



**CALIFORNIA
LANDFORM REGIONS**

Klamath Mountains

Cascade Range

Merino Plateau

North Coast Ranges

Sacramento Valley

Sierra Nevada

San Francisco Bay Area

Delta

Central Coast Ranges

San Joaquin Valley

Basin and Range

Mojave Desert

Transverse Ranges

Los Angeles Basin

Salton Basin

Peninsular Range

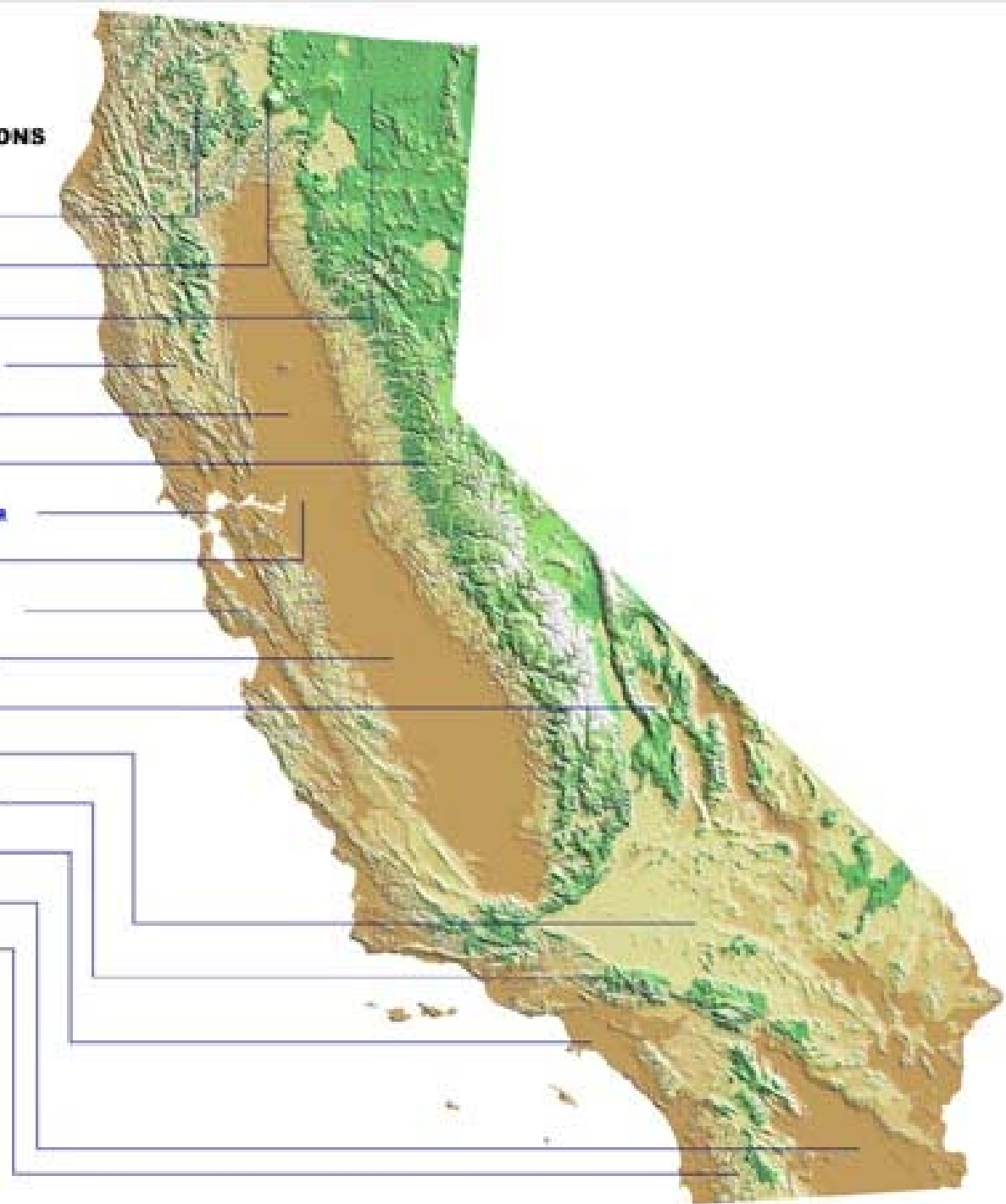
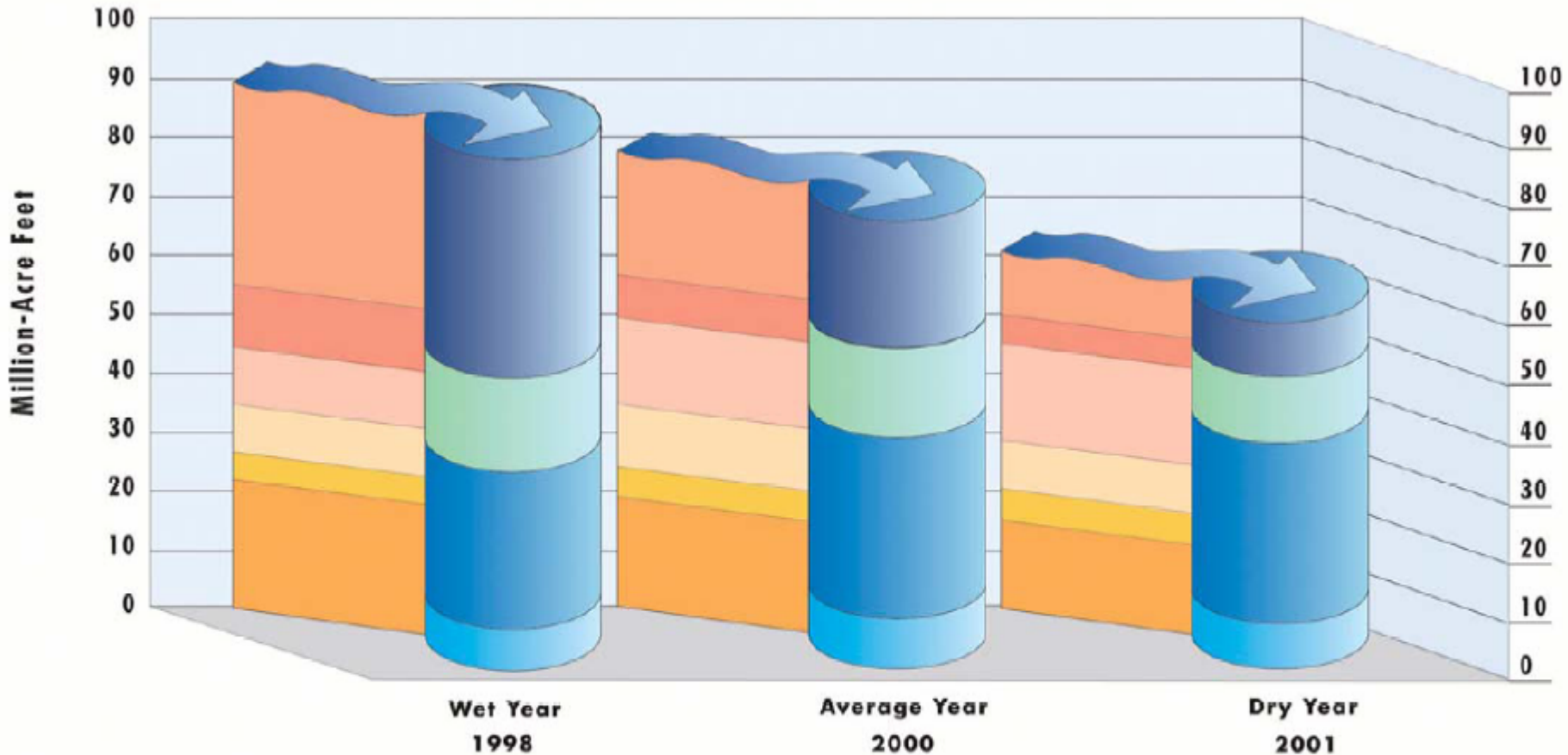


Figure 3-3 California water balance (water source and applied water uses) for water years 1998, 2000, and 2001



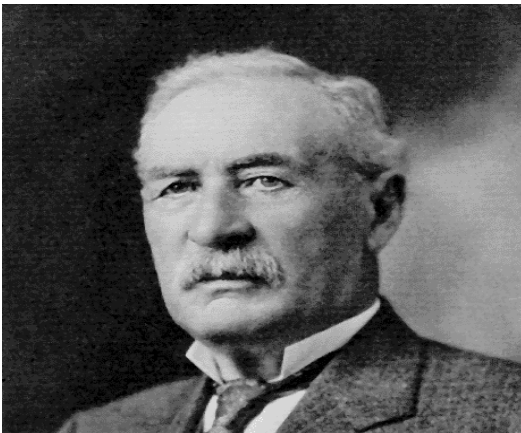
California's water balance can vary significantly from year to year. Three recent years show a marked change in the amount and relative proportion of the following: water delivered to urban and agricultural sectors and water dedicated to the environment (applied water use); where the water came from (water source); and how much water was reused among sectors. Each year,



Los Angeles: “There it is! Take it!”

Early Water History

- Started out with Pueblo water rights and public irrigation system
- Began by contracting to private companies to supply urban water
- As supplies become scarce due to upstream diversions, LA asserts water rights to LA River
- After a series of court battles, CA supreme court eventually grants Pueblo rights to all LA River (*Vernon Irrigation Co. vs LA, 1895*)
- 1903; voters force municipal control of water utilities (natural monopoly)
- William Mulholland, superintendent of water system
- Mulholland modernized water system; installed meters, reduce waste, made the city money
- LA control of water was strategy for growth; major impetus in annexation

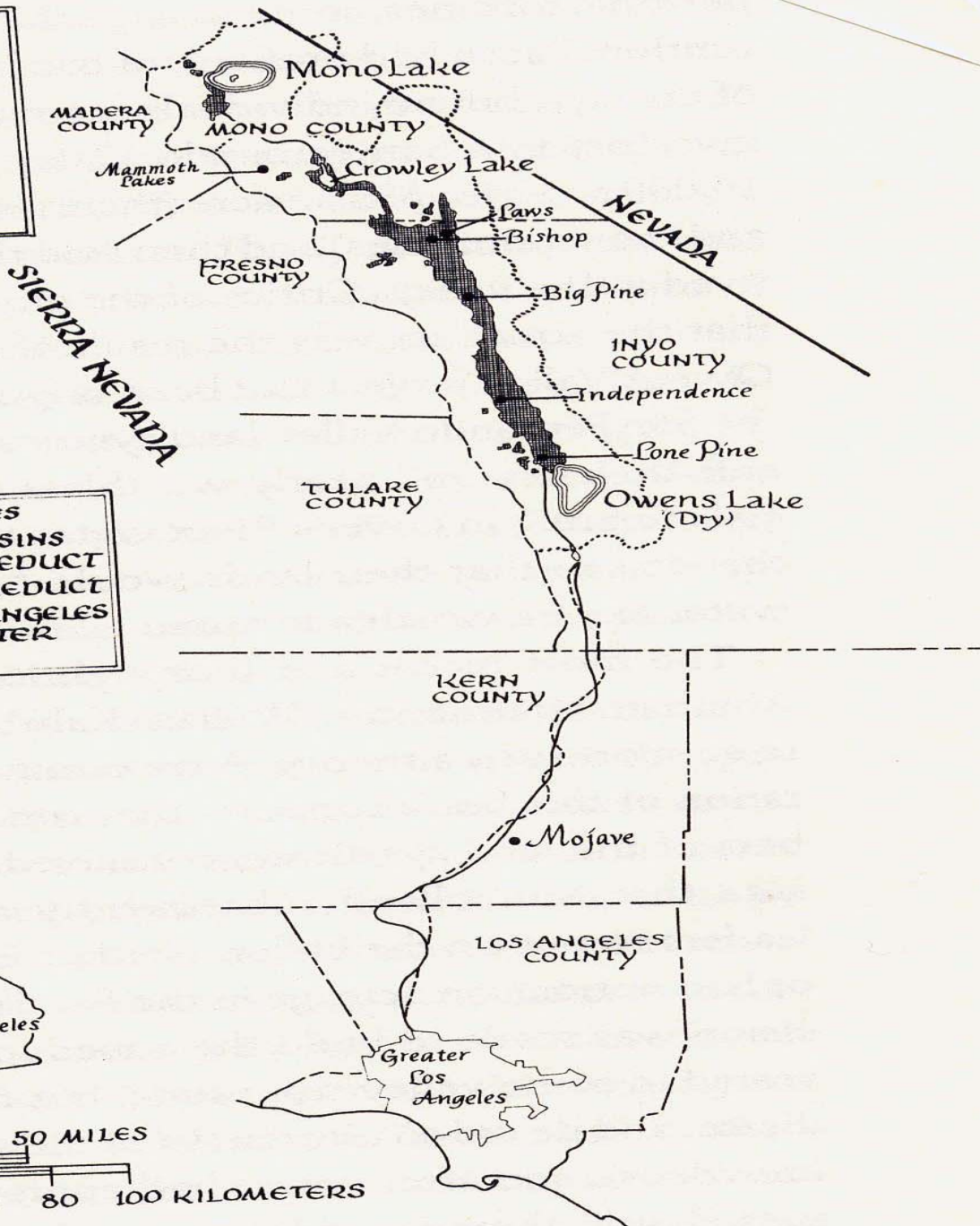
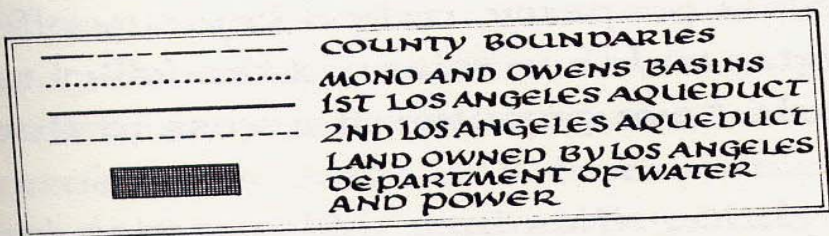


Owens River Valley “Caper”

Early Expansion

- Fred Eaton, former mayor and speculator, begins buying up land and water rights in Owens Valley
- LA buys rights to reservoir site; authorizes \$24.5m in bonds in 1905 and '07 elections
- Supported by massive publicity campaign; dire “drought” predictions
- Speculation in the San Fernando Valley
- 1906: US Congress grants rights-of-way to build aqueduct on public land
- Eventually LA buys all private land in Owens Valley (Inyo County), extends to Mono Lake (into Mono County)
- Resistance (sometimes violent) from Owens Valley residents

LOS ANGELES AQUEDUCT AND MONO EXTENSION



Owens Valley: The Environmental Era

- Early 1980s; controversy erupts as LA starts pumping massive amounts of Owens valley groundwater leading to environmental damage
- Series of court battles involving EIR reports and negotiations between LA and Inyo County
- Joint EIR report prepared by Inyo and LA symbolic of environmental era oversight of natural resource decision-making
- 1997 Court settlement puts into place a river restoration plan, targeting pre-1913 conditions in Owens River
- Air Resources Board also gets involved for dust pollution in dry Owens Lake
- Court ordered reductions in Mono Lake and Owens Valley leads to increased reliance on MWD

San Francisco Bay-Delta: “Dark damn-dam-damnation”

Early Years

- 1900: San Fran municipal charter mandates municipal ownership of water supply; earlier private enterprise on defensive
- San Fran turns to Tuolumne River in Hetch Hetchy valley; Yosemite NP
- Initial appeals to Sec of Interior failed; then later “conservation” Sec of Interior approves
- Creates political firestorm: Muir vs. Pinchot/Roosevelt
- Many questions about the feasibility of alternative water supplies to H.H.
- 1913: Congress passes Raker Act authorizing H.H., keeping water rights in place for irrigation districts and some limits on SF use

Peripheral Canal (1965 Plan)

- Second phase of State Water Project
- Intent to reduce saltwater intrusion into Bay Delta and at same time provide more water to SoCal
- Vigorously opposed by NorCal water interests and environmentalists
- Eventually defeated (1982) when voters approve referendum repealing Periph Canal legislation—1st big defeat of CA water project

CALFED: Background

Motivation

- Delta levees failing at increasing rate; water delivered south is very salty
- Delta water supply is threatened by diversion, salt water intrusion, variety of pollution (e.g., mercury from old mines)
- 1986 lawsuit leads to *Racinelli* decision reject SWRCB Delta water plan and accompanying water rights; State can force feds to abide by state WQ standards
- State response to lawsuit criticized by both enviros and economic interest; EPA steps in with many new restrictions (basically saying state plan is inadequate)
- Provides impetus for collaboration; CALFED supposed to collaborate on plan for restoring Delta

1994 Bay Delta Accord

- Springtime export limits expressed as a percentage of Delta inflow;
- Regulation of the salinity gradient in the estuary so that a salt concentration of two parts per thousand (X2) is positioned where it may be more beneficial to aquatic life;
- Specified springtime flows on the lower San Joaquin River to benefit Chinook salmon;
- Intermittent closure of the Delta Cross Channel gates to reduce entrainment of fish into the Delta.

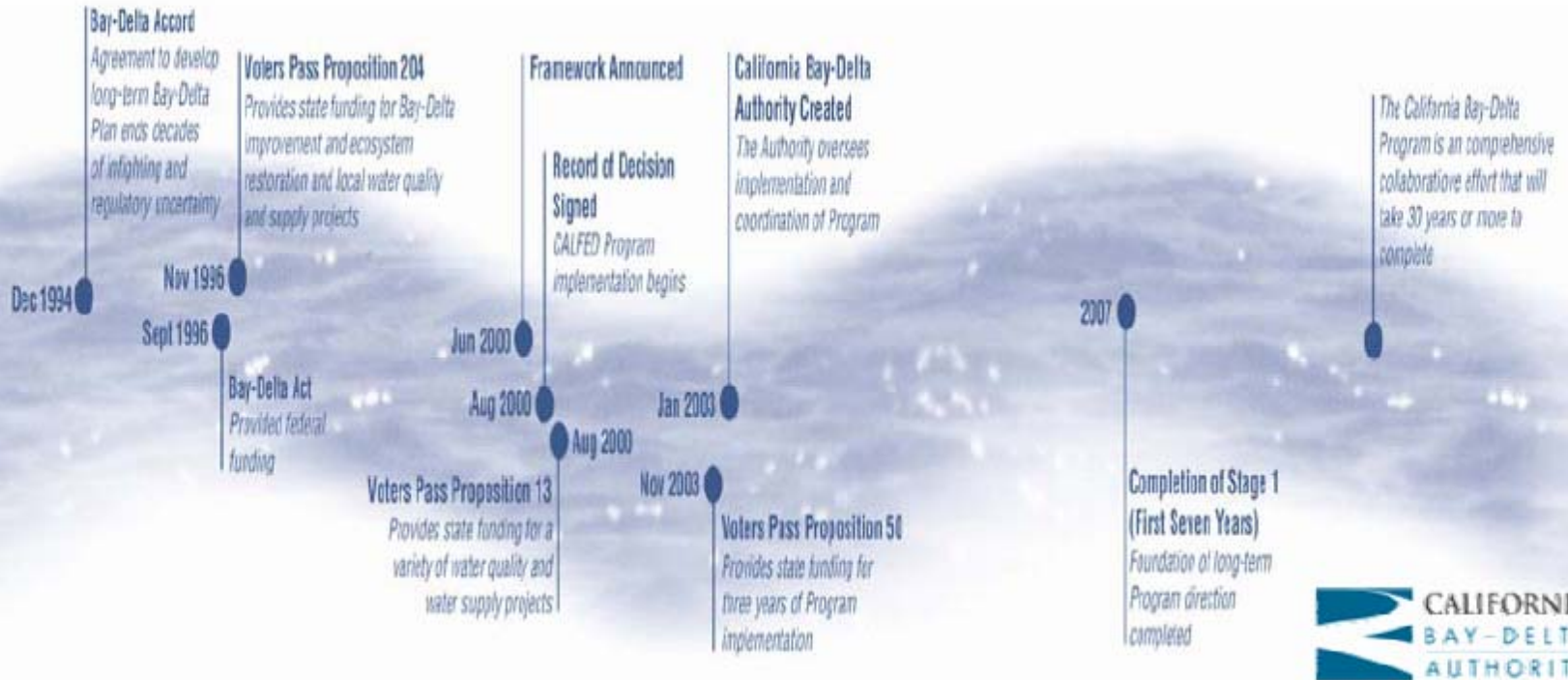
CALFED: Implementation

Current Structure

- 2000 Record of Decision establishes basic CALFED Plan
- 2003: Establishment of California Bay-Delta Authority as implementing agency
- Bay-Delta Authority has state and federal members, plus public (Bay-Delta Advisory Committee) and scientific input (Science Program)
- Funding from existing State/Fed programs, state Propositions 13 and 50, and CALFED bill at Federal level (Feinstein pushed it)

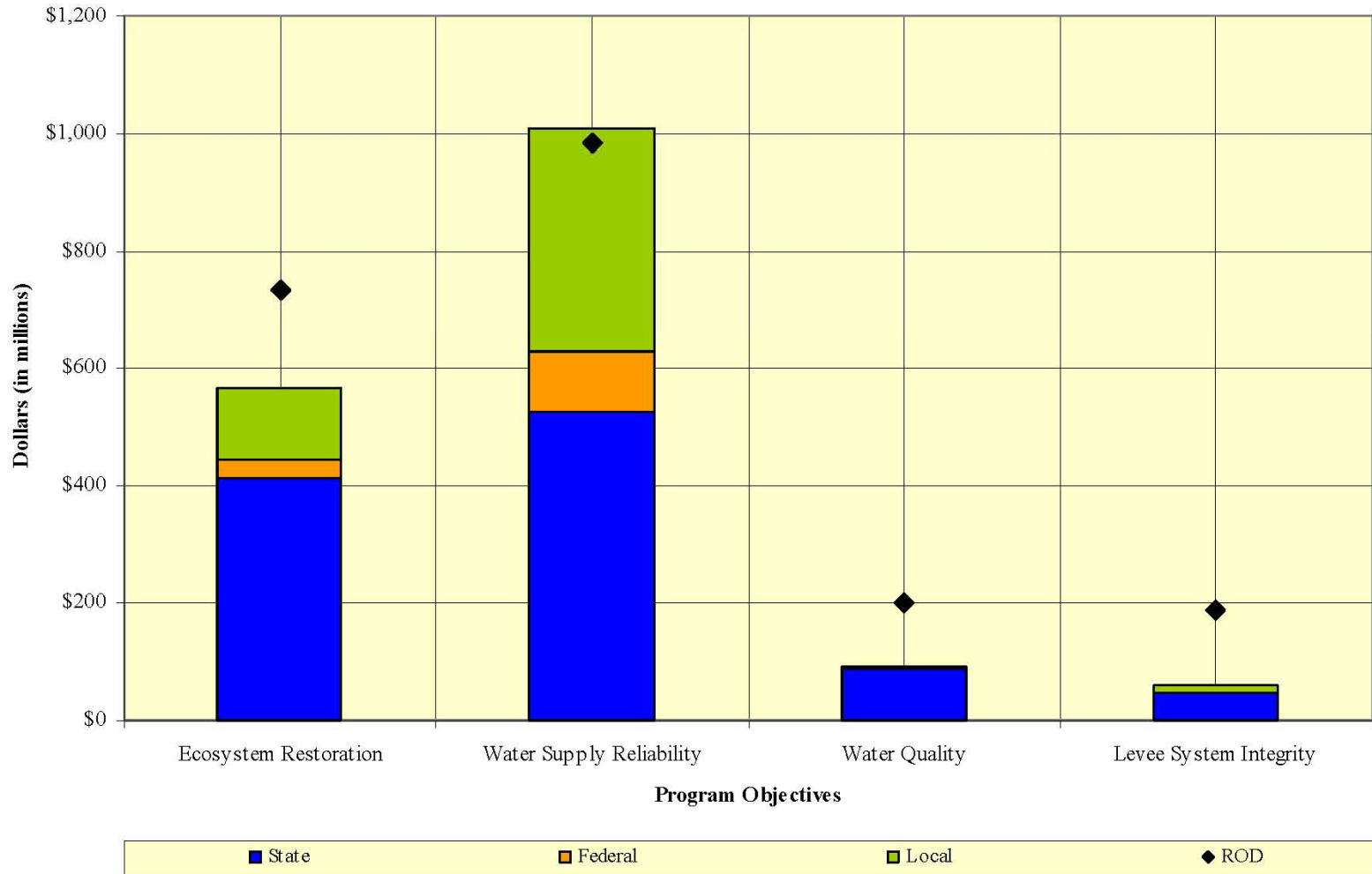
Basic Goals of Plan

- Water supply reliability, including new surface water (950,000 acre foot expansion)/groundwater (conjunctive use) storage, water efficiency, water transfers (Environmental Water Account)
- Water quality, including salinity level in the Delta
- Maintenance of levee system
- Ecosystem restoration (so far about 500 projects worth over \$500 million)



CALFED Program Years 1, 2, & 3 Cumulative Funding to Date

The Years 1, 2, & 3 Fiscal Summary Bar Chart presents State, Federal, and Local/Water User Funding to date, by Program Objective, as compared to the funding estimates, represented by the black diamonds, depicted in the August 2000 Record of Decision



The Death of CALFED?

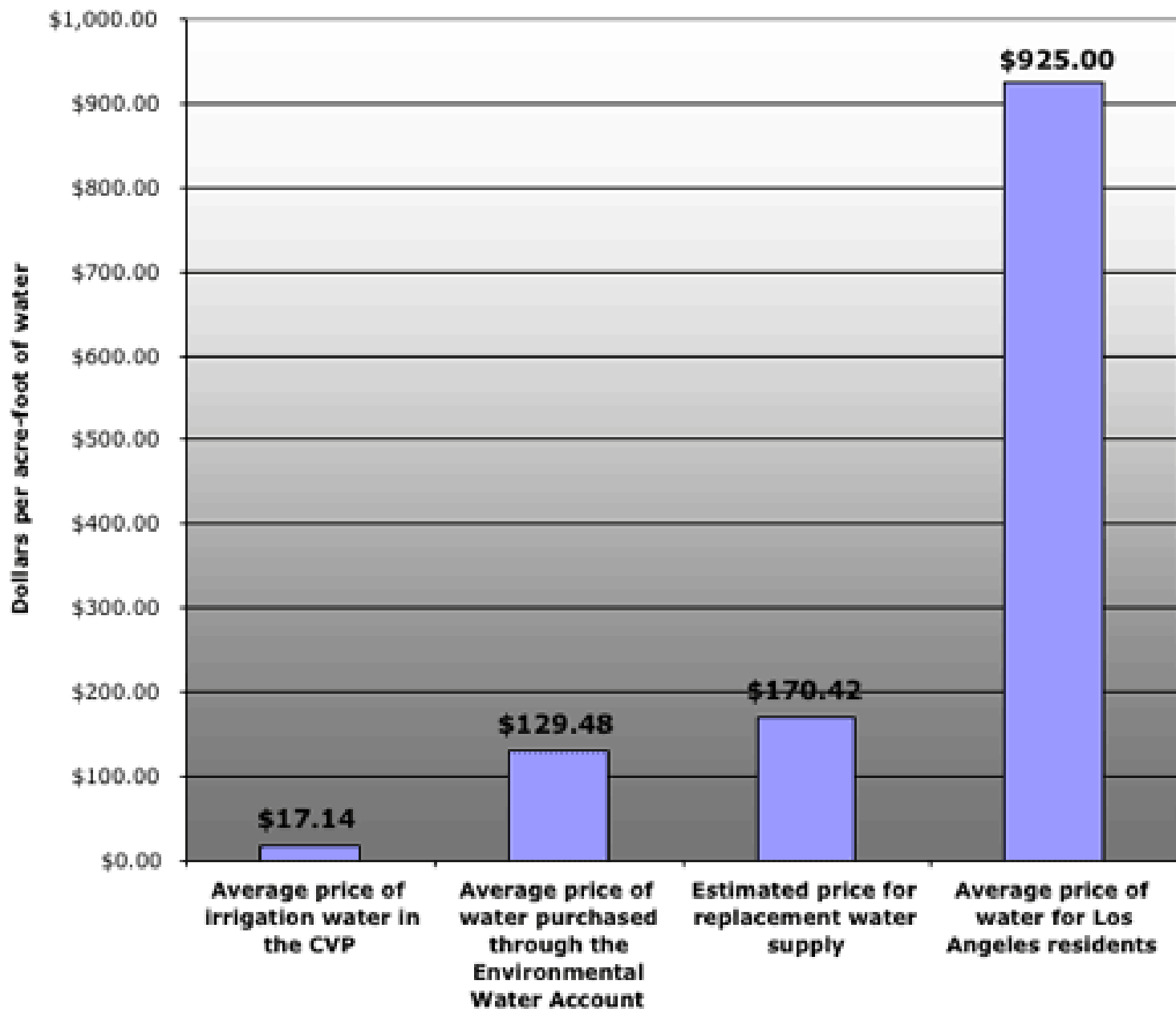
- Enviro problems: Delta smelt and other species in serious trouble; Delta levies unstable; water supply conflicts
- Policy problems: Legislature says CALFED is wasting money; resignation of key CALFED officials; court ruling says CALFED plan EIS is inadequate because of failure to consider water exports to south
- CA state gov't review of CALFED recommends dismantling Bay-Delta Authority
- BDA seen as incapable of controlling the decision-making of implementing agencies
- New structure may put more authority to traditional state agencies; will this put less emphasis on enviro. goals and more on development?
- Are the problems of CALFED symptomatic of large-scale collaborative processes?

Central Valley Project

History

- Began as a State Water Plan (“Marshall Plan”) for water supply and flood control (1919)
- 1933, CA state legislature endorses Central Valley Project; \$170 million in bonds)
- Only Feds can afford to fund project (Depression politics); make public power a requirements
- 1935-Bureau of Reclamation takes over Central Valley Project, in accordance with Reclamation Law
- Reclamation Act of 1902 says Fed irrigation projects may only give water to 160-acre parcels
- Problem: In San Joaquin, 66% of land holdings exceeded 160 acres
- “Technical compliance”: Creative ways splitting land to maintain 160 acre limit; e.g. each stockholder in corporate farm receives water for 160 acres, deed to employees and lease back; etc
- Private vs. public power: PG&E wins “wheeling” contracts to deliver CVP power (Agribusiness cheers!)

CVP farmers pay only 2% of what Los Angeles residents pay for their water



Source: Environmental Working Group

Central Valley Improvement Act

Overview

- Part of larger 1992 “Reclamation Projects Authorization and Adjustment Act”; included money for a lot of projects in other Western states
- Goal: Address fish/wildlife and enviro. issues, including doubling the population of anadromous fish in CVP watershed

Water Management Provisions

- No new water contracts until EIS completed (EIS done in 2001)
- Set aside 800,000 acre/ft annually of CVP water for fish/wildlife
- Renewals of existing contracts subject to additional fees for restoration
- Allows water transfers outside of CVP contractors; recipients must have water meters

Fish and Wildlife Provisions

- Structural measures (e.g.; Temperature Control Device on Shasta) and habitat restoration (e.g.; acquisition of riparian land)
- Restoration plans for San Joaquin and Stanislaus Rivers
- Central Valley Project Restoration Fund; grants for restoration funded mainly by fees on uses of CVP water

Figure 1
TOTAL CVPIA OBLIGATIONS BY FUND SOURCE
Fiscal Years 1993-2002

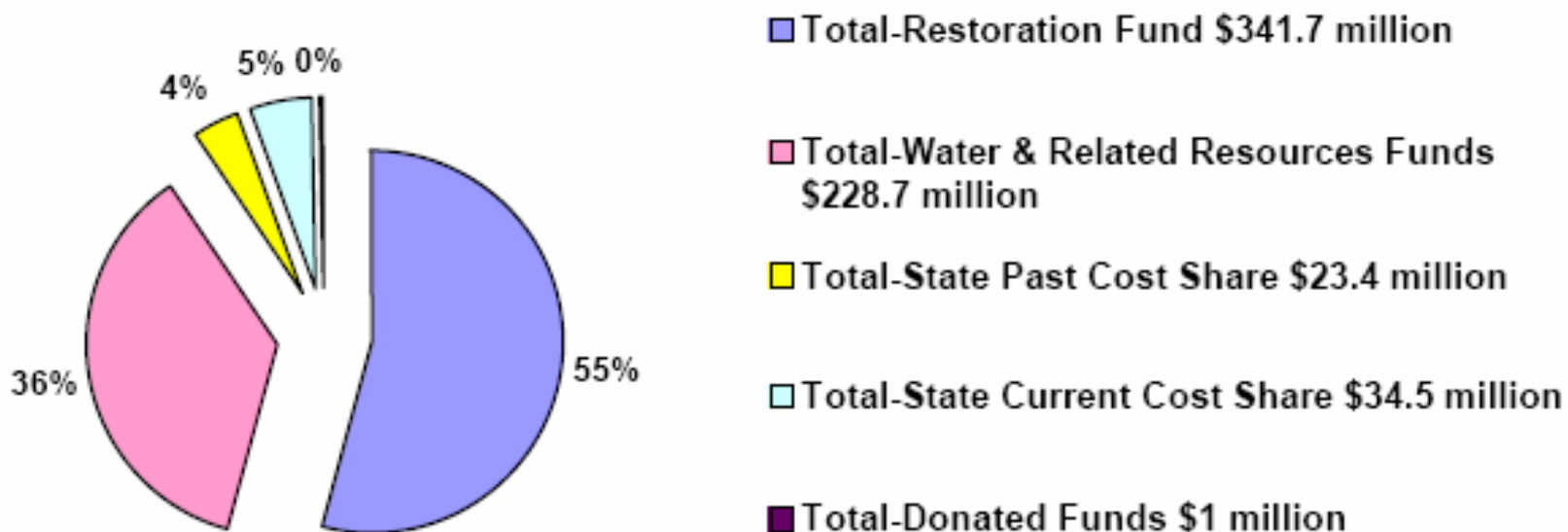
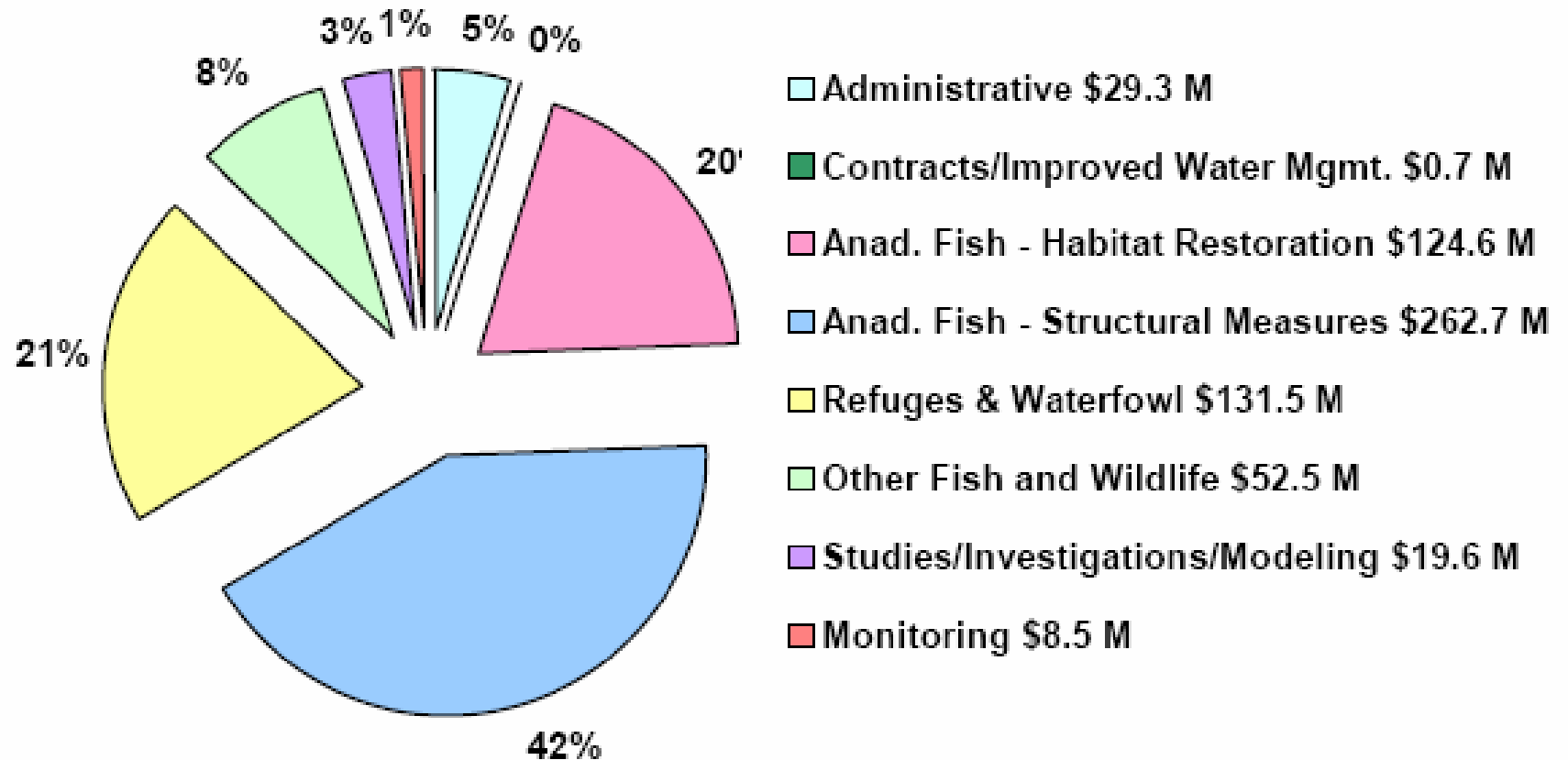


Figure 2
TOTAL CVPIA OBLIGATIONS BY ACTION CATEGORY
Fiscal Years 1993-2002



CVPIA Anadromous Fish Restoration Activities Sacramento River and Tributaries, 1993-2002

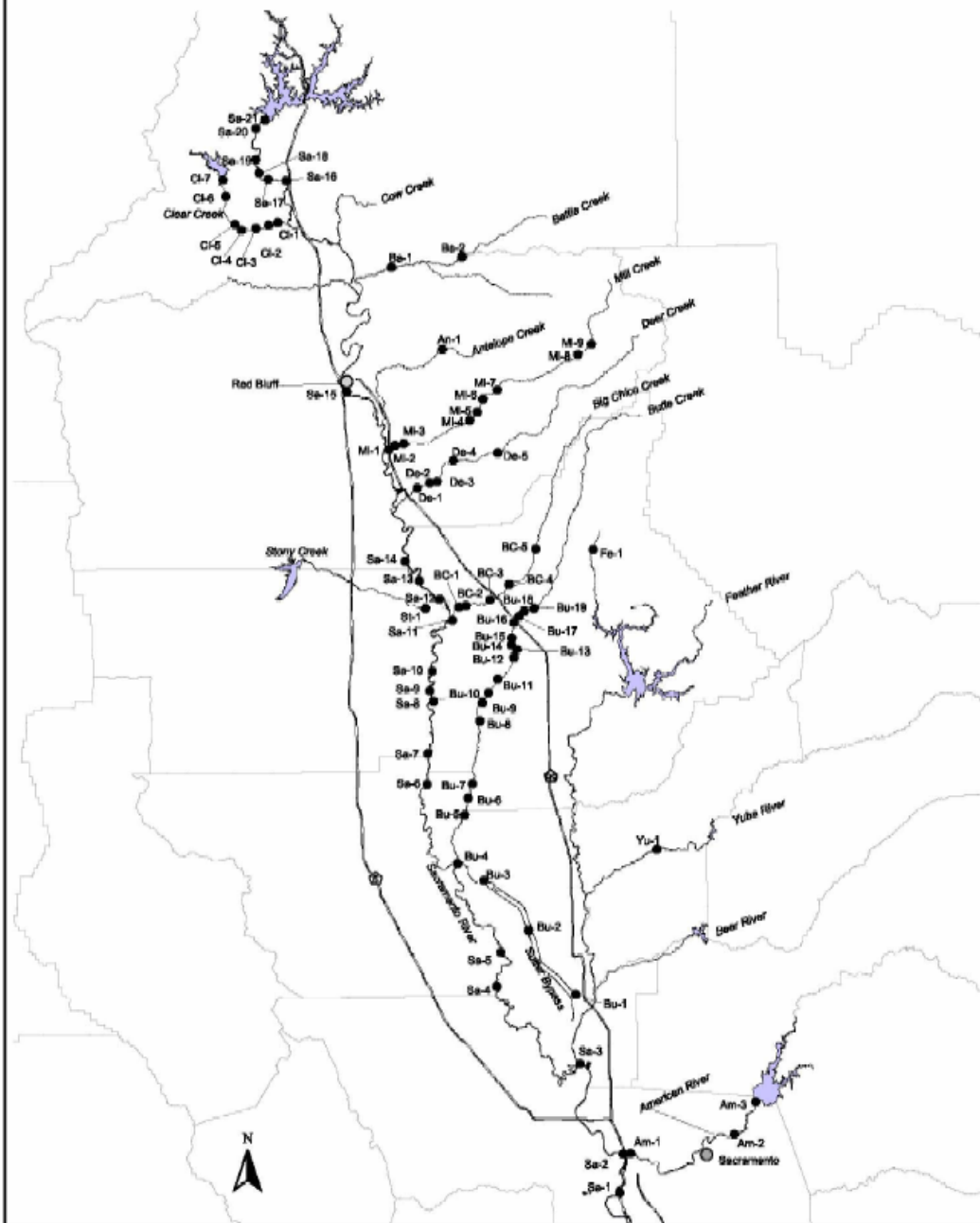


Figure 10
Central Valley Chinook Salmon Abundance Indices

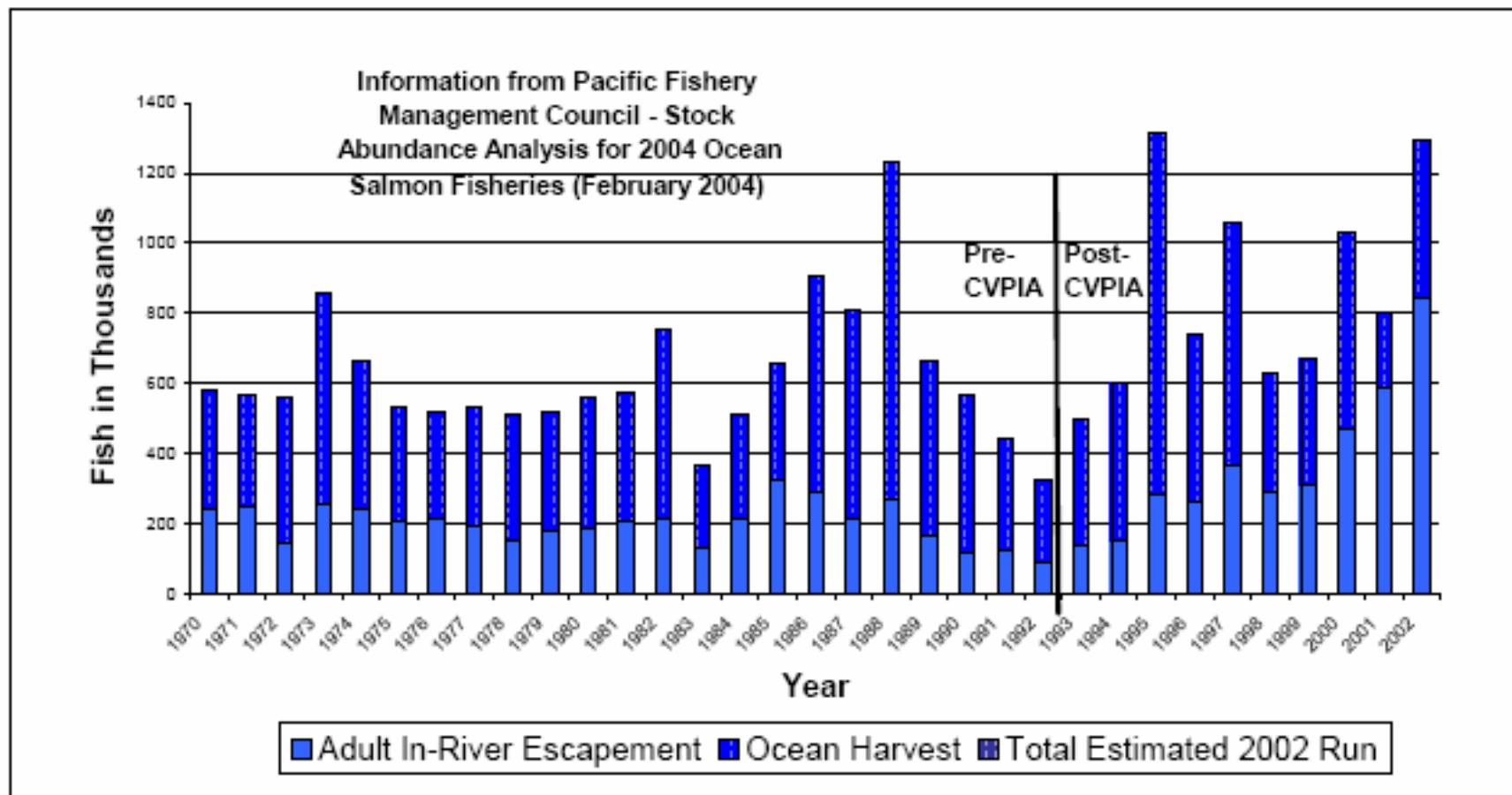


Figure 11
Clear Creek Fall-Run Chinook Salmon
Escapement and CVPIA Implementation

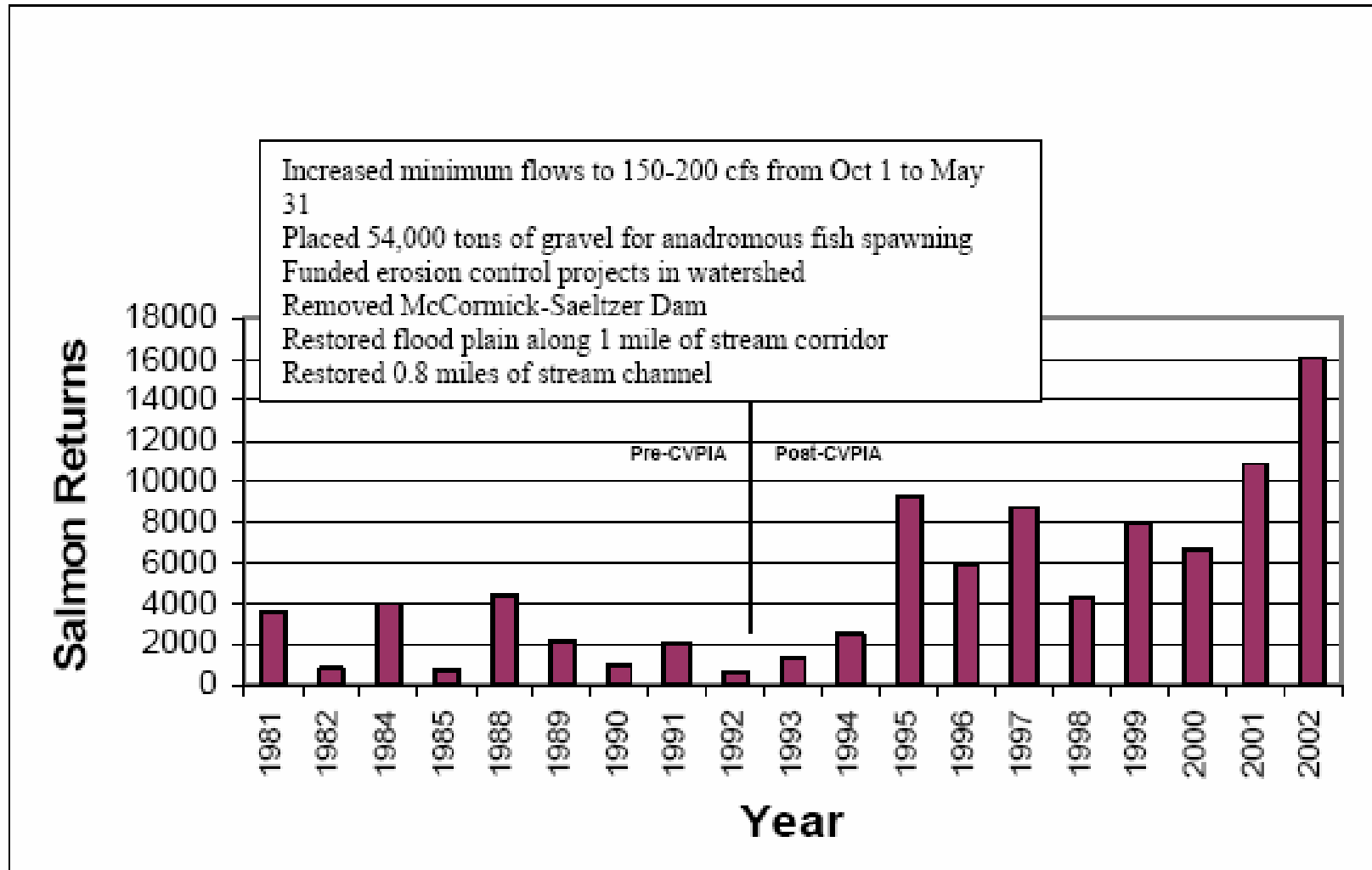
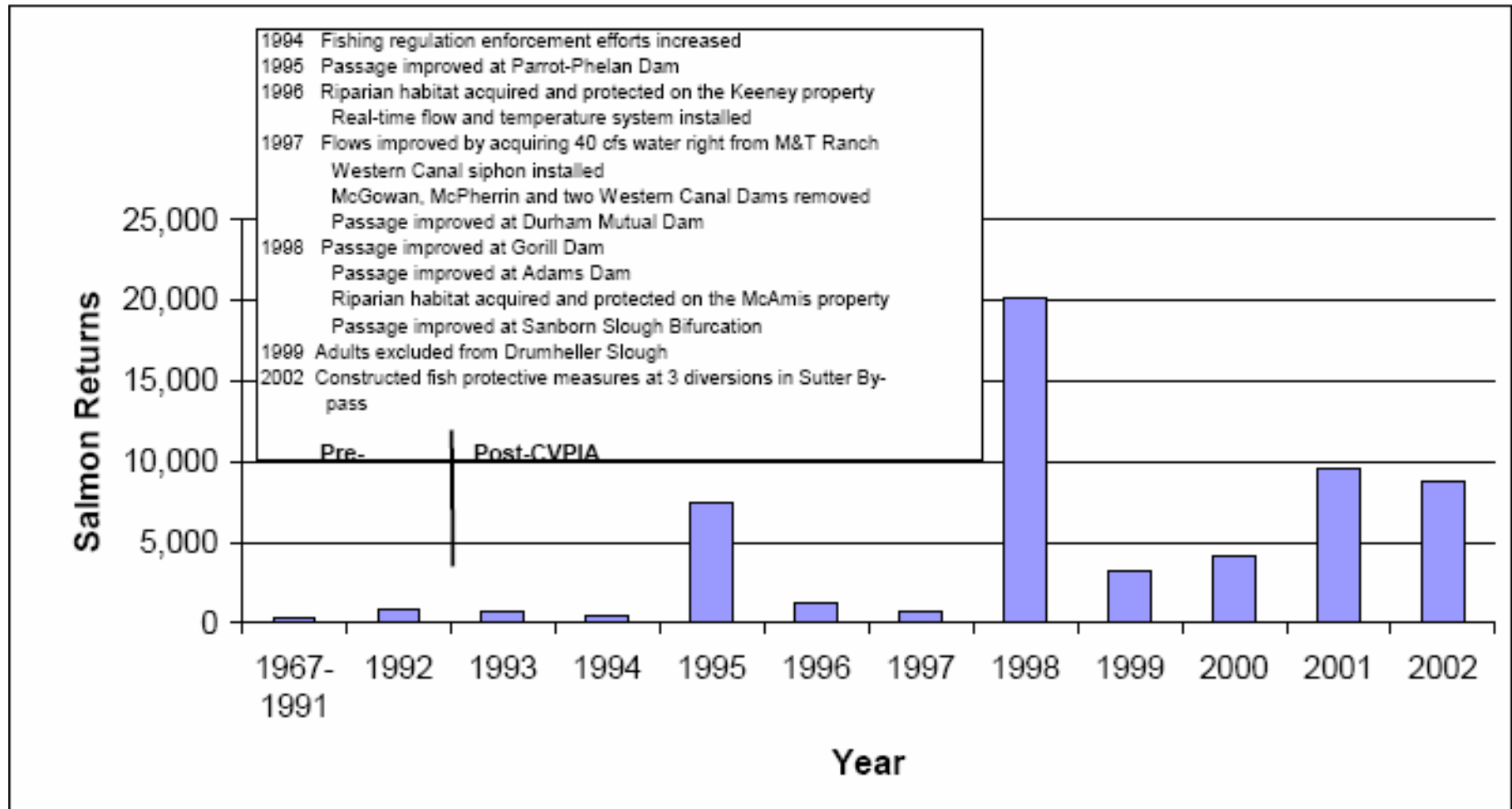


Figure 12

Butte Creek Spring-Run Chinook Salmon Escapement and CVPIA Implementation



State Water Project “It’s better to have problems with water than without water”

- 1951; CA introduces plan for Oroville dam and canal south
- Legislature responds with creation of Dept. of Water Resources (1956) and largest bond act ever passed in CA
- Big benefit for agribusiness because escapes Fed reclamation laws
- Governor Edmund “Pat” Brown (D) made state water planning big political issue (chief executive legacy)
- Very stark North (con)-South (pro) differences in voting for Burns-Porter Act (bond measure); partisanship much less important
- Regional battles in MWD over support of Burns-Porter Act; issue of funding West and East Branch
- Oroville Dam on Feather River and California Aqueduct are centerpieces of SWP
- Agribusiness subsidized in various ways; e.g. Kern County Water Agency taxes urban users to help fund ag. water contracts (see Hundley p. 291-300)
- Subsidized water encourages farmers to oversupply water-intensive crops (e.g., alfalfa/cotton); also market gluts

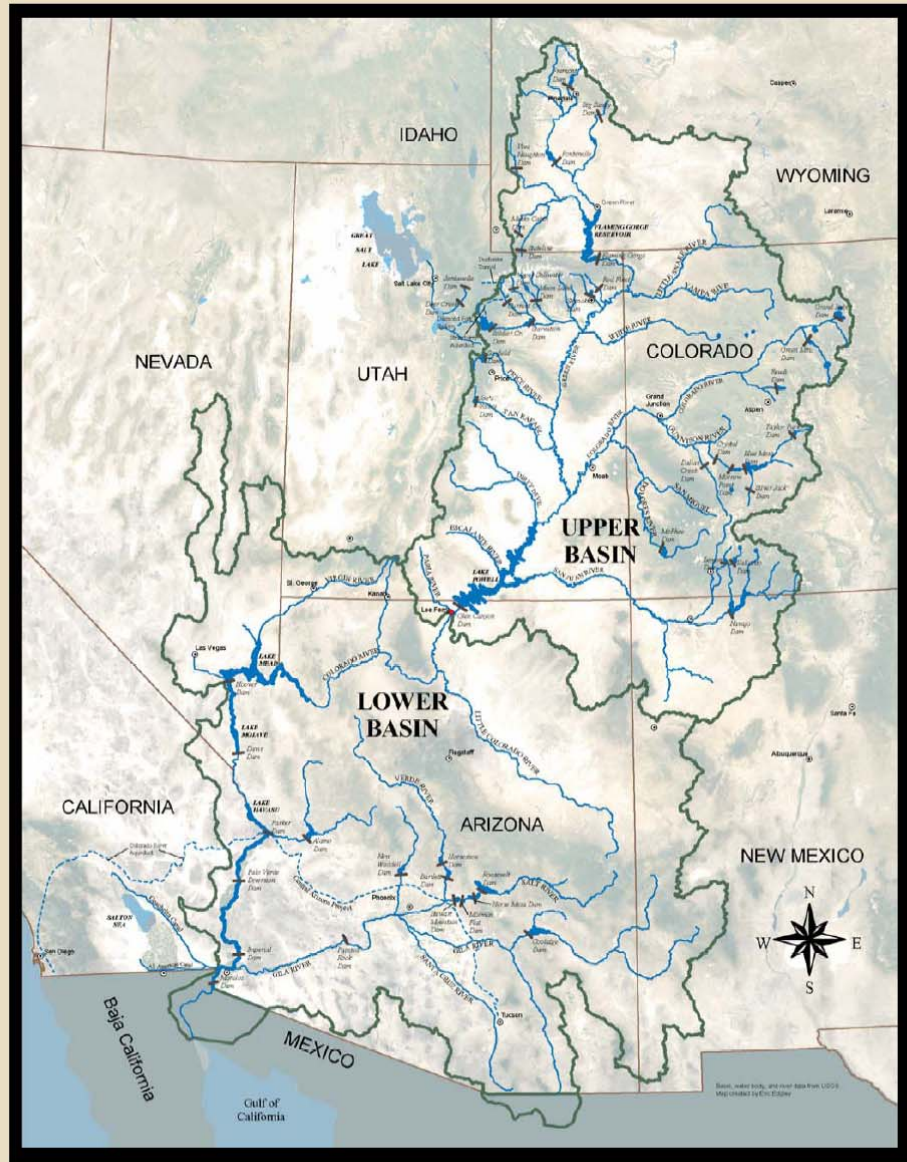


Figure I-2. Names, Locations, and First Year of Service of Long-Term Contracting Agencies, December 31, 2002

Some State Water Project Statistics

- 29 agencies/districts have long-term water contracts with SWP
- Contracts specify average annual delivery of 4.2 million acre-feet
- Metropolitan Water District is largest urban user; Kern County Water Agency is largest agricultural user
- Lake Oroville: Largest earthwork dam in the Western hemisphere
- 675 miles of aqueducts/pipes
- Largest user of electric power in the state
- Highest pumping station in the world (the Edmonston Pumping Plant lifts water 1,926 ft over the Tehachapi mountains)

Colorado River Basin



Colorado River: Overview

“Too thick to drink but too thin to plow”

Some Basic Facts (from CA Colorado River Water Plan)

- Provides water to seven states and Mexico
- 1,440 miles long, watershed is 244,000 square miles
- Massive range in annual natural flow: 24.5 maf max to 5.0 maf min; 1906-1998 average of 15 maf
- CO River storage system has capacity of 60 maf; 5.35 maf is annually available for flood control
- Two biggest reservoirs are Lake Mead (Hoover Dam) in the Lower Basin, and Lake Powell (Glen Canyon Dam) in the Upper Basin—combined storage of 51 maf
- Seven counties in CA with more than half the state population receive CO river water and hydro; even when 4.4 is achieved, 50% of water in SoCal

In the Beginning: The Boulder Canyon Project

- Arthur Davis, director of Reclamation Service, had watershed vision of CO basin
- Imperial Irrigation District wanted an “All-American canal”; pushes bill through US Congress
- 1922, as CA support builds, Boulder Canyon Act introduced (Passed in 1928)
- Eventually leads to completion of Hoover Dam; 1935

“Law of the River”—At least some of it!

Colorado River Compact (1922)

- Others states in CO basin alarmed; CA could acquire water rights to river (*Wyoming vs. CO 1922*; interstate prior appropriation)
- Interstate compact under Constitution compact clause (requires state and Congress approval)—driven by political incentives
- Allocated water between upper (WY, CO, UT, NM) and lower basin(CA, NV, AZ); 7.5 maf each, 1 million in surplus to Lower; based on figure of 18 maf (over apportionment!)
- Colorado River Compact did not allocate water *within* basins
- AZ Democratic governor opposes; AZ may need water for future growth
- Upper basin states clamor for six state ratification and specification of CA amount (Arizona never signed on)
- California limited to 4.4 million acre feet; no more than half of any surplus water!

California Seven Party Agreement (1931)

- Establishes water rights priorities, but does not quantify
- Ag first, urban last

“Law of the CO River”—And still not all!

The most significant documents to date that relate to California’s Colorado River rights and interests include:

- 1922 Colorado River Compact
- 1928 Boulder Canyon Project Act
- 1929 California Limitation Act
- 1931 (California) Seven-Party Agreement
- California Water Delivery Contracts
- Hoover Dam Power Contracts
- 1944 Mexican Water Treaty
- 1948 Upper Colorado River Basin Compact
- 1956 Colorado River Storage Project Act
- 1964, 1979, and 1984 U.S. Supreme Court Decrees in *Arizona v. California*
- 1968 Colorado River Basin Project Act
- 1970 Criteria for the Coordinated Long-Range Operation of Colorado River Reservoirs
- 1973 International Boundary and Water Commission Minute No. 242
- 1974 Colorado River Basin Salinity Control Act and 1984, 1995, and 1996 Amendments
- 1982 Field Working Agreement for Flood Control Operation of Hoover Dam and Lake Mead
- 1986 Colorado River Floodway Protection Act
- 1986 Lower Colorado Water Supply Act

Priorities Under the 1931 California Seven-Party Agreement

Priority	Description	Acre-Feet Annually
1	Palo Verde Irrigation District gross area of 104,500 acres of land on the Palo Verde Valley	} 3,850,000
2	Yuma Project in California not exceeding a gross area of 25,000 acres in California	
3(a)	Imperial Irrigation District and other lands in Imperial and Coachella valleys ¹ to be served by All-American Canal	
3(b)	Palo Verde Irrigation District - 16,000 acres of land on the Lower Palo Verde Mesa	
4	Metropolitan Water District of Southern California for use on coastal plain	550,000
	Subtotal	4,400,000
5(a)	Metropolitan Water District of Southern California for use on coastal plain	550,000
5(b)	Metropolitan Water District of Southern California for use on coastal plain ²	112,000
6(a)	Imperial Irrigation District and other lands in Imperial and Coachella valleys to be served by the All American Canal	} 300,000
6(b)	Palo Verde Irrigation District - 16,000 acres of land on the Lower Palo Verde Mesa	
	Total	5,362,000
7	Agricultural use in the Colorado River Basin in California	

Arizona vs. California

Increasing Demands

- Parker Dam and Colorado River Canal, funded by Metropolitan Water District
- AZ actually sends in militia (symbolic) to prevent anchoring of Parker on AZ side
- Massive growth in SoCal
- Central Arizona Project; AZ starts moving towards full appropriation of CO water allocation

U.S. Supreme Court Case

- Arizona never signed the 1922 Compact
- Confirms DOI as Water Master; can assign interstate and intrastate allocations through water contracts—Congressional apportionment and possible misreading
- Court says AZ has rights to tributaries that do not count towards mainstream apportionment; plus 2.8 maf from mainstream.
- CA limited to 4.4 maf; half of surplus
- Early estimates of amount of surplus were too high
- By 1960; CA taking 5.36 maf; and 70% of decrease would have to come from MWD (junior water rights)

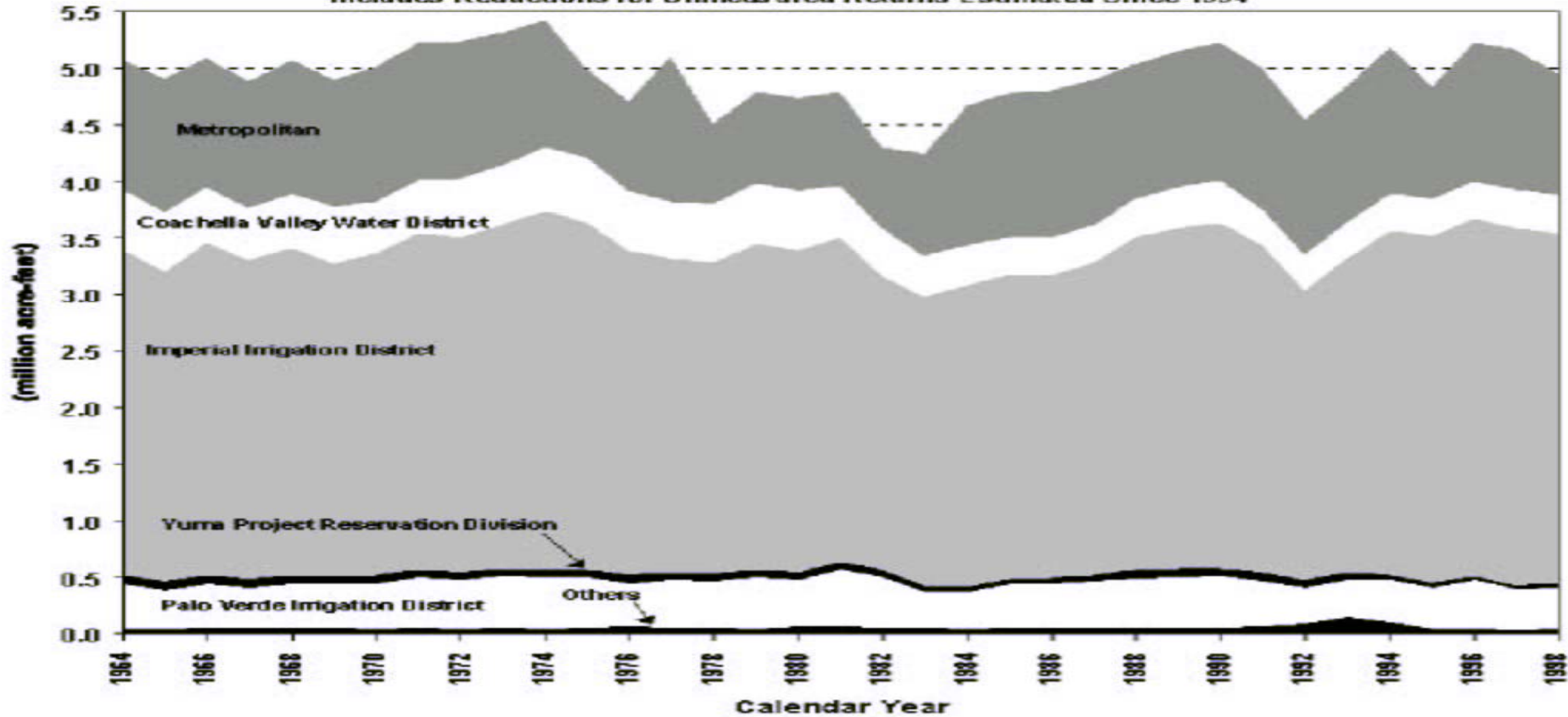
Early Consequences

- Sets into motion a series of water negotiations designed to reach 4.4 maf
- California 4.4 Plan; DOI Interim Surplus Guidelines
- Key deals: MWD and IID; San Diego and IID (200,000 taf; wheeling war)

California “Straws” in the Colorado River

Figure xxx - California's Net Diversions from the Colorado River

California's Net Diversions From the Colorado River
Includes Reductions for Unmeasured Returns Estimated Since 1994



Quantification Settlement Agreement

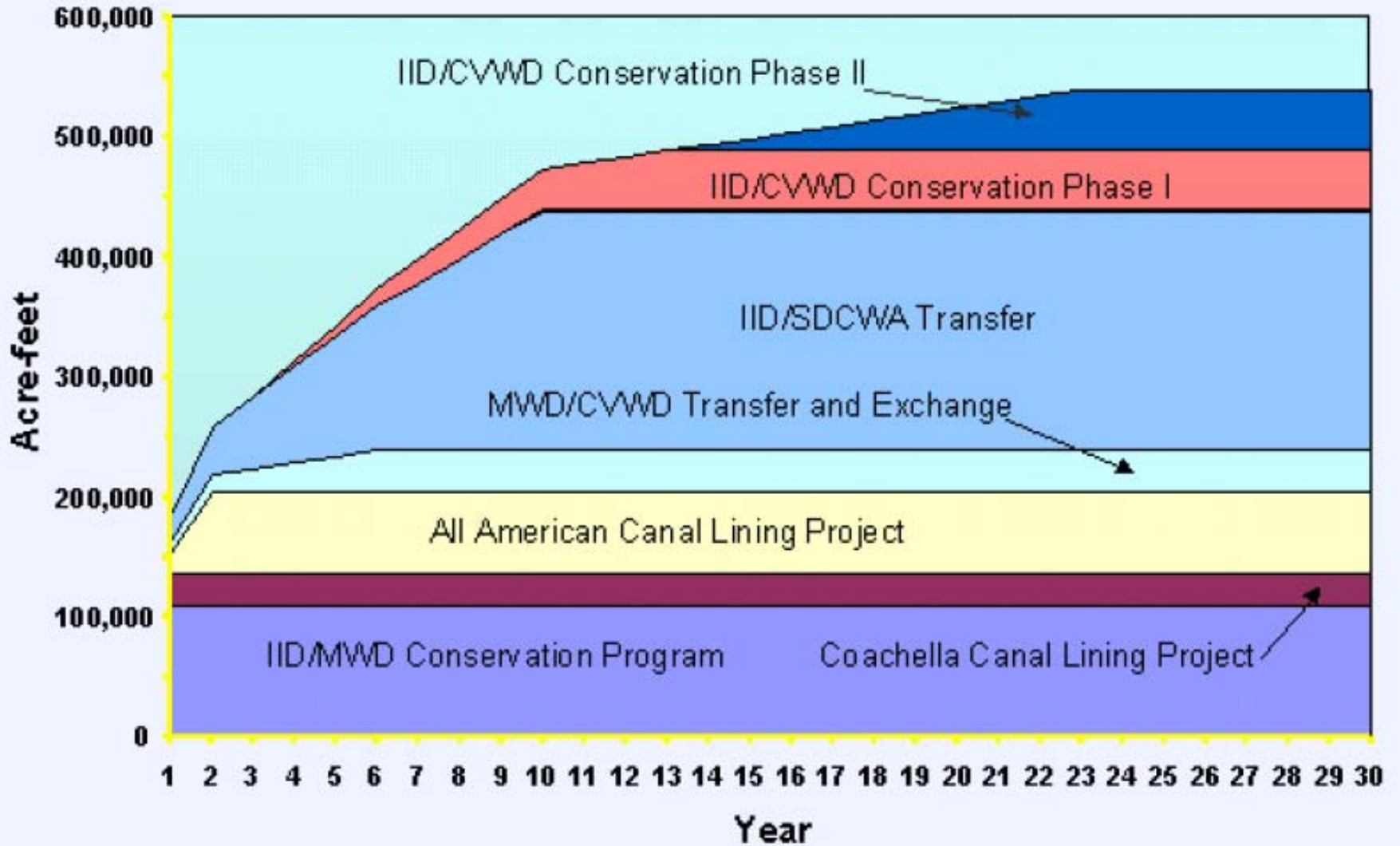
Background

- 1931 Seven Party Agreement allocates water rights within CA; fails to establish specific numbers for IID and Coachella (so-called Priority 3 water)
- 2000: Original terms of QSA drafted by all parties, but required individual agencies to ratify
- 2003: CA agencies fail to ratify; Secretary of Interior cuts CA allocation of CO river water for failing to meet Interim Surplus Guidelines
- 2003: Quantification Settlement Agreement finally signed by all parties

Basic Provisions (Complex! Many different agreements)

- Cap IID water at 3.1 maf; CVWD at .33 maf (quantification of Priority 3 water)
- Transfer of 200,000 acre-feet from IID to San Diego
- Protections for Salton Sea
- Conservation measures, including lining of All-American and Coachella canals paid for by MWD
- Proposition 50 bond money for IID conservation projects (conflict here)

Core Water Conservation/Transfer Projects, and Exchanges



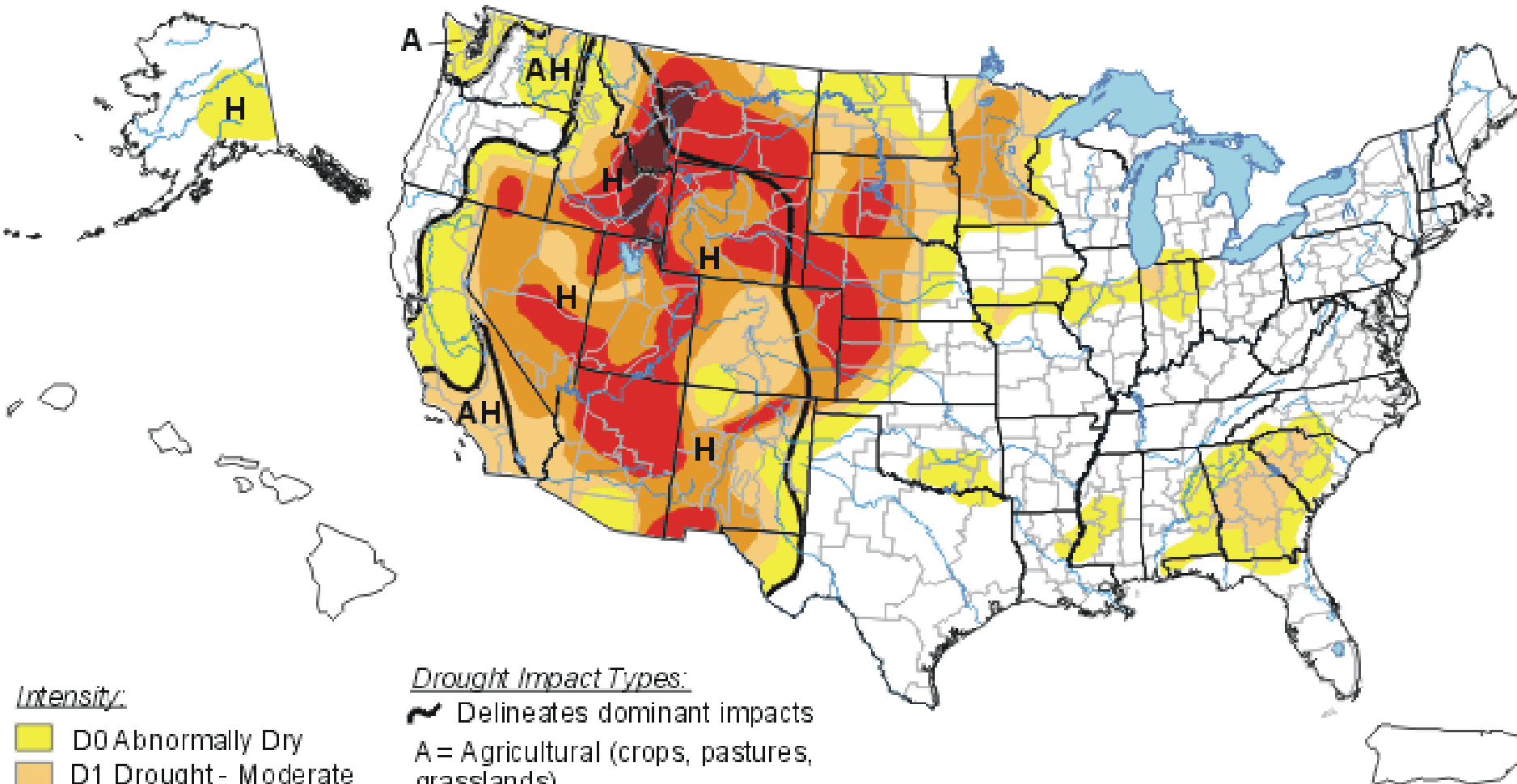
Possible QSA Problems

- Threat of drought—will DOI declare shortage during worst drought in recorded history? Drought guidelines recently developed in 2006
- Enough water for environment? Colorado River Delta
- California compliance/enforceability
- Salton Sea restoration—irrigation runoff from IID and conservation
- Lack of public participation (may change as drought worsens)






U.S. Drought Monitor

May 11, 2004


Valid 8 a.m. EDT



Intensity:

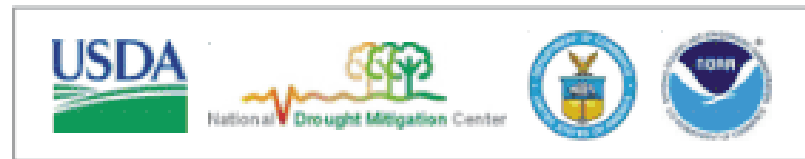
-  D0 Abnormally Dry
-  D1 Drought - Moderate
-  D2 Drought - Severe
-  D3 Drought - Extreme
-  D4 Drought - Exceptional

Drought Impact Types:

-  Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)
- A, H = Agricultural and Hydrological
- (No type = Both impacts)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://drought.unl.edu/dm>



Released Thursday, May 13, 2004

Author: David Miskus, JAWF/CPC/NOAA

Water Marketing

Pricing

Stability

Legal barriers

Third-party impacts

Trust/transaction costs

Water rights—is selling water a “beneficial use”? Yes, according to CA state law