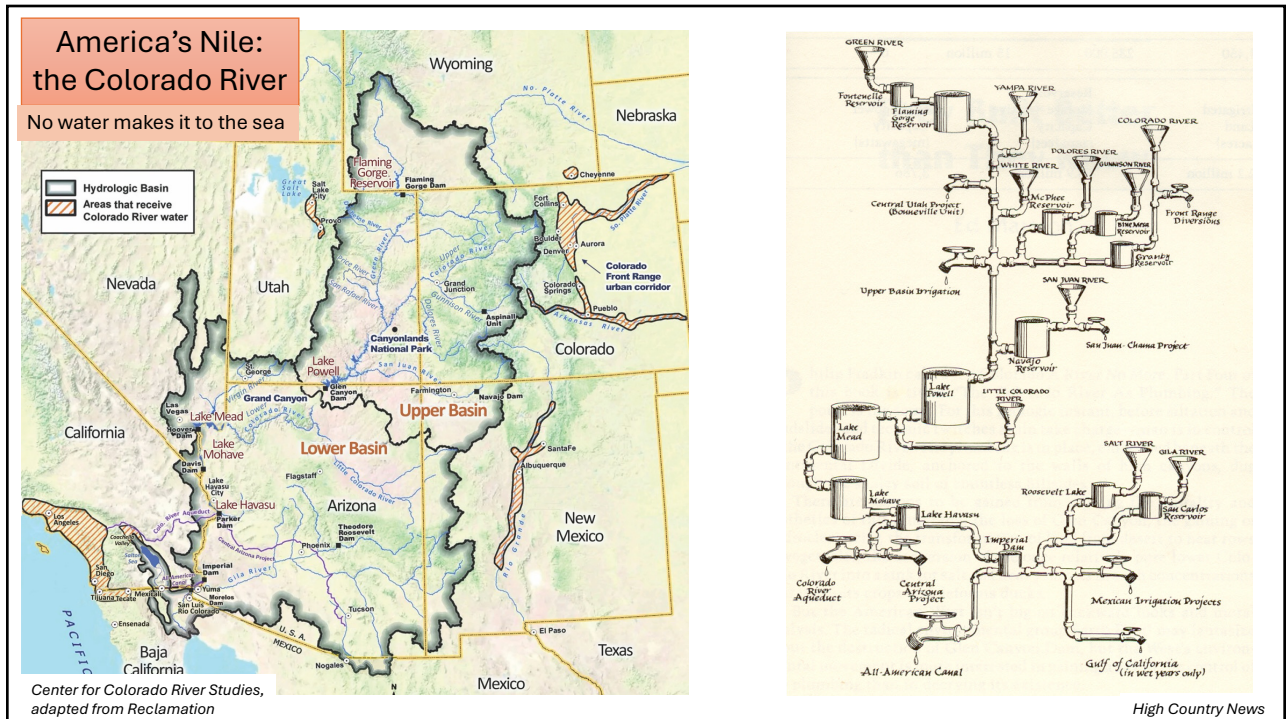
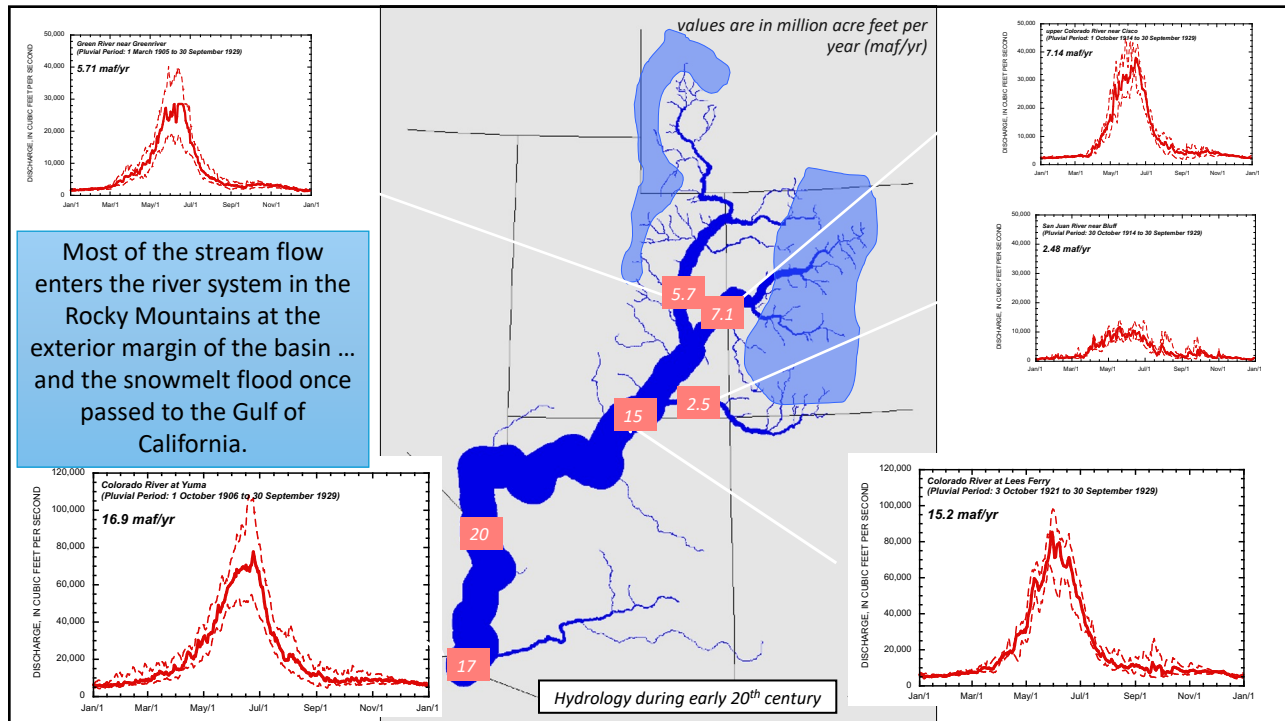


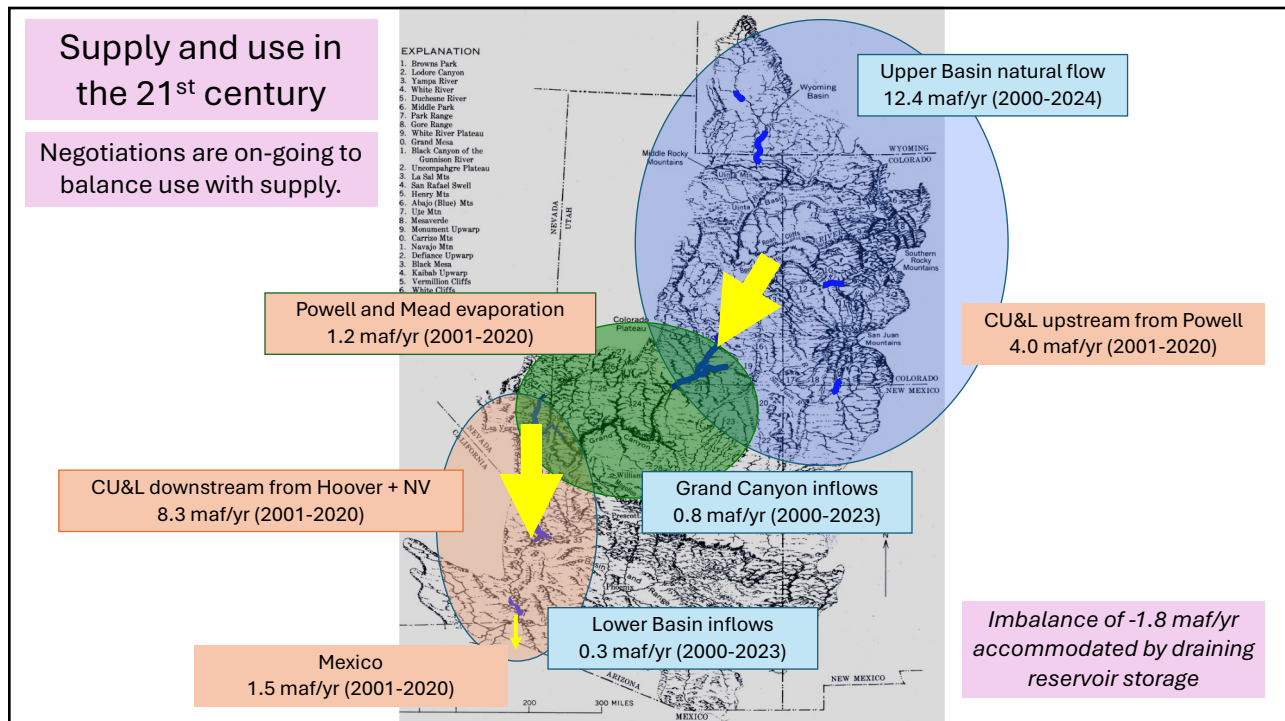
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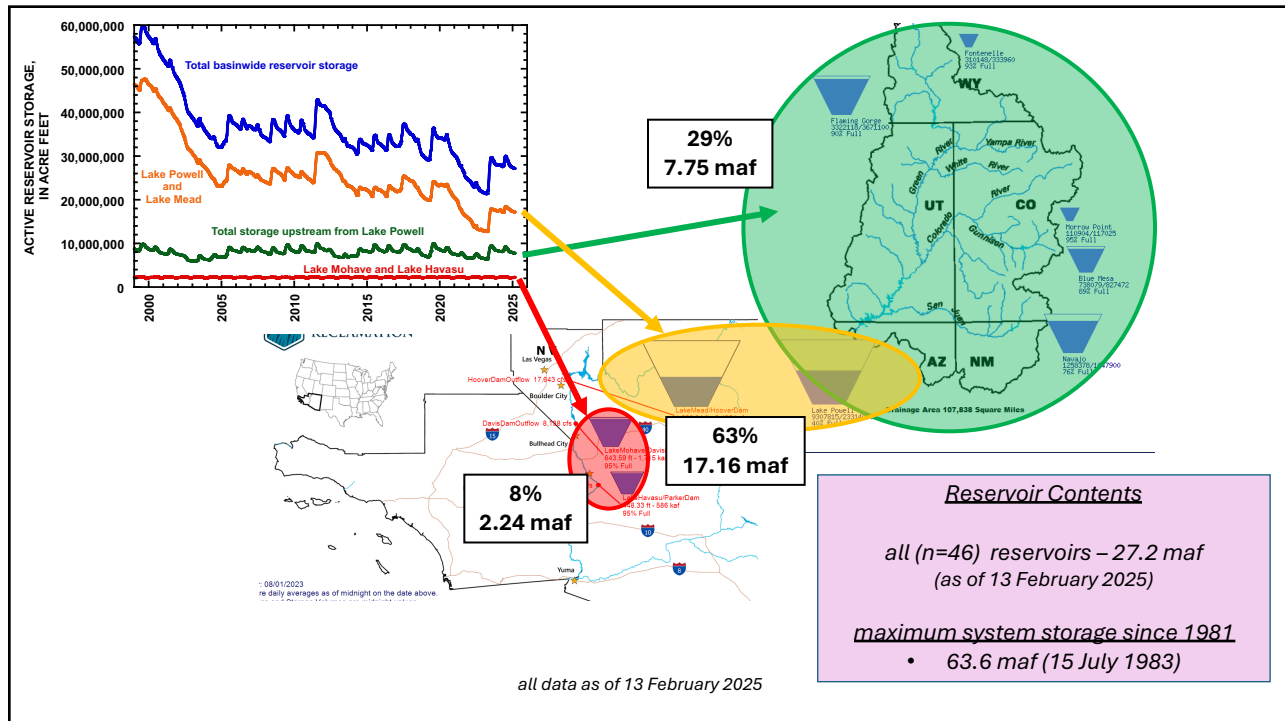
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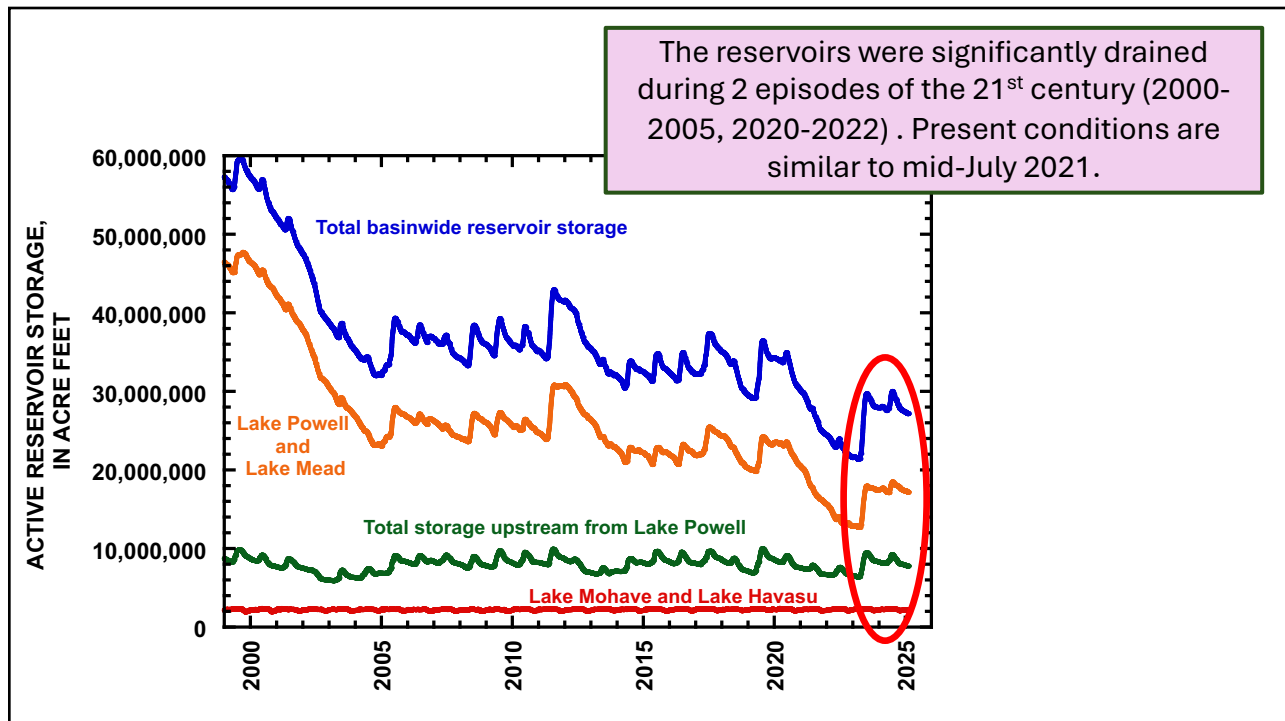
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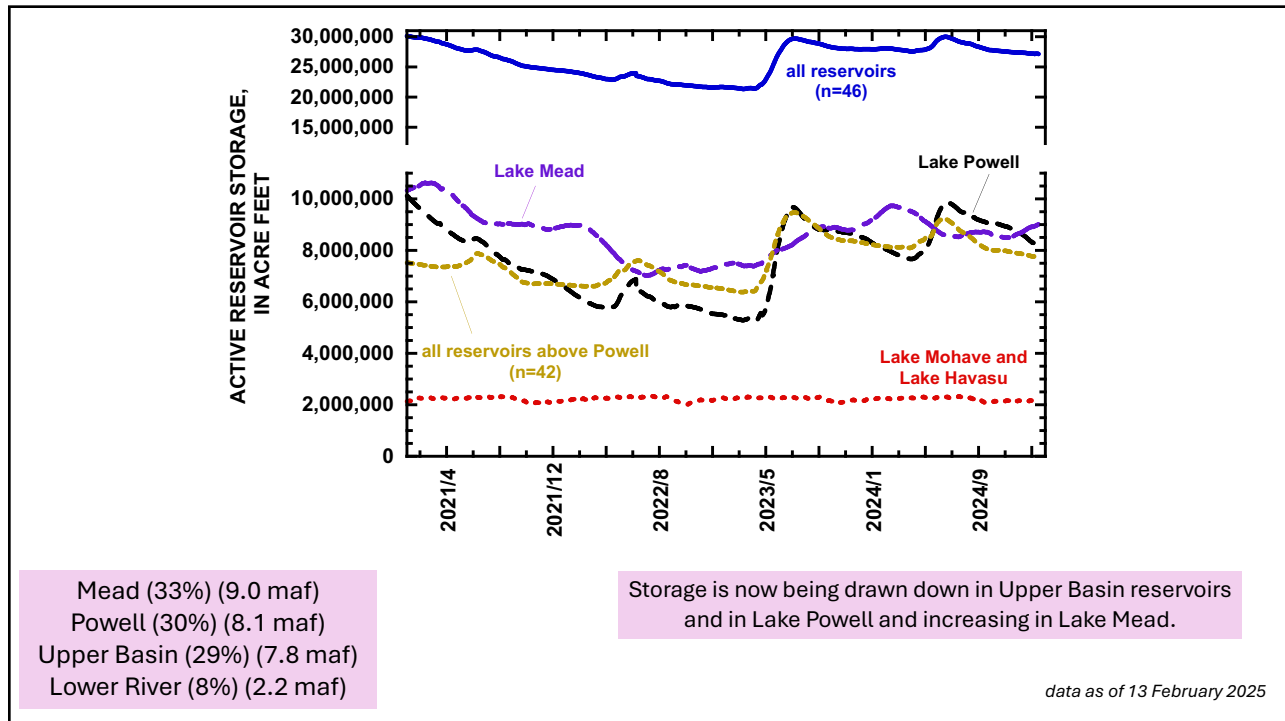
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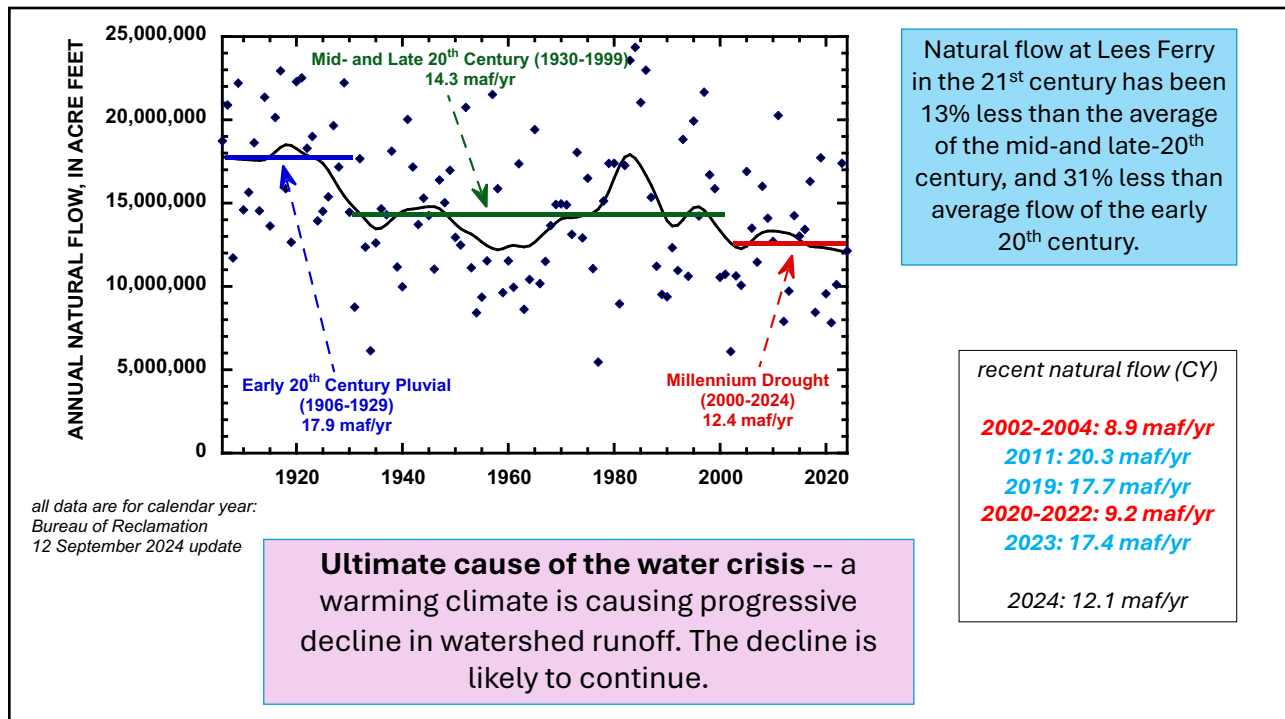
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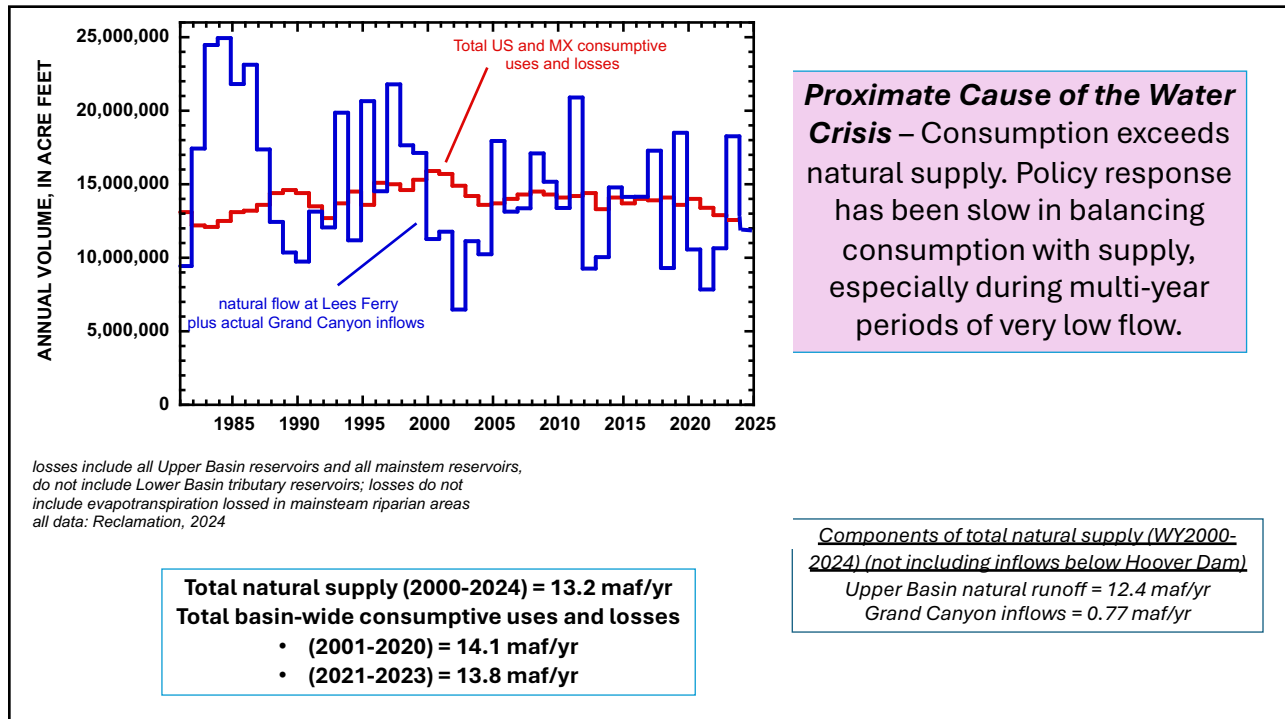
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Law of the River ...
 includes two interstate compacts, a bi-national treaty, Supreme Court rulings, laws, records of decisions, and administrative agreements

- 1) Mexico (1,500,000 af/yr)
- 2) Tribal reserved water rights and other perfected rights
 - all water rights held before ratification are valid; in time of severe drought, all rights fulfilled in chronological order, regardless of state (~3 maf pre-Compact water rights in CA)
- 3) Lower Basin
 - 7.5 maf/yr from mainstem; additional 1 maf/yr (some debate); tributaries don't count (some debate)
 - CA – 4,400,000 af/yr (rights are senior to all others); NV – 300,000 af/yr; AZ – 2,800,000 af/yr (AZ right is subservient to others)
- 4) Upper Basin
 - perfected rights are senior, but remainder available only after obligation to Lower Basin has been met (some debate)
 - AZ (50,000 af/yr); CO 51.75%; UT (23%); WY (14%); NM (11.25%)
 - Must deliver 75 maf/decade (generally accepted); 82.3 maf/yr (includes half of obligation to MX; some debate)

1920 population (when CRC negotiated):

New York City – 5,600,000
 Chicago - 2,700,000
 Philadelphia – 1,800,000
 Detroit – 990,000
 Cleveland – 900,000

California – 3,400,000
 Colorado – 940,000
 Utah – 450,000
 New Mexico – 360,000
 Arizona – 330,000
 Wyoming – 190,000
 Nevada – 77,000

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What needs to be negotiated for the future?

Balance consumption with supply

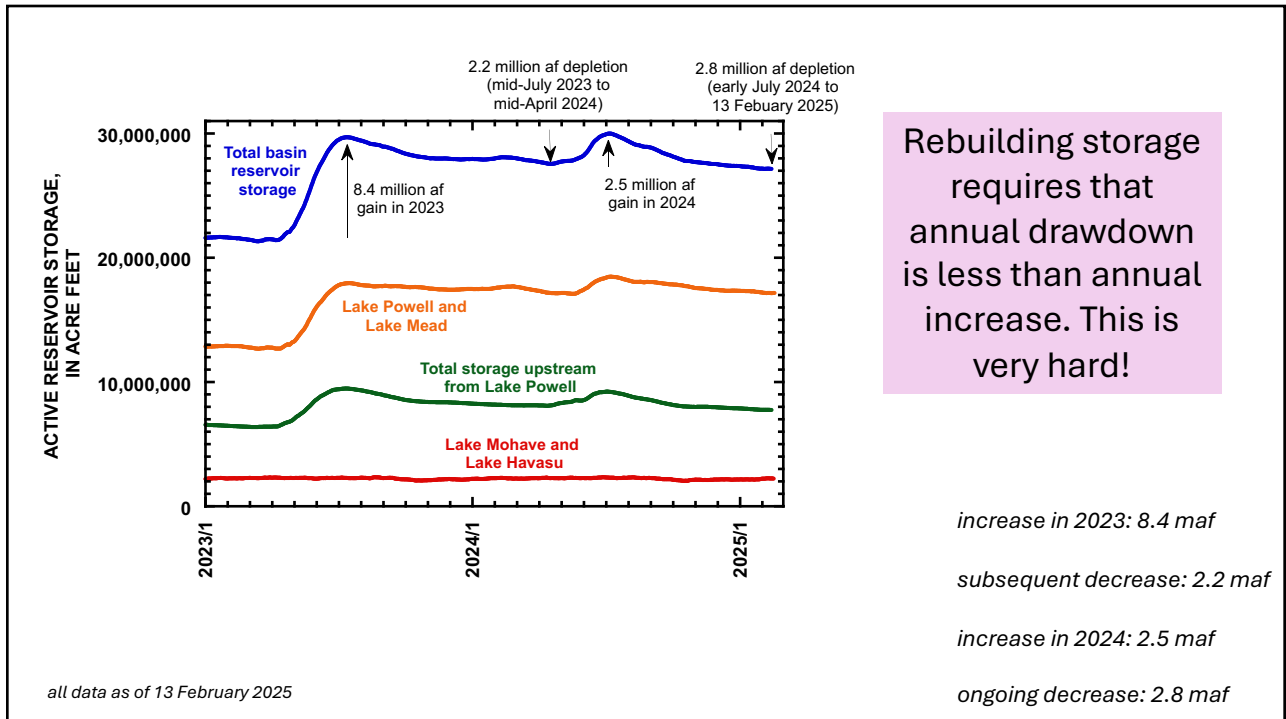
- who takes the cuts? how implemented? when initiated?
- must recover reservoir storage when it is lost

Management of river and reservoir resources

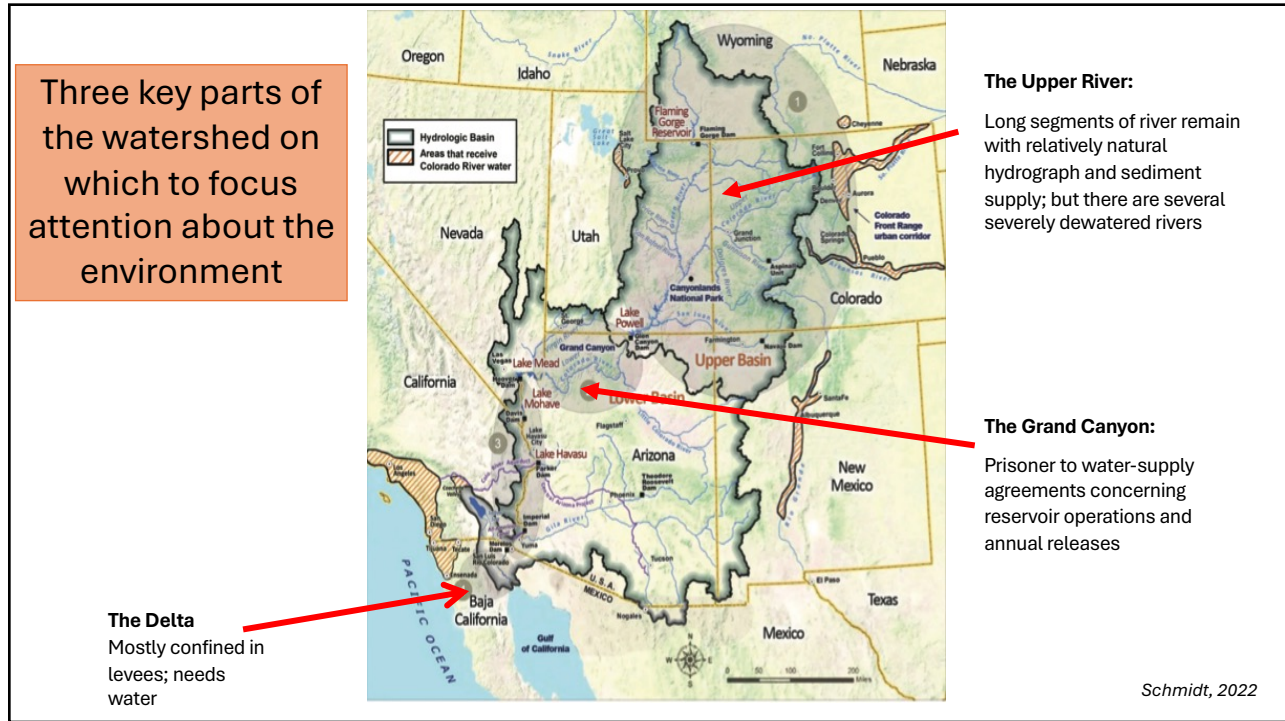
- where to focus concern?
- what are desired resource outcomes?
- how achieve those outcomes?

Tribal empowerment

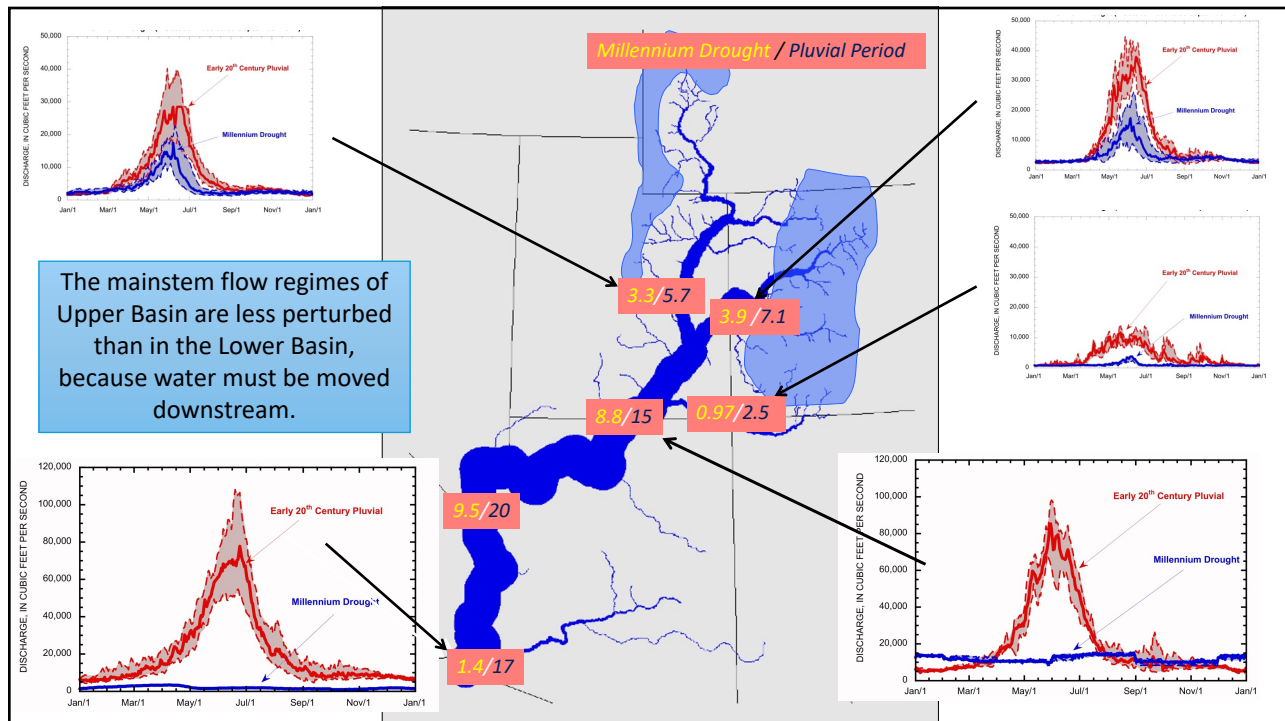
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How to allocate storage between Lake Mead and Lake Powell? How to operate annual releases from Powell to Mead?

- average storage in Powell+Mead is *unlikely to be >50% of capacity*; where to emphasize storage?
- Preferential storage in Lake Powell may be effective in controlling non-native fish invasions into Grand Canyon
- Existing release strategy is to implement *designer flows* (controlled floods, bug flows) to mitigate adverse environmental impacts
- **Annual releases** are an important *determinant of ecosystem condition* in Grand Canyon and may be considered in new operating agreements

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- The 21st century water crisis continues
- General pattern of basin storage:
 - Mead: 30%
 - Powell: 30%
 - Upper Basin: 30%
 - Lower river: 10%
- Although the ultimate cause of the water crisis is declining watershed runoff, the proximate cause is that consumption is not quickly reduced during dry periods when storage is already low
- Large drawdown of reservoir storage occurred, primarily 2000-2005 and 2020-2022
- Reservoirs are bathtubs. They should be replenished, but it is hard to refill them if the drains remain wide open.
- Key foci of environmental concern
 - Upper Basin
 - Grand Canyon
 - Delta

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