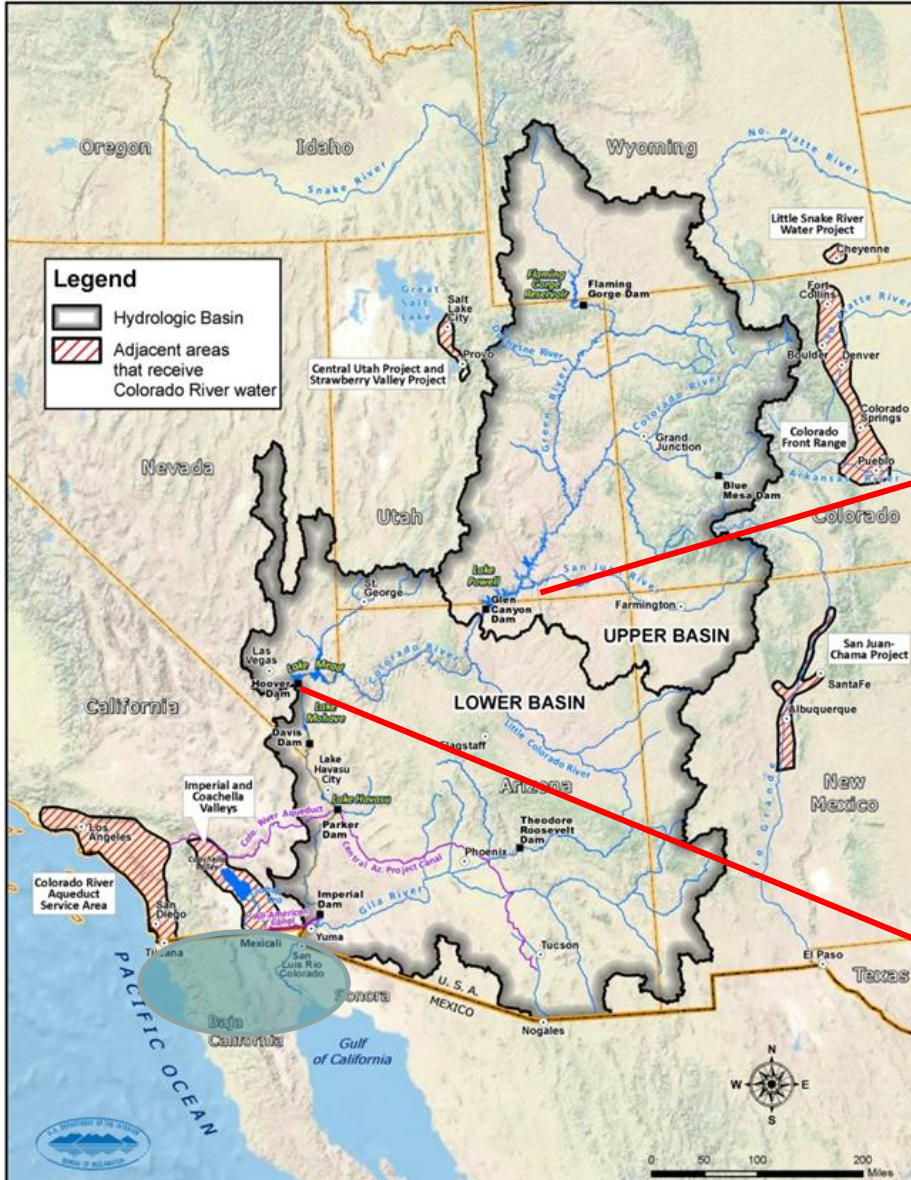


Wicked Water Problems

- **Incomplete or contradictory knowledge**
- **Large number of differing agencies/people/opinions in play**
- **Significant magnitude of economic risk/burdens**
- **Large-scale interconnectedness**

- **Wicked Water Problems seem to defy “normal solutions”**

Colorado River System



Lake Powell



Lake Mead

Goals of Interstate & International Water Management

- **Reduce Uncertainty, Increase Resiliency**
- **Develop Stable Operations**
- **Provide Opportunities for Collaboration**
- **Balance Upstream and Downstream Risks**
- **Acknowledge Shared Resources/Responsibilities**
- **Cooperatively Respond to Changes & Crises**

To Build Trust – Use consistent and verifiable interstate and international data with shared models/analytical tools

Colorado River Basin- “The Law of the River”

- **US – Mexico Relations**
- **US – States – Water Users Relations**
- **Water allocations and water deliveries, and flood control**
- **Reservoir operating requirements and criteria,**
- **Environmental regulations, mitigation, and restoration**
- **Power production and distribution**
- **Water quality considerations**

“Law of the River” Summary (abbreviated)

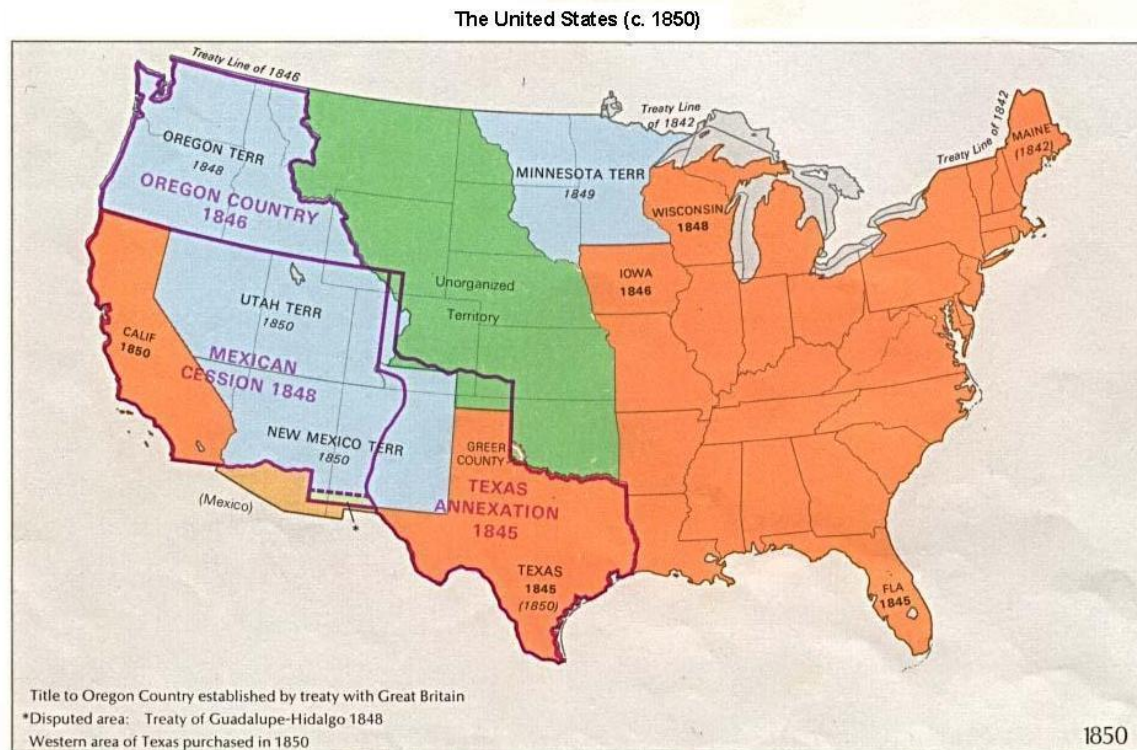
- 1922 Colorado River Compact
- **1928 Boulder Canyon Project Act**
- **1944 US – Mexico Water Treaty**
- 1948 Upper Basin Compact
- 1956 Colorado River Storage Project Act
- 1964 Arizona v. California
- 1968 Colorado River Basin Project Act
- **1973 US Mexico Minute 242**
- 1974 Colorado River Basin Salinity Control Act
- 1992 Grand Canyon Protection Act
- 2007 Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operation of Lake Powell and Lake Mead
- **2010 – 2012 US Mexico Minute 316, 317, 318, and 319**

Binational Issues

- **Water Delivery**
 - Mexico receives 1.5 MAF/YR
- **Water Quality**
 - Minute 242 governs water quality for deliveries to Mexico
- **Low and High Reservoir Operations**
 - Minute 319 provides for shortage and surplus
- **Water Storage**
 - Minute 318 & 319 provide for storage of Mexico's water within US reservoirs
- **Environmental Concerns**
 - Minute 316, 317, & 319 provide for environmental issues

Binational Issues

- **Changing Map/Boundary Colonial Period to Modern Period**
 - France & Spain
 - Mexico – American War (Treaty of Guadalupe Hidalgo 1848)
 - Gadsden Purchase
 - Development

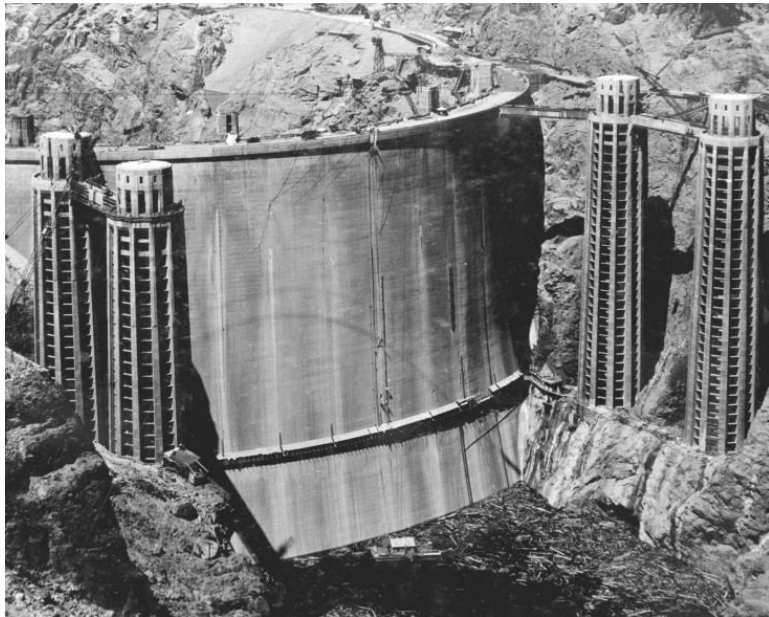


Early Stressors Lead to Water Treaty

- **Water Development in the US (Upstream)**
 - Gold rush 1840s
 - Exploration and pioneer irrigation 1860 – 1900
 - Federal land grants and Reclamation Act 1906 pave way for large-scale water development
- **US 1922 Compact Divide ALL Colorado River Water**
 - Mentions future water allocation to Mexico
 - Mexico requests participation in discussions but rebuffed
- **US 1929 Authorizes Construction of Hoover Dam,**
 - Project to provide water storage Only for US
 - Flood protection for all (US-Mexico)
 - Additional diversion system for All American Canal
 - Leads to US development

Construction of Hoover Dam 1936

- 1929 – 1936 Triggers International Concern
- 1944 Complete Treaty



Signing of 1944 Treaty



Why Did US Negotiate 1944 US – Mexico Water Treaty

- US enacted “Good Neighbor Policy” to reduce tensions in the region (US intervention concerns)
- US entered into the 1929 Inter-American Arbitration Treaty, ratified in 1935
 - International arbitration for treaty or *other* asserted rights,
 - Creates leverage for Mexico’s assertion of rights to the Colorado River in an international context
- US sought to resolve conflict PRIOR TO Mexico development of FULL water projects on the Colorado River
- Mexico successfully links Colorado River to Rio Grande River issues

1944 US – Mexico Water Treaty

- Mexico Water deliveries 1.5 MAF per year,
- Monthly Maximum and Minimum water deliveries to Mexico,
- Identify delivery points to Mexico, with water ordering procedures and points of measurement
- *Balance conditions in the US-Mexico, droughts & surplus, with sharing of reductions/increases in proportion to use*
- Creates International Boundary and Water Commission (IBWC, US & Mexico Sections) to administer treaty provisions and create Minute agreements

Note: California opposed Treaty asserting that Mexico's right will contribute to "over-allocation"

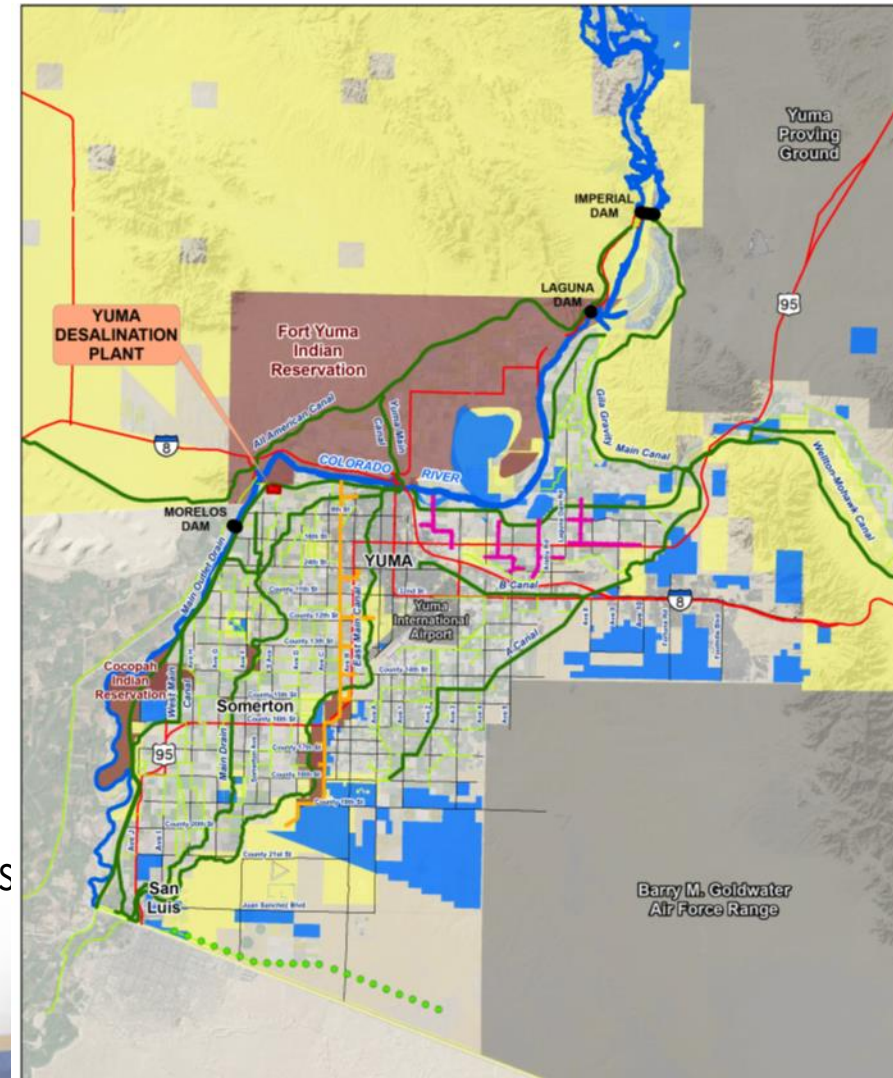
Salinity Dispute Leads to Minute 242

- Impacts of Glen Canyon Dam
- 1973 - Minute #242 – Established salinity management goals for the US and Mexico



Points of Delivery & Salinity Management

- **Northerly International Boundary (Morelos Dam)**
 - 1,360,000 af
- **Southerly International Boundary**
 - 140,000 af
- **Salinity Differential**
 - 115ppm (+-30) < NIB-Imp. Dam
- Mexico receives more than 1.5 MAF
 - 1.5 MAF per Treaty
 - 0.200 MAF "Other"
 - 0.114 MAF via MODE
 - 0.086 MAF via over-deliveries



Why Did US Negotiate Minute 218 & 242 to US – Mexico Water Treaty

- **1944 Treaty allows delivery from “any and all sources” and intended to share salinity with Mexico due to the plumbing (Imperial Dam & All American Canal)**
- **US developed a new irrigation project in Arizona (Wellton-Mohawk Project) delivering saline drainage water to the River, increasing salinity ONLY to Mexico.**
- **US evaluates Mexico’s options and concludes Mexico could bring a claim:**
 - **International Court of Justice**
 - **Through arbitration under the 1929 Inter-American Arbitration Treaty, (now through the OAS)**

Minute 316, 317, 318 & 319

Shortage & Drought + Environment:

- **Shortage & Surplus Sharing, Conservation Investments, and Environmental Values**
 - Mexico shares shortage with junior priority US users in Arizona and Nevada
 - Allows Mexico to store conserved water in US reservoirs and supports binational conservation/infrastructure investments
 - Mexico shares surplus supplies with junior priority US users in Arizona, California, and Nevada
 - Provided water to protect environmental values in Mexico
- **Negotiations on-going for Next Agreement 32x**

Consideration of Equitable Doctrine

- Rivers are a shared resource and include the commodity value of water AND non-economic and environmental benefits
- Balance harms and benefits
- Links to approaches developed in Western States – Doctrine of Equitable Apportionment
- Considerations include: geography (upstream/downstream), hydrology, climate, past uses (prior appropriation), economic and social needs, efficiency, available alternatives, and environmental values
- Example: 1997 ICJ Gabziovo-Nagymoros Dam Decision
- Convention on Non-Navigational Uses on International Watercourses 1997

US-Mexico Water Treaty & Minutes & Components of Equitable Doctrine

- Rivers are a shared resource and include the commodity value of water AND non-economic and environmental benefits (Minute 306, 316, 317, 318, 319)
- Balance harms and benefits (Minute 218, 242)
- Links to approaches developed in Western States – Doctrine of Equitable Apportionment
- Considerations include: geography (upstream/downstream), hydrology, climate, risks and shortage, economic and social needs, efficiency, available alternatives, and environmental values
- *Ability to seek arbitration or claims through ICJ provide leverage for continued cooperation, IBWC provides vehicle for such efforts*

Binational Wicked Water Problems Going Forward

- **Maintain shared perspectives**
 - We have largely addressed data and tools
- **The current conflict is between water management – Conservation vs Water Quality**
 - The more we save the more ag drainage blends so water quality decreases
- **Solutions will be complex and require new investments**
 - Binational Desalination is a potential tool
- **Wicked linkages**
- **Economic impacts**
- **Shift to Opportunistic management**
 - Trade certainty for resiliency and flexibility