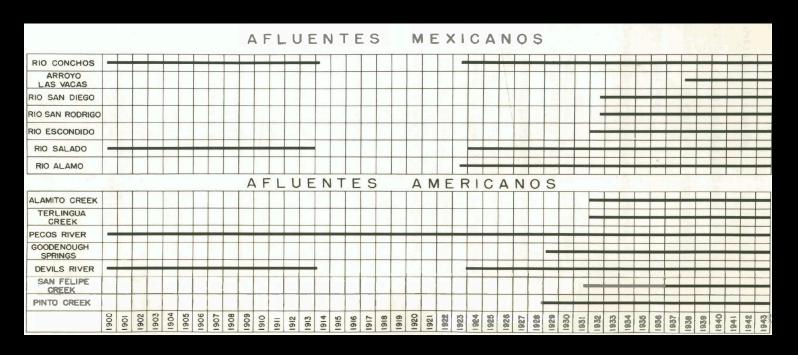
## Main research challenges

-Data, data, data!

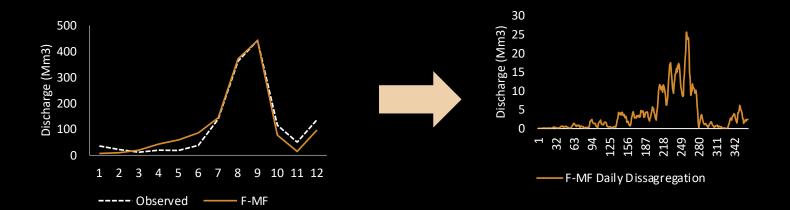
Massive amount of data, gaps, outdated gauge stations etc.

## -Filling gaps and data disaggregation

Fractal-Multifractal Approach, visual evaluation of 10,000 hydrographs per year, per gauge



Inputs	Source	Control Points (CP)	Period of record	Time Step
Natural	Blythe et al. (2018)	33 CP of the Upper RGB	1900 – 2010	D
Streamflow	<ul> <li>Escorcia-González, Y. (2016)</li> </ul>	13 CP mainstem of the lower RGB	1900 - 1913	D
	<ul> <li>Loredo-Rasgado, J (2018)</li> </ul>	13 CP mainstem of the lower RGB	1900 - 1943	M
l	• Silva, H. (2008)	37 CP for the Lower RGB	1950 - 2008	M



# Main Professional challenges

- Underrepresentation
  - Harassment

#### Rio Bravo Basin Council



Binational Summit on Groundwater at the US-Mexico Border.

