

CALIFORNIA WATER 101



NATIONAL FOOD LEADERSHIP INSTITUTE

SHELL BEACH – JUNE 18, 2018

DANIEL M. DOOLEY

NEW CURRENT WATER AND LAND, LLC

THE STORY
OF
CALIFORNIA
IS THE
STORY OF
WATER.



THE SIERRA AS A NATURAL RESERVOIR

Snow that falls high up in the mountains melts and flows downstream, providing water for the entire state.



The majority of California's water supply originates in Sierra snowmelt

💧 Drinking water

25 million people in cities from the Bay Area to Southern California

💧 Irrigation

Farms, ranches and dairies

💧 Hydroelectric power

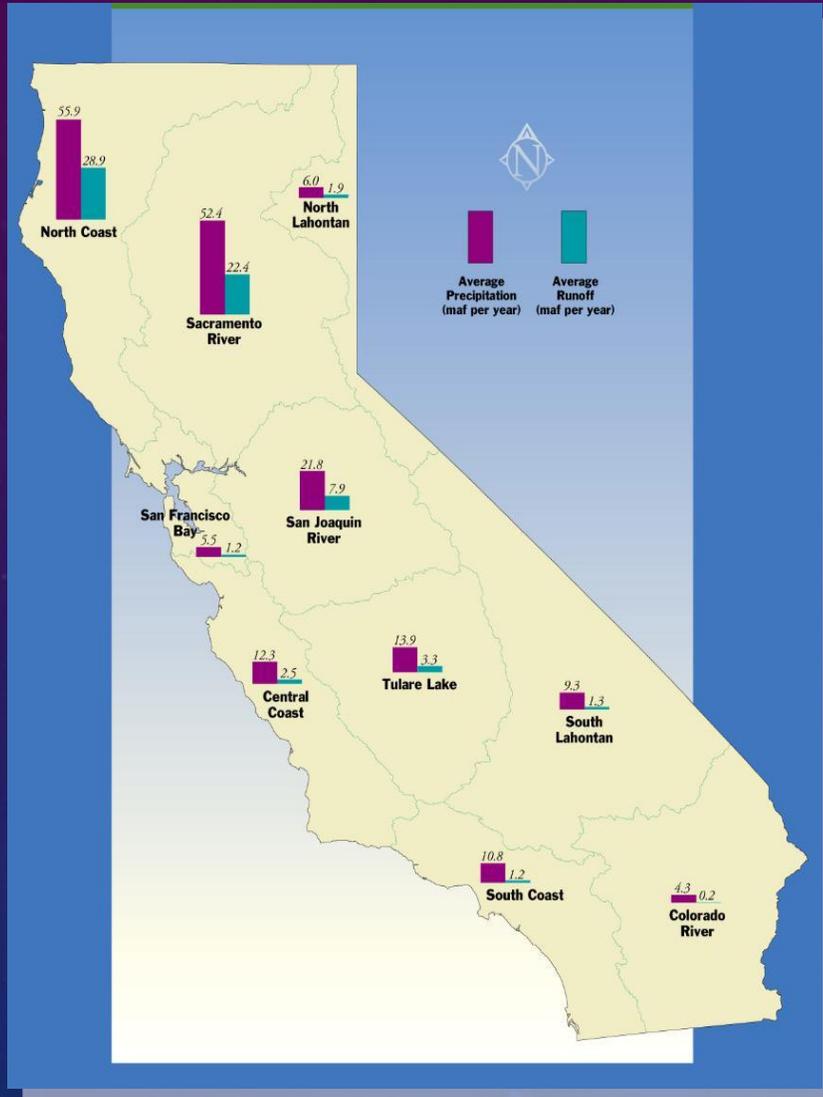
Up to 15% of California's entire energy use each year

💧 Environment

Flows through the Sacramento-San Joaquin Delta – the state's largest and most important estuary



CALIFORNIA HYDROLOGY

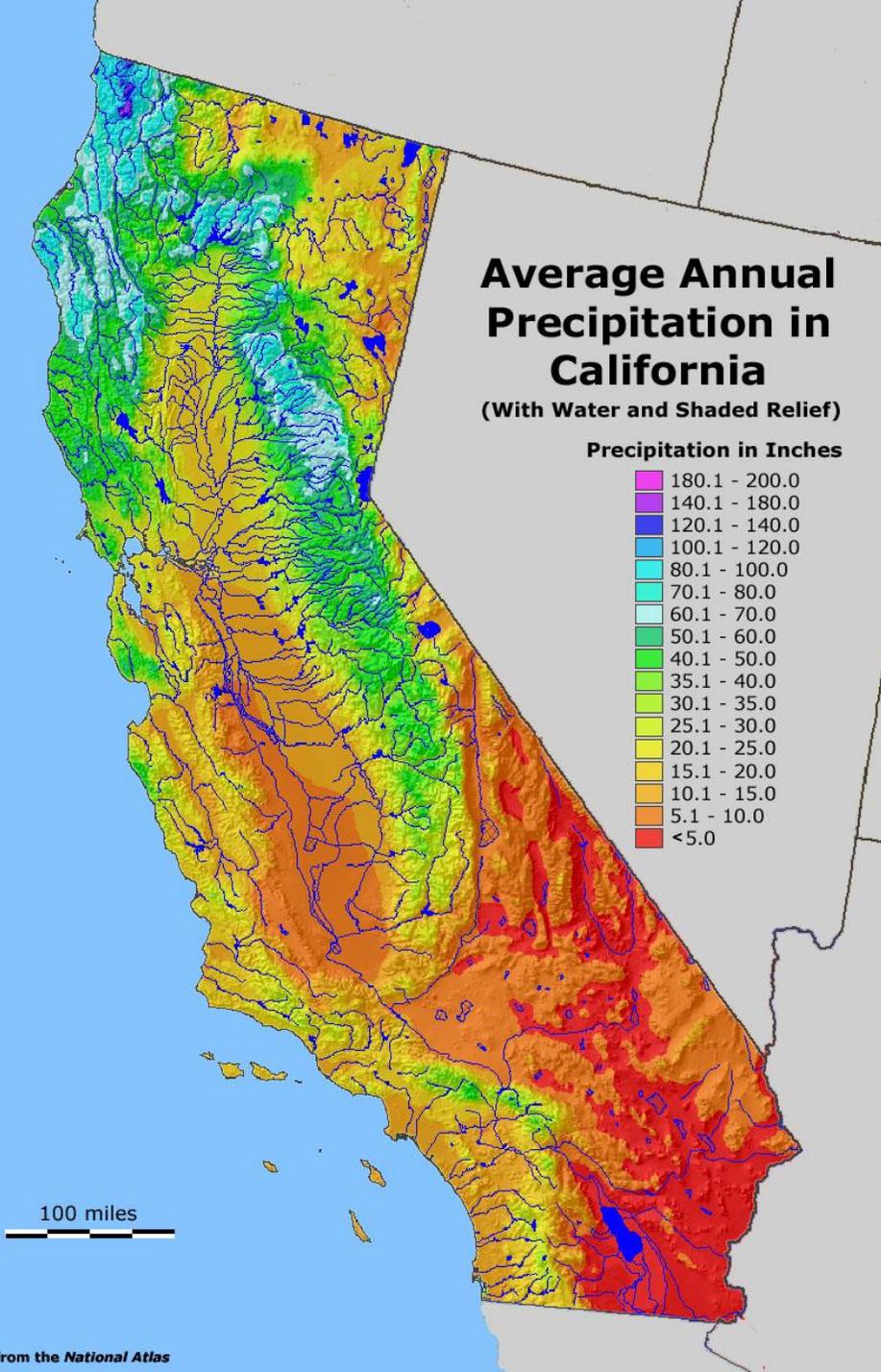


💧 Mediterranean climate – dry summers, mild winters

💧 In average year, 82 million acre-feet of water used for agriculture, environment and cities

💧 More precipitation in north than south, reverse of population location

CALIFORNIA HYDROLOGY



WET IN NORTH
DRY IN SOUTH

GREATEST
POPULATION IN
SOUTH

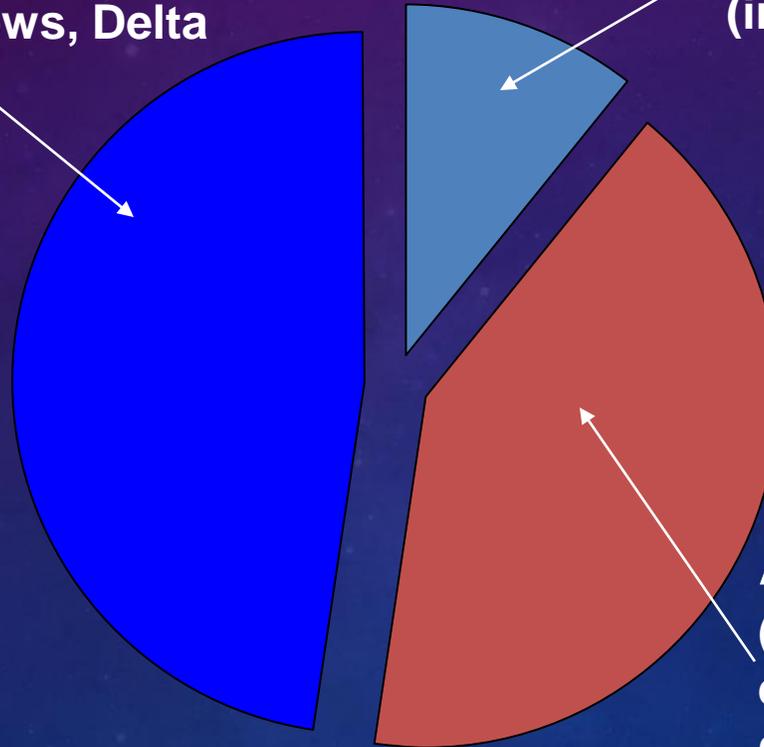
MAJOR USES OF WATER

Environment

(natural flows, Wild & Scenic River flows, Delta outflow, etc.)

Urban

(interior, landscape)



Agriculture

(on-farm use, evapotranspiration, conveyance losses)

Average water year

MAJOR WATER ISSUES

- 💧 Availability
- 💧 Population growth
- 💧 Drought and Flood
- 💧 Climate Change
- 💧 Diversification
- 💧 Unimpaired Flows
- 💧 Groundwater management



WATER RIGHTS' ISSUES

- 💧 Guarding water rights can lead to complex and expensive legal battles
- 💧 Water rights issues involve the Sacramento-San Joaquin Delta
- 💧 Water rights figures in transfers from one user to another
- 💧 Groundwater has separate legal regime from surface water

RIPARIAN RIGHTS

- 💧 Property owners adjacent to streams have a right to divert natural flow.
- 💧 Riparian rights take priority over other claims.



APPROPRIATIVE RIGHTS

- Beginning with Gold Rush, water moved away from original source to area of use
- Such appropriative rights based on seniority – first in time, first in right
- 1914 Water Commission Act
- Dams and aqueducts allow movement



AREA OF ORIGIN LAWS (CIRCA 1960S)

Laws acknowledge the importance of the needs and rights of the areas where California's water originates.

Evolving area of law and subject to court challenges.

News Headline Aug. 3, 2011:

“Water users in the Sacramento Valley have no preferential right to delivery of Central Valley Project water under the state's ‘area of origin’ laws, according to the U.S. District Court in Fresno.”

BENEFICIAL USE

Water can be diverted from a specified source and put to beneficial, nonwasteful use.



- 💧 1928 – voters approve state constitutional amendment banning waste & unreasonable use
- 💧 Commonly included municipal and industrial uses, irrigation, hydroelectric generation, and livestock watering.
- 💧 Concept been broadened to recreational use, fish and wildlife protection, and enhancement and aesthetics

PUBLIC TRUST

Courts apply the doctrine of public trust to California's resources equation

💧 Doctrine = fish and wildlife, beauty and recreation are all public benefits of streams and lakes and gives these protection consideration.



💧 1983 California Supreme Court ruling upheld public trust values of Mono Lake in case against Los Angeles.

MAJOR WATER PROJECTS

 Federal – Central Valley Project (CVP)

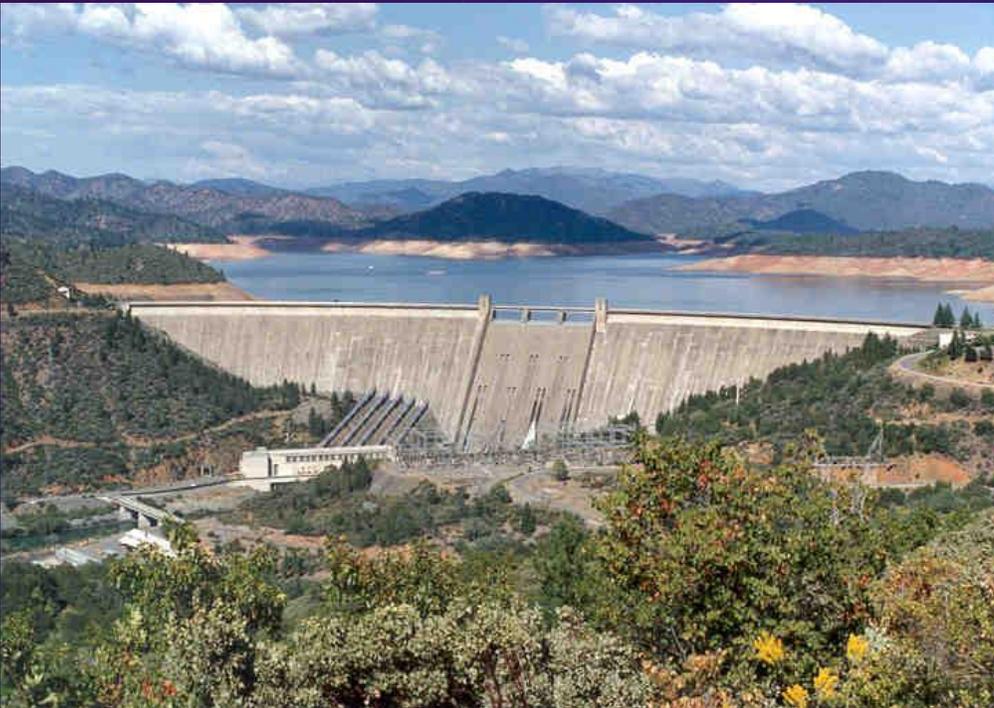
 State – State Water Project (SWP)

 Local – Many smaller projects throughout state



THE CENTRAL VALLEY PROJECT (CVP)

- 💧 35 federally funded dams, reservoirs and canals. Built by U.S. Army Corps of Engineers and U.S. Bureau of Reclamation



Shasta Dam

- 💧 Central Valley Project (CVP), which begins on the Sacramento River at Shasta Dam and ends near Bakersfield.

STATE-FUNDED PROJECTS - SWP



The State Water Project (SWP) provides water to 25 million residents and about 750,000 acres of irrigated farmland from Northern- to Southern California.

It consists of:

- 34 storage facilities, reservoirs and lakes
- 20 pumping plants
- 4 pumping-generating plants
- 5 hydroelectric power plants
- 701 miles of open canals and pipeline.

State Water Project



Gov. Pat Brown at Oroville Dam

1961 – Construction begins

Facilities were built from north to south –
Oroville Dam to Southern California.

The State Water Project is the largest
state-financed water project ever built.

LOCALLY FUNDED PROJECTS

600 cities and local agencies provide water through projects and imported supplies.

Local systems include:

- 🔹 Los Angeles: Owens Valley and Los Angeles Aqueducts
- 🔹 San Francisco: Hetch Hetchy
- 🔹 East Bay Municipal Utility District: Pardee and Camanche Reservoirs



Hetch Hetchy

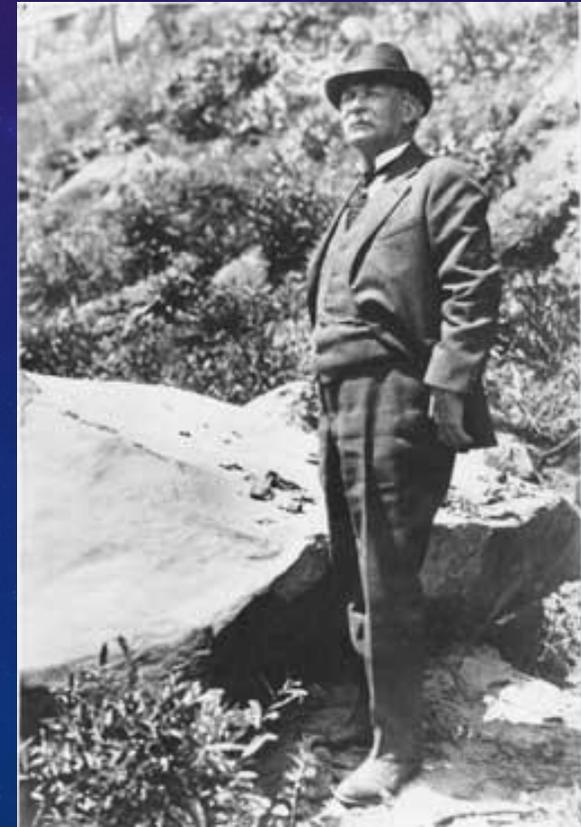
The Los Angeles Aqueduct



“Dedication”

1913 - Mulholland dedicated the aqueduct to "you and your children and your children's children for all time."

1913 Los Angeles had reached 485,000 residents. Within 10 years Mulholland was looking for water again.



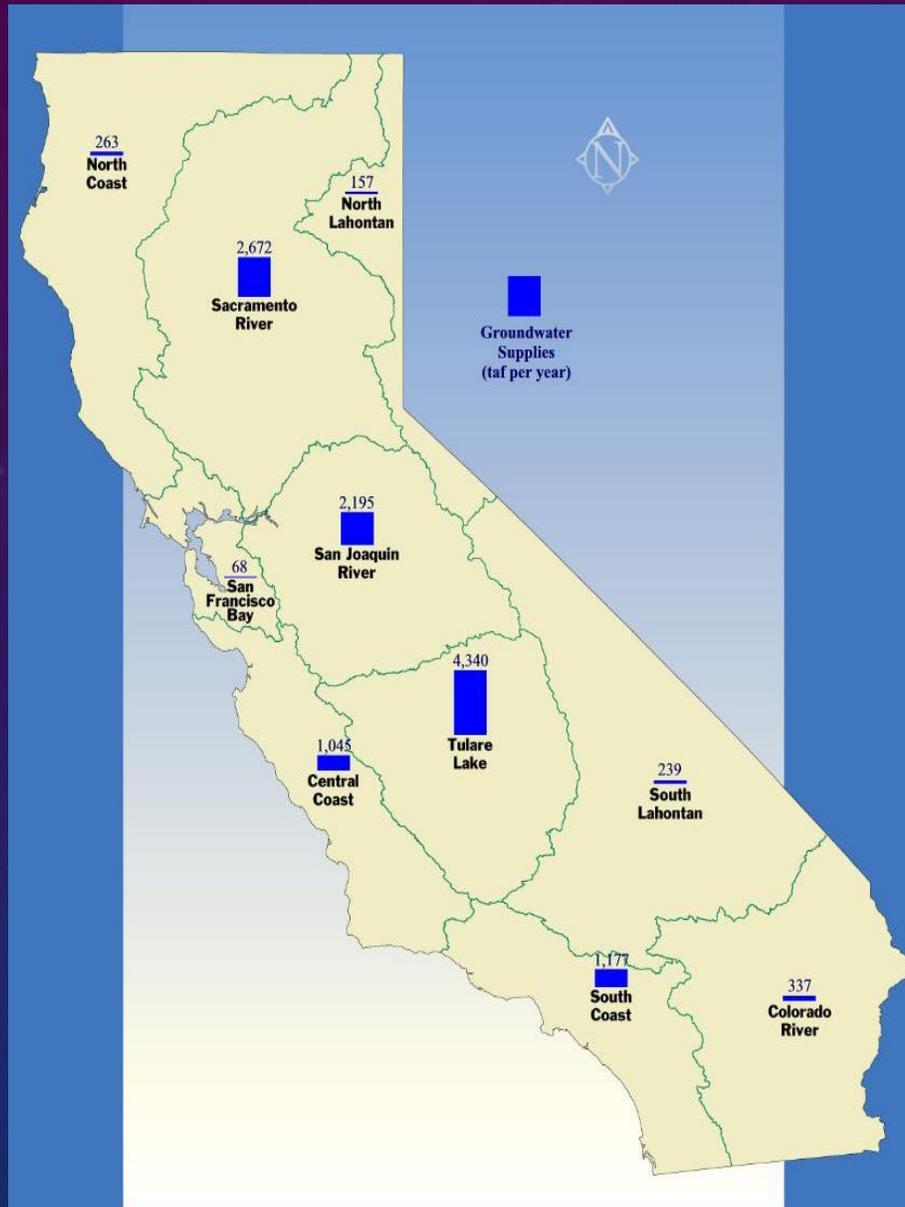
The Colorado River became the next
“new” source

GROUNDWATER

- 💧 About 30% (15 million acre-feet) of state's water comes from groundwater in normal years; 40%-45% in drought years
- 💧 California uses more groundwater than any other state – about 40% of population gets drinking water from groundwater.
- 💧 SGMA - 2014



GROUNDWATER SUPPLIES



Where is the groundwater?

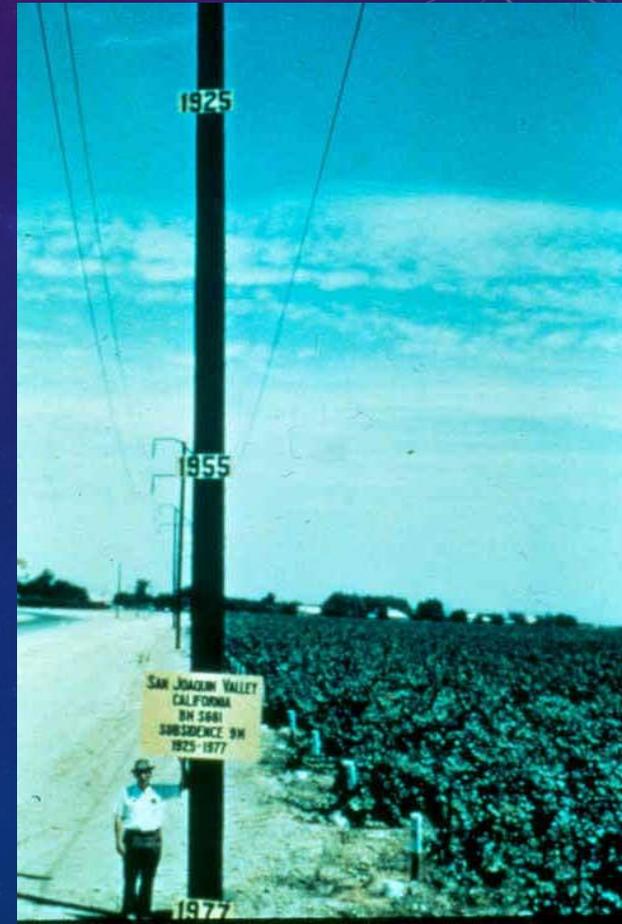
The California Department of Water estimates more than 400 groundwater basins hold a total of about 850 million acre-feet of water.

Groundwater Overdraft

Overdraft is taking more water out of the ground than is recharged

- 🔹 Historical overdraft in Central Valley led to construction of Central Valley project
- 🔹 NASA - Central Valley has lost enormous amounts of groundwater from 2003-2009 – 24.3 million acre feet – enough to fill Lake Powell, 2nd largest reservoir in USA

USGS scientist shows overdraft in San Joaquin Valley, 1970s



SUSTAINABLE GROUNDWATER MANAGEMENT ACT OF 2014

- Fundamental Change
 - Provides for local/regional management of groundwater basins
 - Requires the development of sustainability plans
 - Requires implementation
 - Provides for State monitoring of performance and intervention in certain cases

AVOID “UNDESIREABLE RESULTS”

- Chronic lowering of groundwater levels
- Significant reduction of groundwater storage capability
- Significant seawater intrusion
- Significant degradation of groundwater quality
- Significant land subsidence
- Surface water depletions that have a unreasonable adverse impact on beneficial uses

PLAN REQUIREMENTS AND AUTHORITIES

- Establish a sustainability goal
- Include measureable objectives
- Coordination among and between local agencies overlying the basin
- Authorizes allocation of pumping rights
- Authorizes imposition of pumping taxes
- Authorizes construction of facilities to recharge basins

STATUS

- GSA have been formed
- GSPs are being prepared
- Key issues
 - Pumping caps
 - Credits for recharge
 - DACs

THE DELTA: WATER TRANSFER POINT



The most important aspect of California's complicated water picture is the Delta, where the Sacramento and San Joaquin rivers meet.

Sacramento-San Joaquin Delta



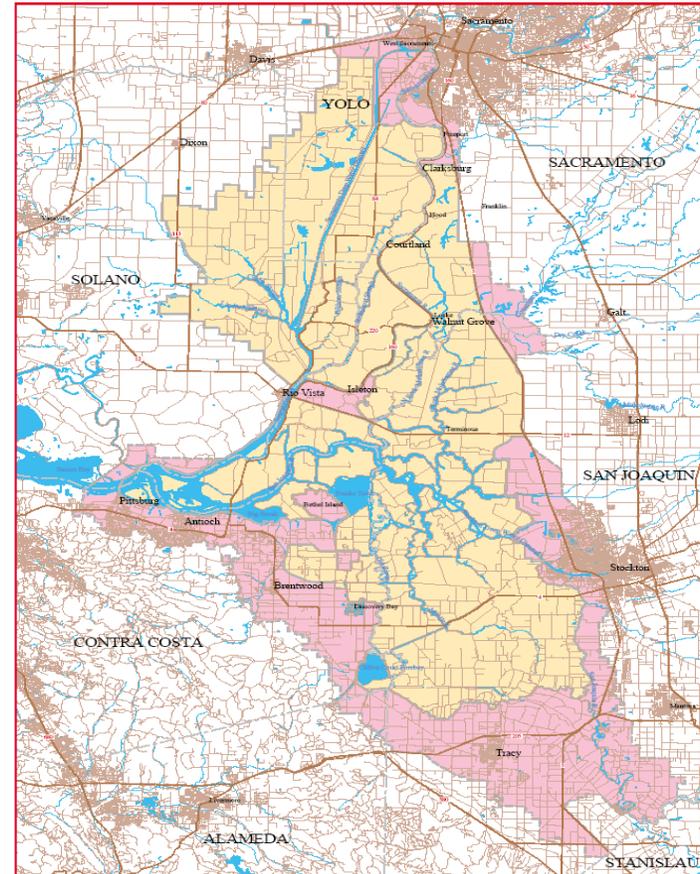
Legal Delta and Zones

- Primary Zone
- Secondary Zone
- County Boundary
- Surface Streets
- Major Highways
- Hydrography
- Delta Primary Zone
- Delta Secondary Zone

Source: Department of Water Resources
1995

Delta Protection Commission

MILES 10



Importance of the Bay-Delta



100s Gas Lines



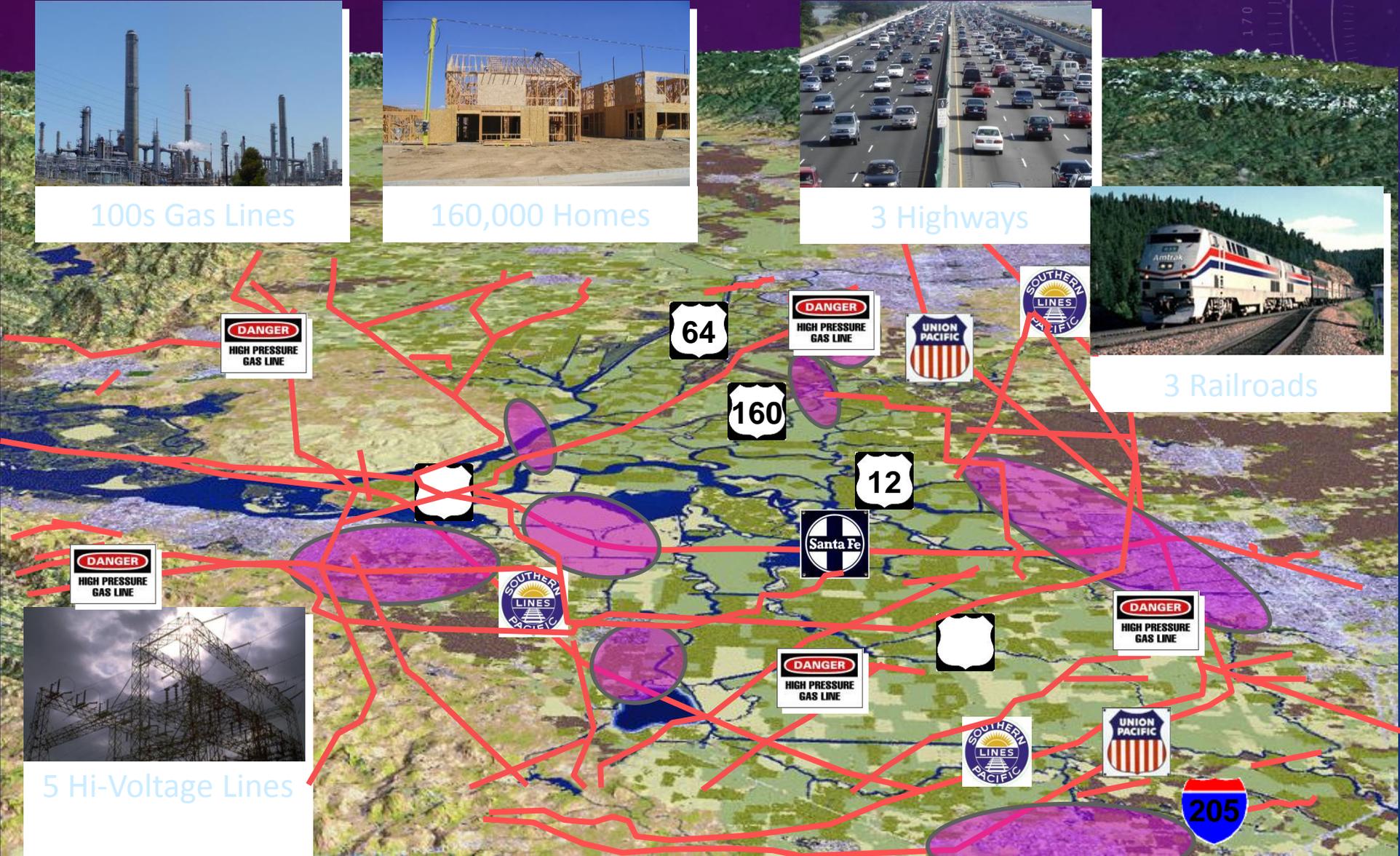
160,000 Homes



3 Highways



3 Railroads



5 Hi-Voltage Lines

ECOSYSTEM CRASH AND FISH



Populations of in-Delta fish, including Delta smelt, have significantly declined - restricting water supplies statewide.

Other fish in decline:

- Chinook salmon and steelhead on brink of extinction
- Longfin smelt
- Threadfin shad

DELTA OF THE FUTURE

Six “drivers of change” will impact the Delta sustainability

- 💧 Subsidence
- 💧 Sea Level Rise
- 💧 Climate Change
- 💧 Seismicity
- 💧 Invasive Species
- 💧 Population Growth

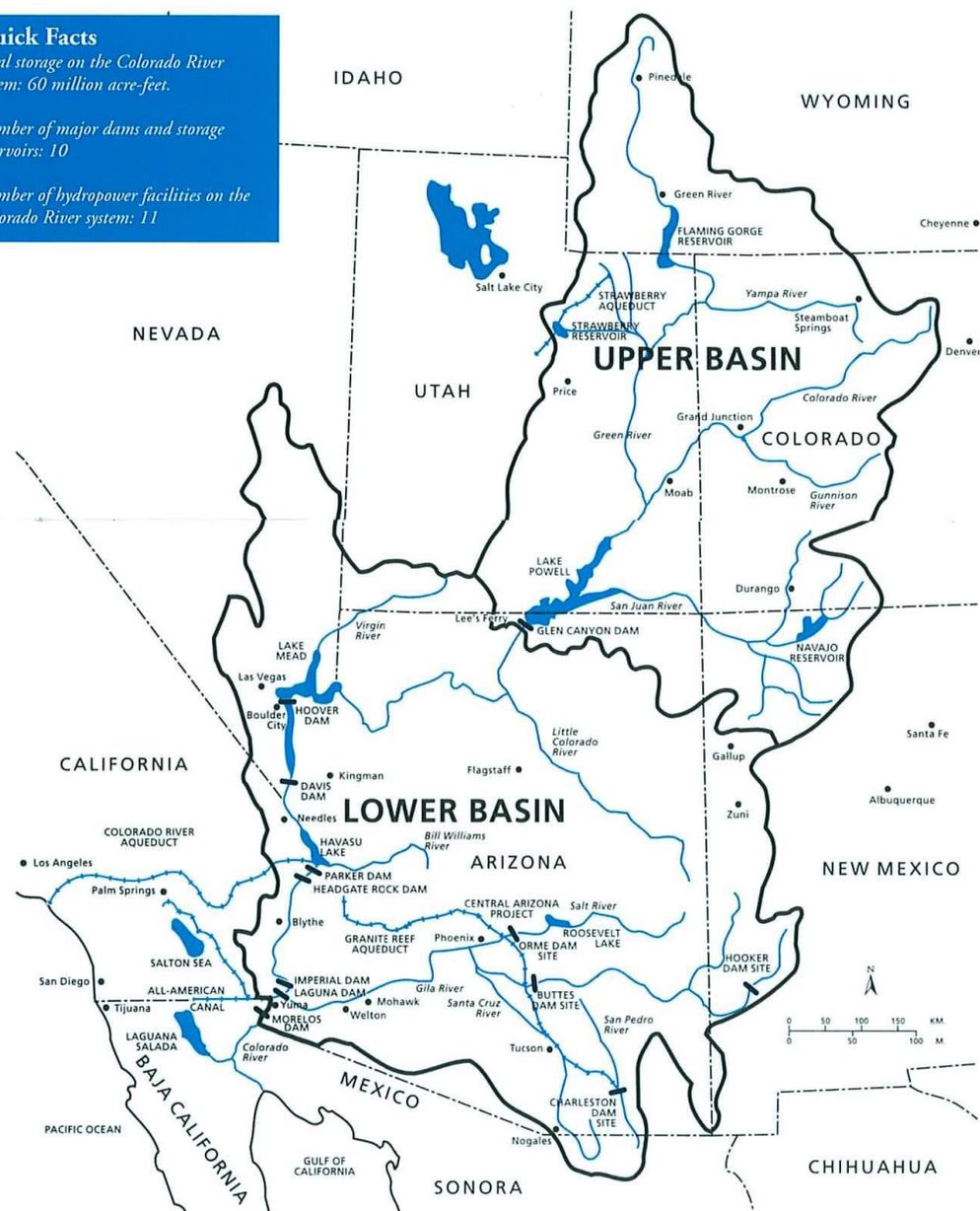


The Colorado River is an important part of the California water picture

The Colorado River System

Quick Fact
Size of Colorado River Basin:
242,000 square miles.

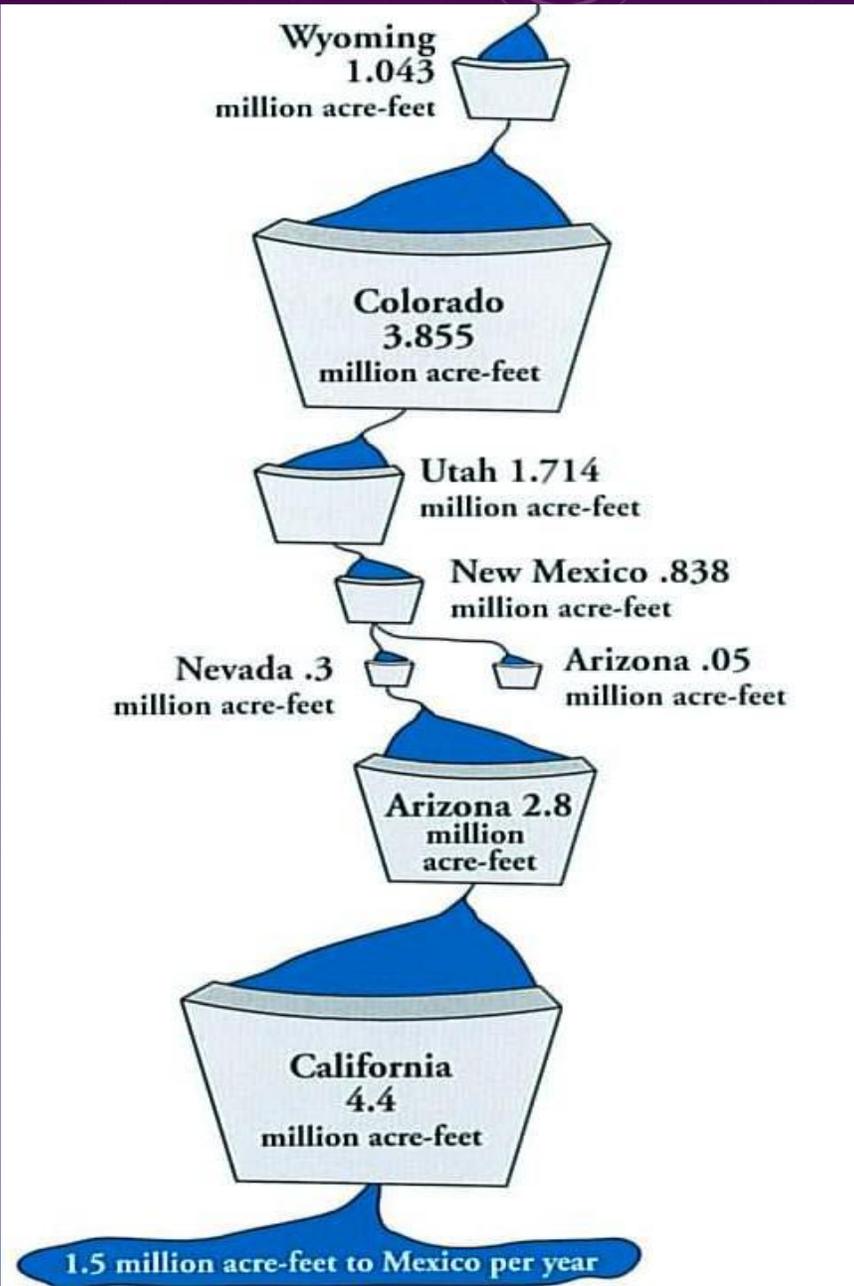
Quick Facts
Total storage on the Colorado River system: 60 million acre-feet.
Number of major dams and storage reservoirs: 10
Number of hydropower facilities on the Colorado River system: 11



THE COLORADO RIVER



- Seven U.S. states and the Republic of Mexico share the Colorado River
- Amount of water allocated is more than actual average Colorado River flows
- Severe drought has affected major reservoir storage levels



WHO GETS WHAT?

Upper Basin:
Colorado, New Mexico,
Utah, Wyoming

Lower Basin: Arizona,
California, Nevada

CALIFORNIA'S ALLOTMENT

California entitled to 4.4 million acre-feet annually

- Most - 3.85 maf - irrigates crops in the Palo Verde, Imperial and Coachella Valleys (senior water rights)
- Also provides water to urban Southern California; MWD (junior rights)



PENDING ISSUES

- ❖ Water Fix
- ❖ Habitat Restoration
- ❖ Minimum Instream Flows
- ❖ Storage
- ❖ Implementation of SGMA
- ❖ Water Transfer Legislation

- QUESTIONS?

