FACTS AND INFORMATION ON CALIFORNIA'S WATER AND ENVIRONMENTAL DEBATES

DELTA STEWARDSHIP COUNCIL

Delta Stewardship Council

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"The challenges of managing water and achieving ecological rehabilitation in the Delta are numerous, including the reluctance of many participants to confront the reality that water is scarce; the distribution of water management responsibilities among many agencies and organizations; the suite of environmental factors (stressors) that affect the structure and functioning of the Delta ecosystem, including the many biological and physical changes that have occurred in the Delta; and the lack of detailed understanding of future socioeconomic, climate, biological, and other changes and the consequent lack of ability to plan for them."

SUSTAINABLE WATER AND ENVIRONMENTAL MANAGEMENT IN THE CALIFORNIA BAY-DELTA

NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES
www.nap.edu
March 29, 2012

This booklet provides information on a wide range of water issues facing California with particular focus on the Delta.

For an electronic copy of this handout, go to www.deltacouncil.ca.gov

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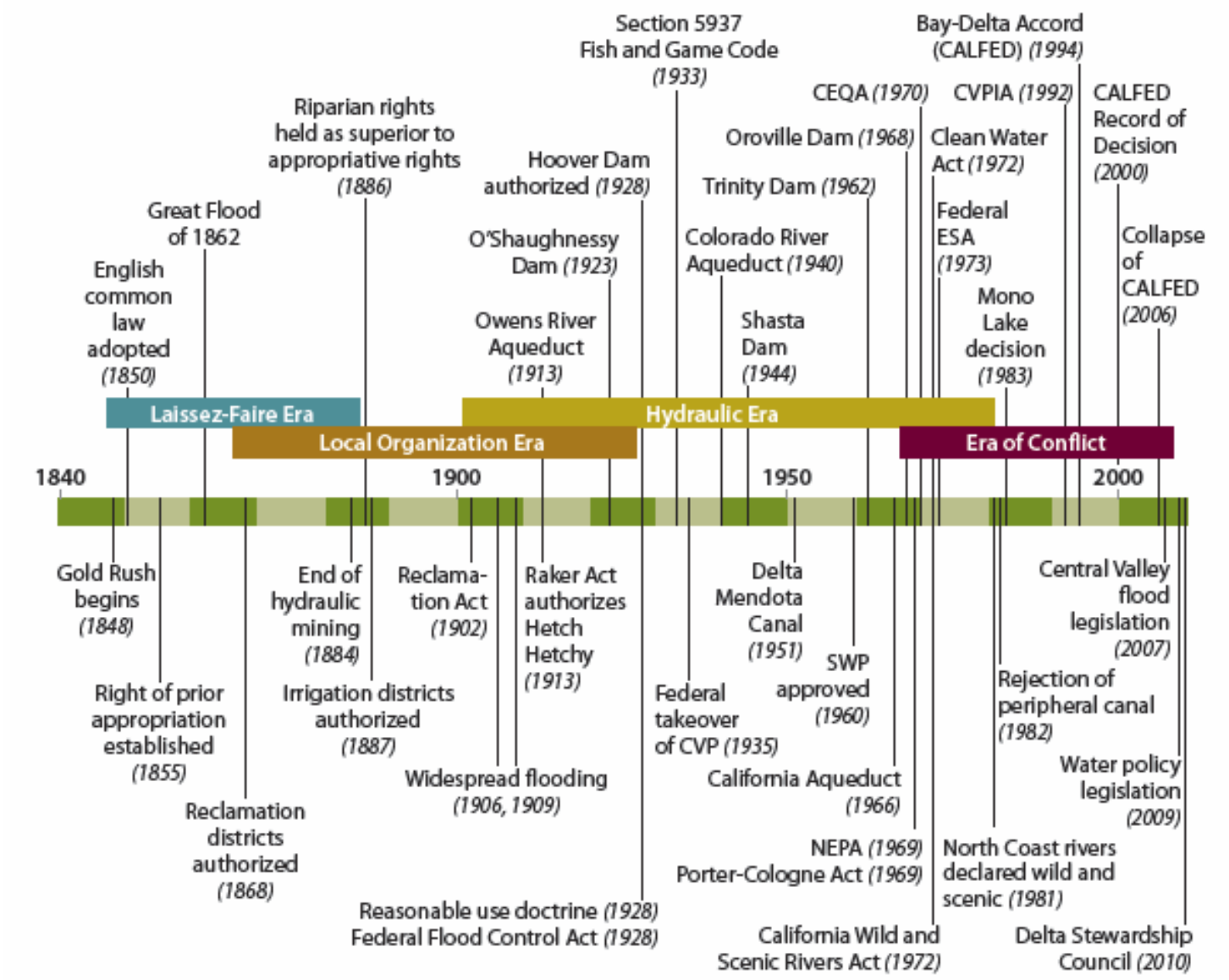
WATER MANAGEMENT IN CALIFORNIA SINCE 1840



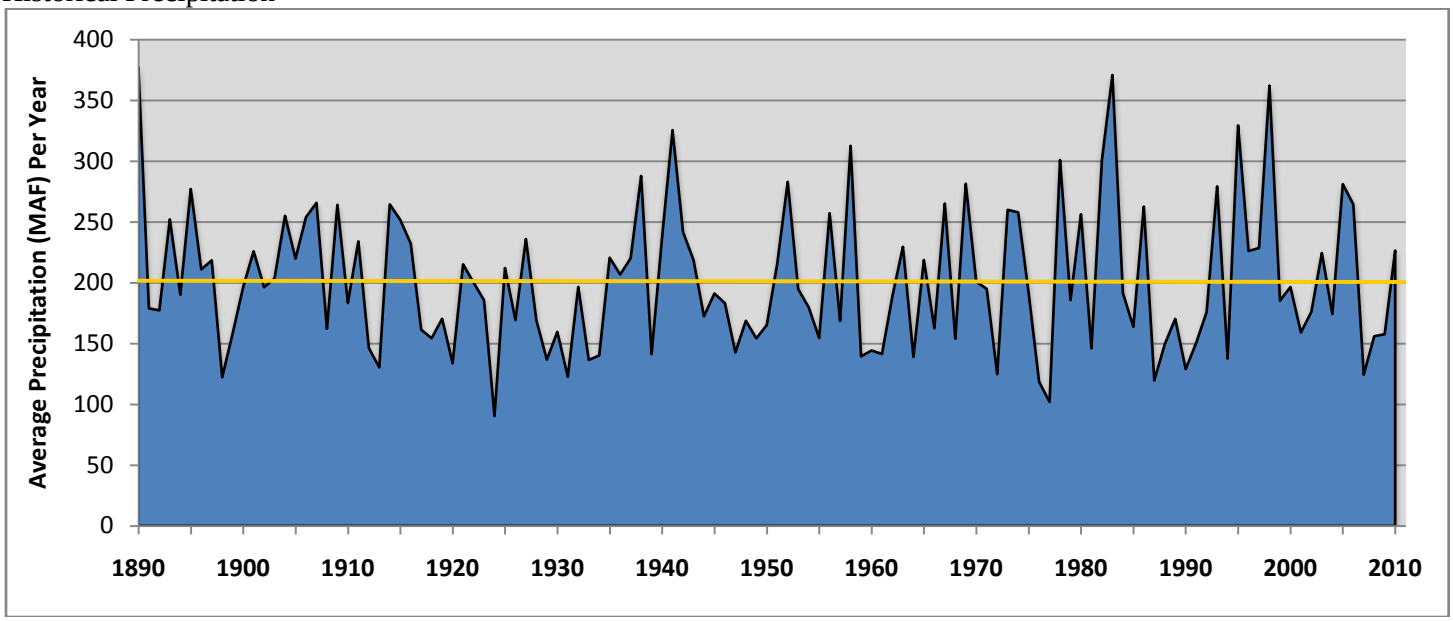
Source: Hanak, E., J. Lund. A. Dinar, B. Gray, R. Howitt, J. Mount, P. Moyle, and B. Thompson. 2011. Managing California's Water: From Conflict to Reconciliation. San Francisco, CA. Public Policy Institute of California.

Public Policy Institute of California is a non-profit, nonpartisan think tank which has written extensively about California water issues. PPIC has published Envisioning Futures for the Sacramento-San Joaquin Delta (2007), Comparing Futures for the Sacramento-San Joaquin Delta (2008), and most recently, Managing California's Water: From Conflict to Reconciliation (2011). Many charts in this handout were produced by or adapted from PPIC.

For more information, see Managing California's Water: From Conflict to Reconciliation.

CALIFORNIA'S WATER SUPPLY IS NOT GROWING AND IT ARRIVES ERRATICALLY

Historical Precipitation



120 year average: 201.3 MAF
Driest 30 year span (1908-1937): 180 MAF
Wettest 30 year span (1977-2006): 210.5 MAF

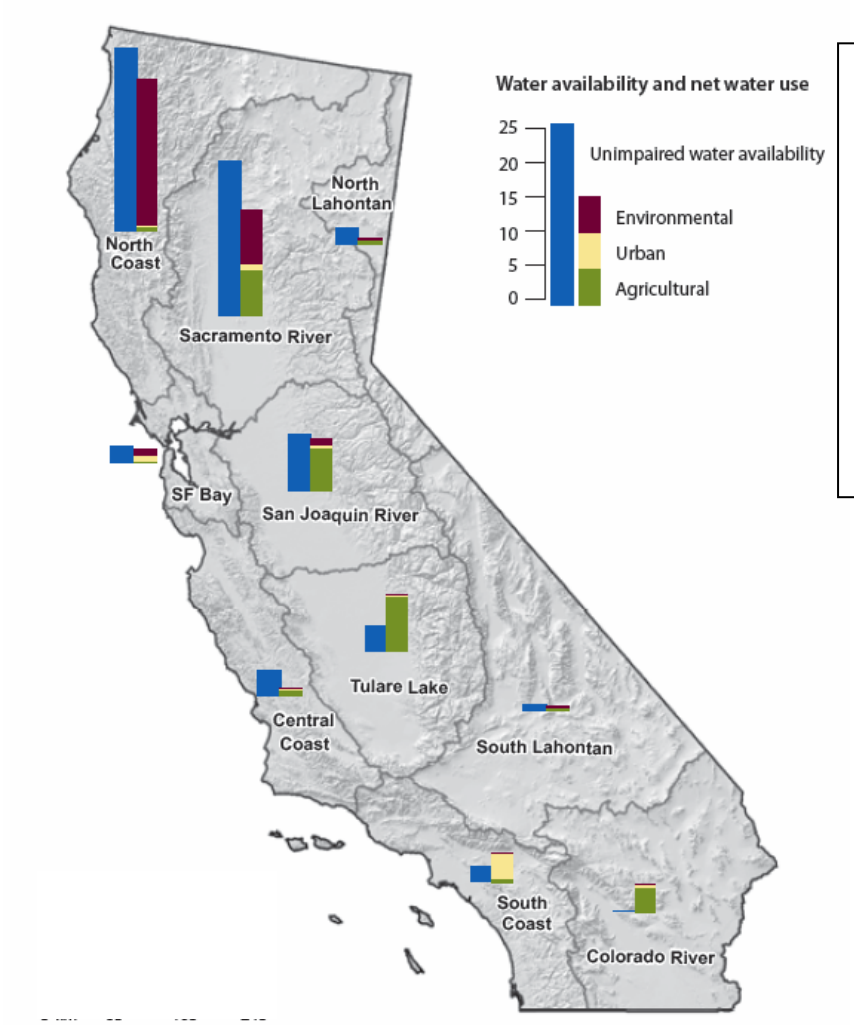
Source: Delta Stewardship Council. 2012. Sacramento, CA. Adapted from data compiled by Jim Goodridge, state climatologist formerly of DWR, and updated by Michael Anderson, DWR State Climatologist.

- Precipitation, rain and snow, is the source of 97% of California's water supply.
- California's annual precipitation is more variable than any other state with the bulk of supply coming in only 5 to 15 days in a given year.
- California's annual precipitation fluctuates from less than 100 million acre feet to more than 375 million acre feet. Over 120 years, the average annual precipitation is 200 million acre-feet and is not changing.
- Two-thirds of precipitation is lost to evaporation and transpiration by trees and other plants, leaving only about a third available for human and environmental use. This makes up gross water use.

For more information, see the Delta Vision Strategic Plan and DWR's Overview of California's Geography.

MOST PRECIPITATION OCCURS FAR FROM WHERE DEMAND IS GREATEST

Unimpaired Water Availability and Net Water Use



Net (or "consumptive") water is the part of gross water use that is unavailable for reuse. Net use consists of water (1) consumed by people, plants, or industrial goods, or lost to evaporation and transpiration and (2) water return flows discharged into saline or contaminated waters or groundwater basins.

Source: Hanak, E., J. Lund. A. Dinar, B. Gray, R. Howitt, J. Mount, P. Moyle, and B. Thompson. 2011. Managing California's Water: From Conflict to Reconciliation. San Francisco, CA.

Source: Hanak, E., J. Lund. A. Dinar, B. Gray, R. Howitt, J. Mount, P. Moyle, and B. Thompson. 2011. Managing California's Water: From Conflict to Reconciliation. San Francisco, CA. Public Policy Institute of California. Adapted from DWR California Water Plan Update 2009.

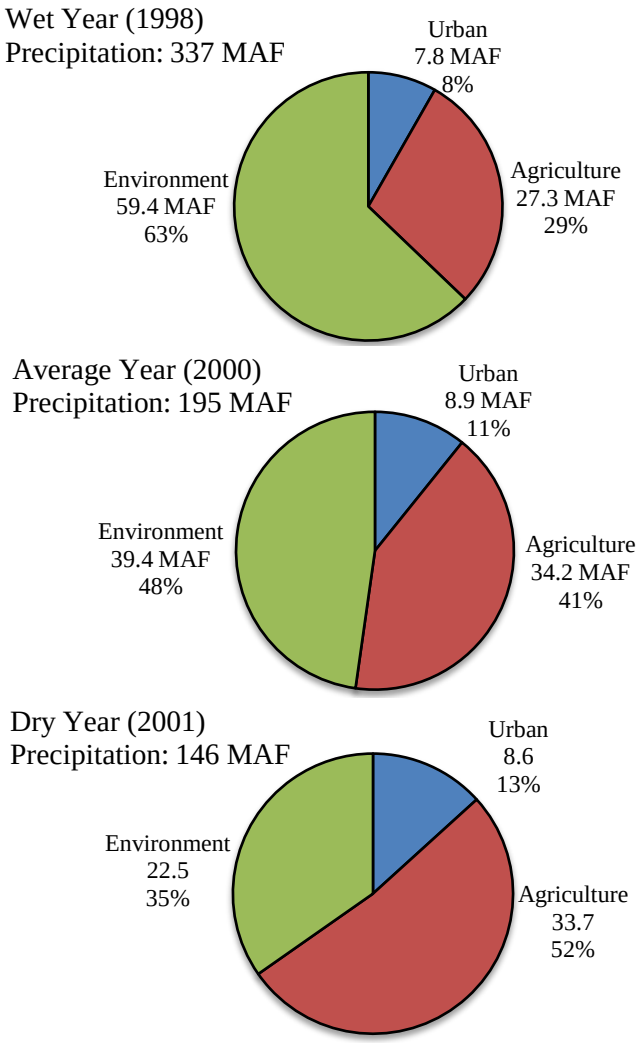
The map shows annual average values for 1998-2005 in millions of acre-feet. For regional data on water availability and net use, see Tables 2.1 and 2.2.

- Two-thirds of precipitation occurs north of Sacramento while more than two-thirds of urban and agricultural demand lies south of Sacramento.
- Precipitation ranges from less than an inch in Death Valley to about 56 inches along the North Coast. However, due to legal and technical constraints, most of the water in the North Coast cannot be used.
- Half of the state's annual runoff, that is water flowing in rivers and streams, is in the Delta Watershed. More than 75% of Californians live outside the Delta Watershed.

For more information, see Managing California's Water: From Conflict to Reconciliation.

HUMAN USE IS FIRST PRIORITY AND ENVIRONMENTAL WATER TAKES THE REDUCTIONS

Gross Water Use in Representative Water Year Types



Gross (or "applied") water use is the water delivered to a home, business, or farm—not all of which is consumed. Some water—such as excess irrigation water and discharges from wastewater treatment plants—flows to streams, lakes, aquifers, or the sea ("return flow"). Some of this return flow ("recoverable flow") is available for reuse, because it returns to freshwater streams, lakes, or canals or recharges groundwater basins.

Source: Hanak, E., J. Lund. A. Dinar, B. Gray, R. Howitt, J. Mount, P. Moyle, and B. Thompson. 2011. Managing California's Water: From Conflict to Reconciliation. San Francisco, CA.

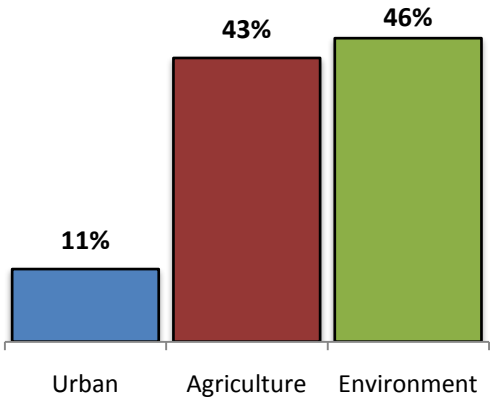
Source: Delta Stewardship Council. 2012. Adapted from DWR California Water Plan Update 2005, Table 3-1 California Water Summary. Includes groundwater use.

- In dry years, urban and particularly agricultural water use increases both in absolute numbers and as a proportion of the water available. Also note that precipitation in each year far exceeds gross water use as roughly two-thirds of precipitation is lost to evaporation and transpiration.
- Environmental water is water that is used for managed wetlands or instream flows to support public trust resources although much of this water is reused for human use.
- Water allocated to the environment declines significantly in dry years as human use is historically prioritized before environmental use.

For more information, see the California Water Plan Update 2005.

MOST ENVIRONMENTAL WATER HAS FEW CONNECTIONS TO OUR STATEWIDE WATER SYSTEM AND CANNOT BE RECLAIMED FOR URBAN AND AGRICULTURAL USE

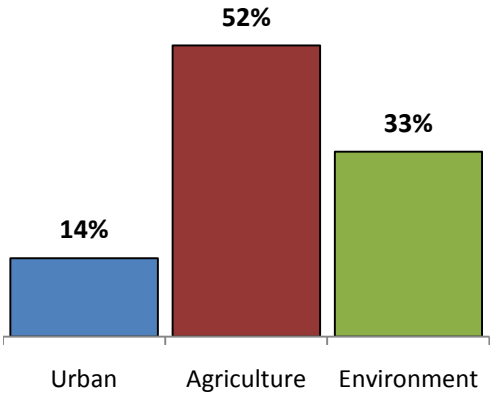
Statewide Gross Water Use 1998-2005



- Gross water use is a common measure of California's total water use. Gross water use is the water delivered for urban and agricultural use, and also set aside for instream flow, habitat, and water quality requirements not all of which is consumed.

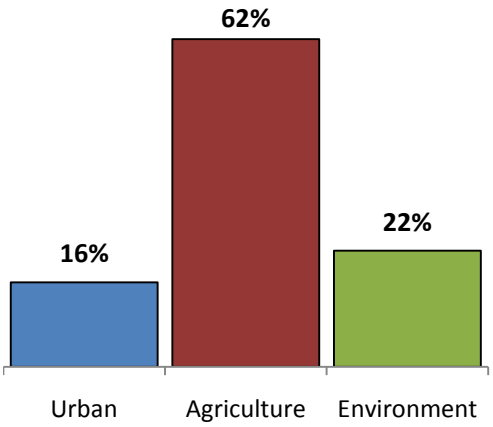
- In this measurement, environmental water use is dominated by flows designated for Wild and Scenic Rivers. Most of this water flows in rivers in the North Coast far from most urban and agricultural demand and includes flood flows that there is no practical way to reclaim for urban and agricultural use.

Gross Water Use Excluding North Coast Flows 1998-2005



- Excluding North Coast flows that have few connections to the statewide water supply, the amount of water that goes to the environment decreases from 46 percent to 33 percent with urban and agricultural water use increasing in proportion.

Net Water Use Excluding North Coast Flows 1998-2005



- When accounting is based on net water use, meaning water that is consumed, lost to evaporation and transpiration, or flows out of the State, environmental water use represents about a fifth of total use.

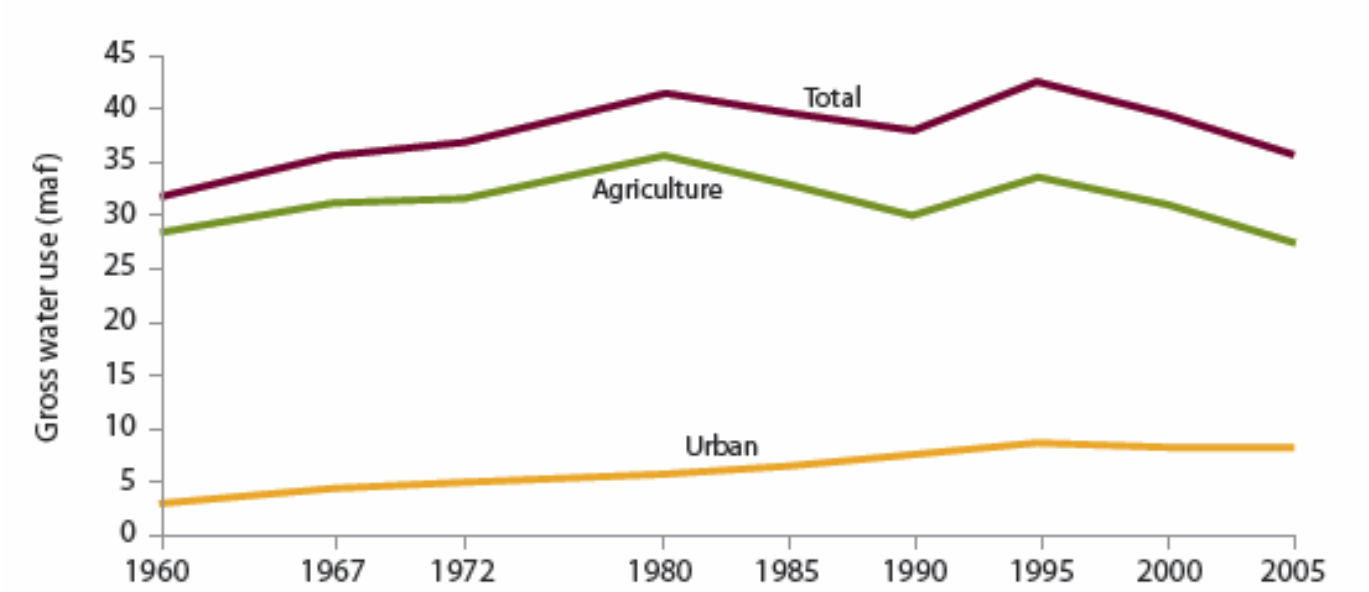
- Some of this environmental water is necessary to maintain water quality for drinking water supply.

Source: Delta Stewardship Council. 2012. Adapted from PPIC Myths of California Water – Implications and Reality. Figures represent the average water use for 1998-2005, adapted from California Water Plan Update 2009. Includes groundwater use.

For more information, see the California Water Plan Update 2009, U.S. Bureau of Reclamation Water Supply and Yield Study, and PPIC's Managing California's Water and Myths of California Water – Implications and Reality.

HUMAN WATER USE MAY HAVE PEAKED IN CALIFORNIA

Historical Gross Water Use



Source: Hanak, E., J. Lund. A. Dinar, B. Gray, R. Howitt, J. Mount, P. Moyle, and B. Thompson. 2011. Managing California's Water: From Conflict to Reconciliation. San Francisco, CA. Public Policy Institute of California. Authors' calculations using data from *California Water Plan Update* (California Department of Water Resources)

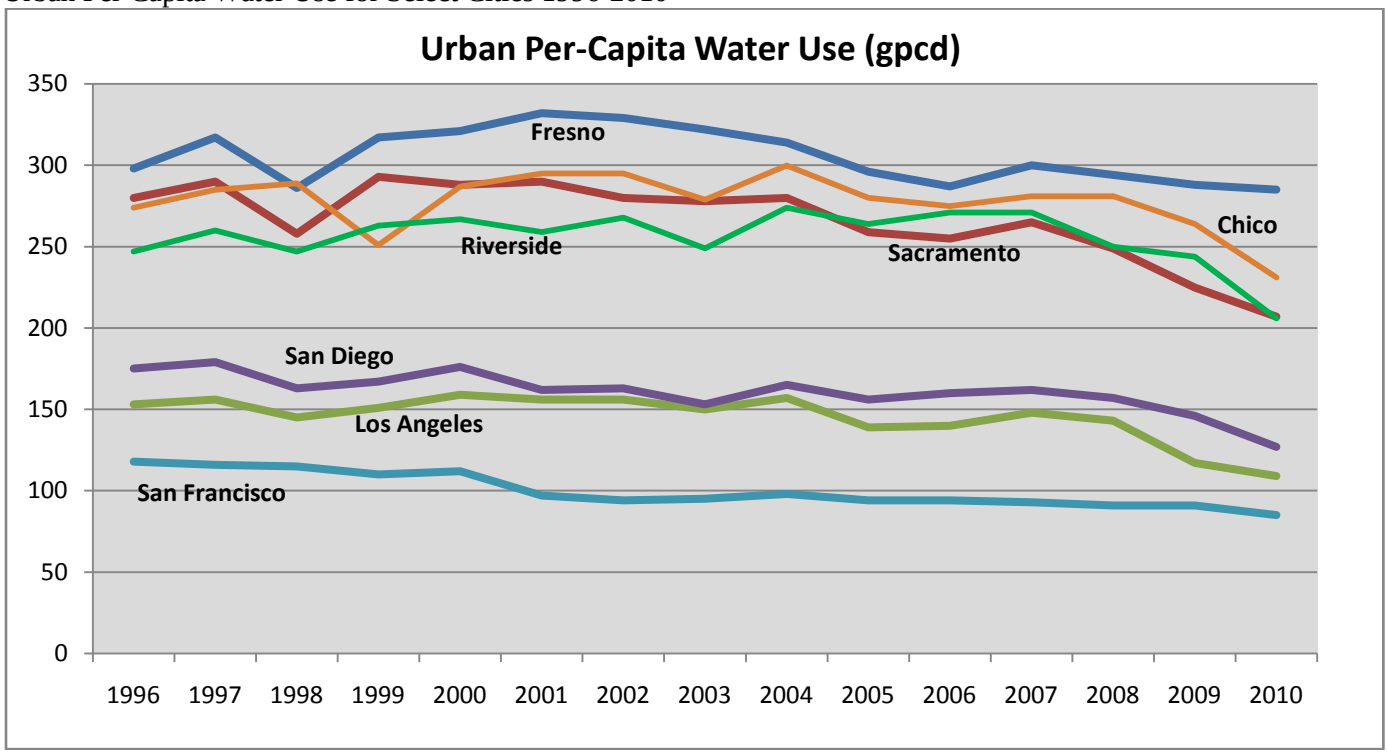
The figure shows gross water use. Urban includes residential and nonagricultural business uses. Pre-2000 estimates are adjusted to levels that would have been used in a year of normal rainfall. Estimates for 2000 and 2005 are for actual use; both years had near-normal precipitation. Estimates omit conveyance losses, which account for 6 to 9 percent of the total.

- The recent decline in total water use is largely driven by the decrease in agricultural water use
- Agricultural water use has declined from 90 percent of human water use in 1960 to about 77 percent in 2005. Improvements in irrigation efficiency and the retirement of some land due to urbanization as well as increased soil salinity are most responsible for the decline.
- California's population grew from 15.7 million in 1960 to 38 million in 2010. From 1960 to 1990, total urban water use grew almost proportionally with population though recent conservation efforts have slowed the rise.

For more information, see Managing California's Water: From Conflict to Reconciliation and the UC Davis Archive of California Water Plans.

NO SURPRISE: COASTAL CITIES USE LESS WATER THAN INLAND CITIES

Urban Per Capita Water Use for Select Cities 1996-2010



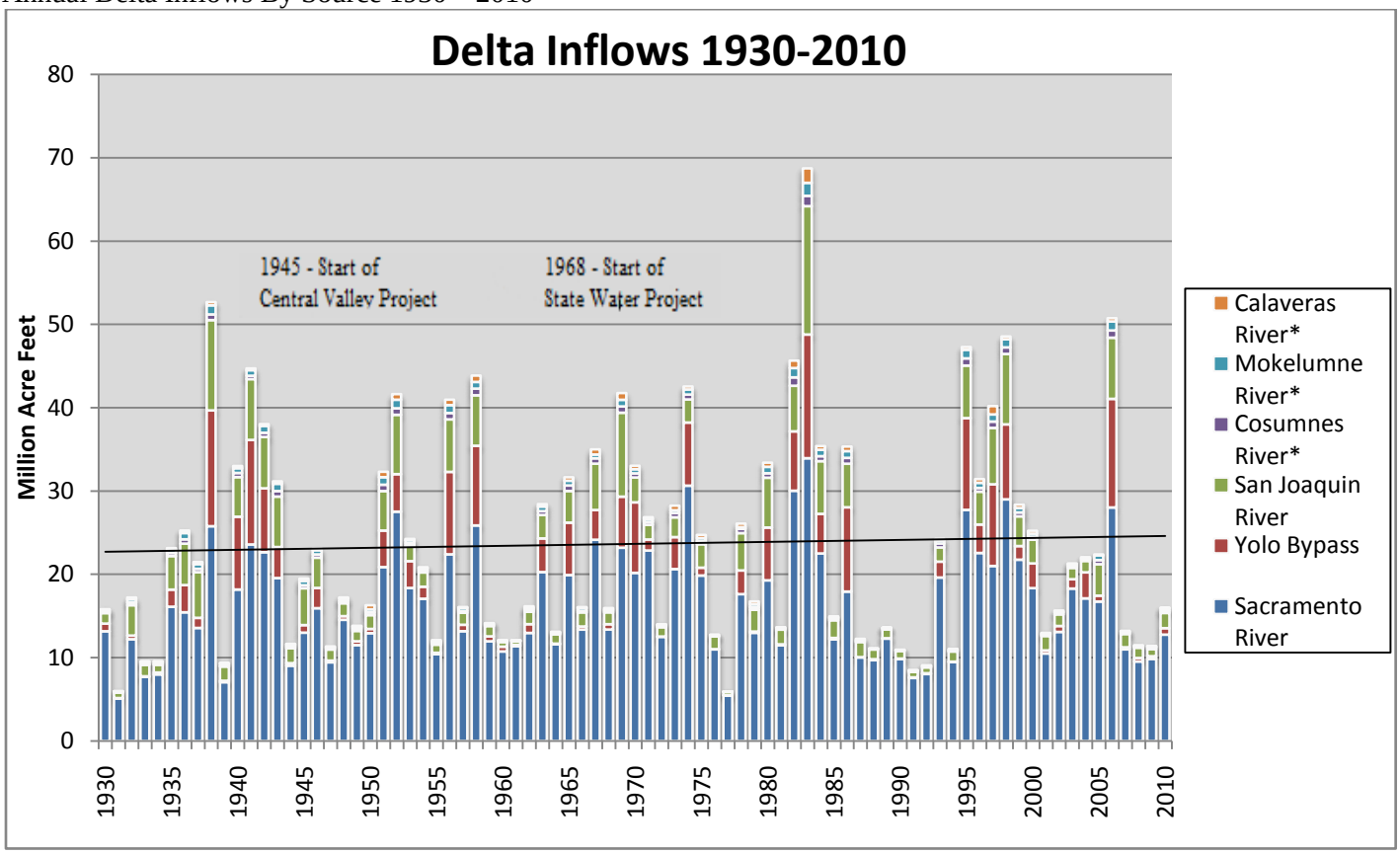
Source: Delta Stewardship Council. 2012. Adapted from data collected from 2010 Urban Water Management Plans for City of Los Angeles (DWP), City of San Diego, City of Fresno, City of Riverside, California Water UWMP for Chico-Hamilton City District, San Francisco (Prepared by Public Utilities Commission), and the City of Sacramento.

- Southland and coastal cities have far lower per capita water use than cities in the Central Valley caused both by conservation and the benefit of a more temperate climate.
- Conservation success is partly due to increased installation of low toilets/appliances, the use of water meters, and voluntary conservation particularly in the commercial and industrial sector.
- Many urban areas have experienced significant short-term declines in water use with the recent recession, but over the longer term, many local water agencies will likely see a return to higher water use patterns.

For more information, see the 2010 Urban Water Management Plans for Chico-Hamilton City, Fresno, Los Angeles, Riverside, Sacramento, San Diego, and San Francisco.

FLOWS COMING INTO THE DELTA VARY WIDELY BY WATER YEAR TYPE

Annual Delta Inflows By Source 1930 – 2010*



Source: Delta Stewardship Council. 2012. Adapted from DWR Dayflow Program 1930 – 2010

Each of the Delta inflow sources above has its own measurement point maintained by a variety of government agencies in order to quantify its individual contribution to total inflow. The measurement points have changed over the course of the Dayflow Program. DWR compiles the information and develops calculations to provide a consistent historical record for each inflow source. Table of measuring points below. The chart above does not include in-Delta precipitation which is sometimes included in measurements of Delta inflow. *East side tributaries

Responsible Agency	Input Data
USGS	Sacramento River at Freeport, Yolo Bypass at Woodland, Cosumnes River at Michigan Bar, San Joaquin River at Vernalis, Delta Cross Channel, Georgiana Slough
US Army Corps of Engineers	Calaveras River
East Bay Municipal Utility District	Mokelumne River at Woodbridge
DWR O&M	Precipitation at Stockton Fire Department, Clifton Court Forebay gate flow, Barker Slough export, Byron Bethany ID depletion, X2 (only when outflow is negative)
DWR DPLA	Sacramento Weir spill, Lisbon Weir flow
U.S. Bureau of Reclamation	Delta Cross-Channel gate status, Tracy export, Contra Costa export
SCWD	Lake Barryessa releases, Lake Solano inflow, Putah Creek

- On average, 80 percent of the water that flows into the Delta originates in the Sacramento Valley with the Sacramento River supplying 68 percent and the Yolo Bypass 12 percent. The San Joaquin River is responsible for 13 percent of the average inflow with east-side tributaries making up the remaining 7 percent.

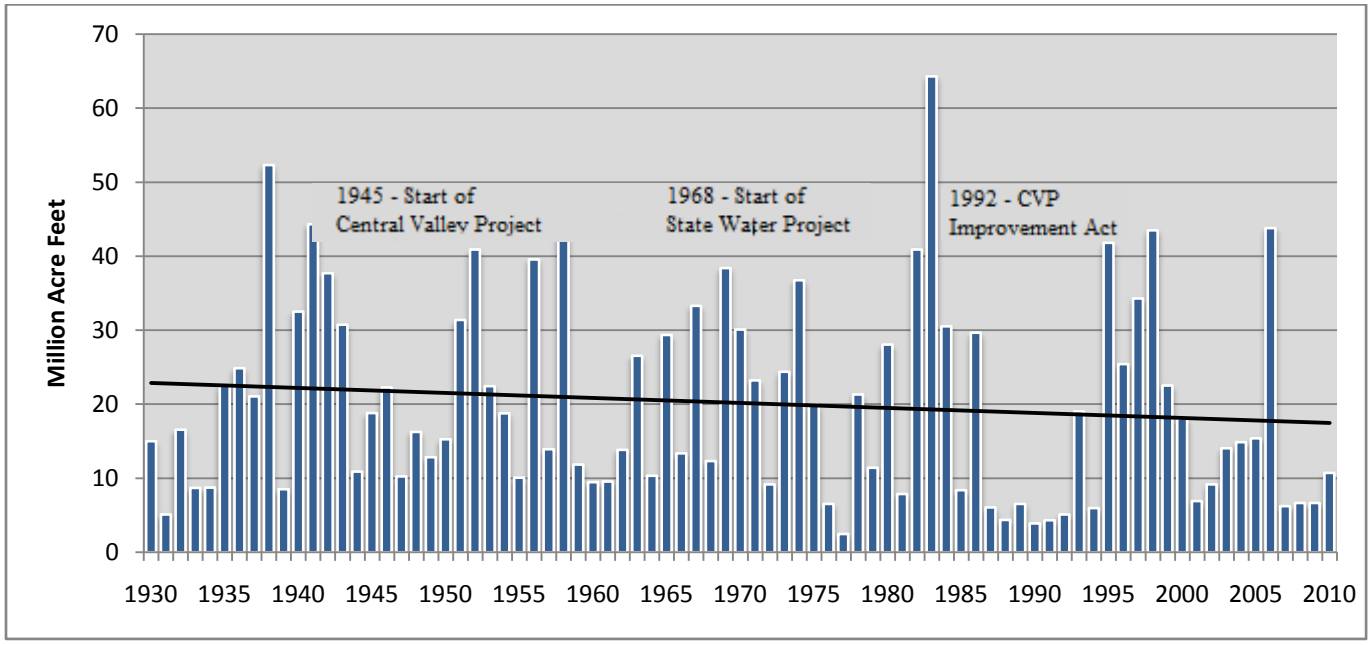
- Like California's total precipitation, the amount of water which flows into the Delta varies widely by water year type with Yolo Bypass flows measuring more than 10 MAF in some wet years down to almost zero in dry years.

- The slight upward trend in average Delta inflows can be attributed to a several extremely wet years in the past thirty years. This hides the increase in upstream water use.

For more information, see DWR Dayflow Program.

FLOWS THROUGH THE DELTA & TO THE BAY HAVE DECLINED OVER TIME

Delta Outflows 1930-2010



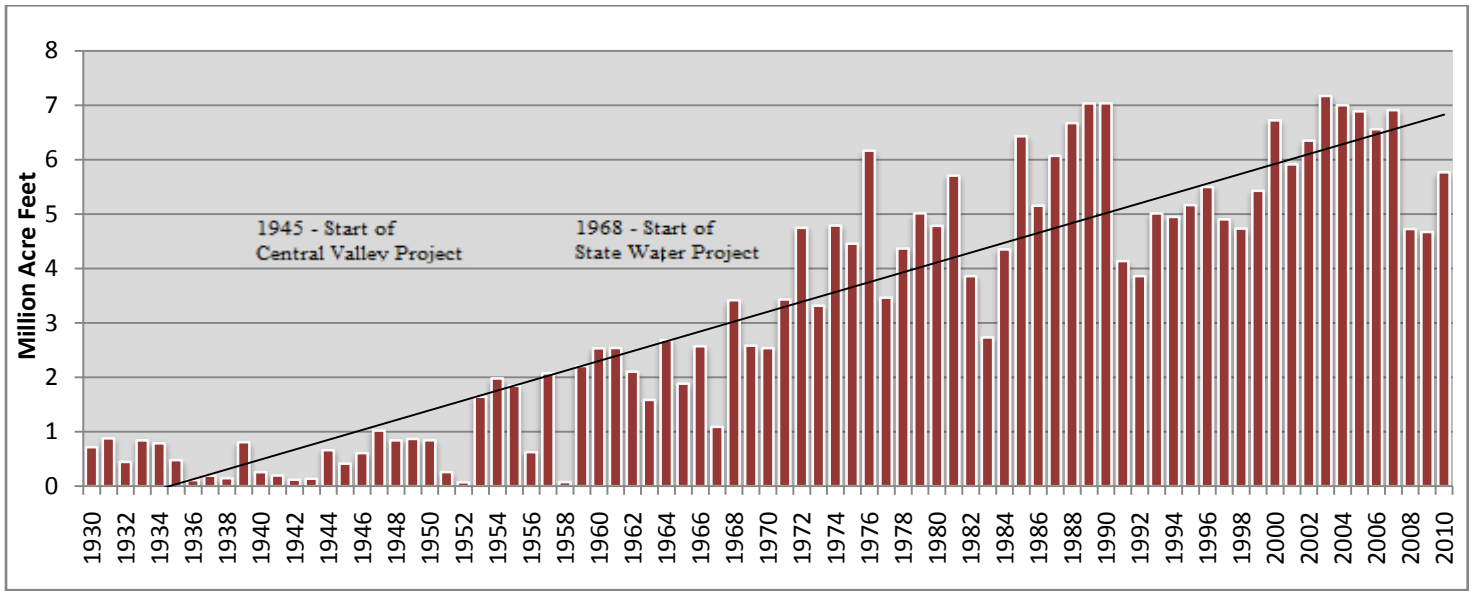
Source: Delta Stewardship Council. 2012. Adapted from DWR Dayflow Program 1930 - 2010

- While the volume of Delta inflow has remained almost constant since 1930, the amount of water that flows into the Delta and out to the bay as it would under natural conditions has decreased.
- The decrease is attributable to the gradual increase in exports from the start of the Central Valley Project in 1956 and a modest increase in in-Delta consumptive use.
- In dry years such as the late 1980s and early 1990s, exports represent a greater proportion of Delta inflows.

For more information, see DWR Dayflow Program.

EXPORTS HAVE INCREASINGLY REDUCED THE AMOUNT OF WATER FLOWING INTO THE DELTA THAT ULTIMATELY FLOWS OUT TO THE OCEAN

Difference between Delta annual inflows and outflows 1930 – 2010



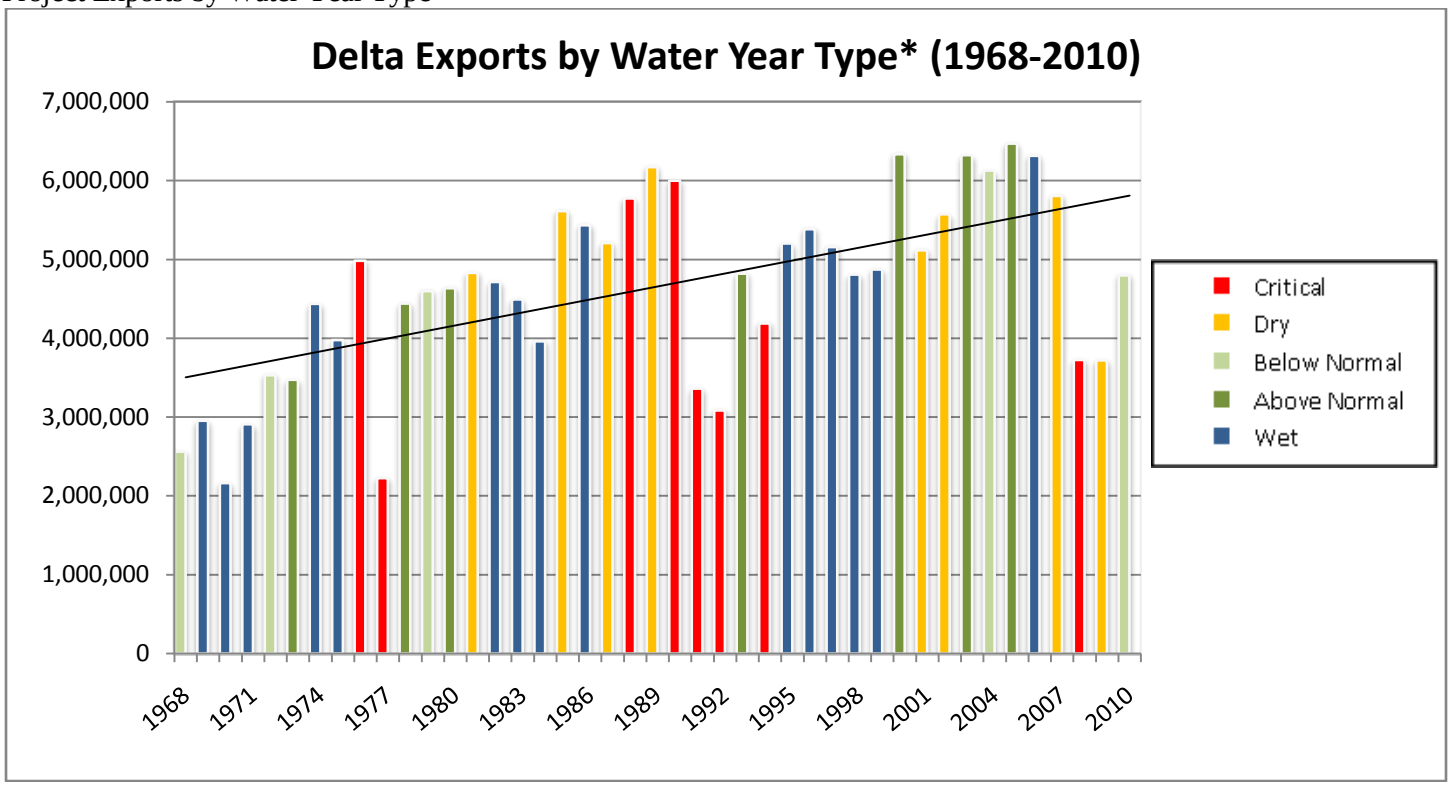
Source: Delta Stewardship Council. 2012. Adapted from DWR Dayflow Program 1930 - 2010

- Increased exports and in-Delta consumptive use over time has comprised a greater amount of Delta inflow, diverting water that would otherwise flow out into the Bay.
- While the gap between Delta inflow and outflow increased, the barrier between incoming freshwater from runoff and salt water from the ocean has moved further north and east, reducing water quality in some parts of the Delta.
- In some dry years such as the late 1980s and early 1990s, the gap between inflows and outflows is smaller as exports are reduced in absolute numbers even while comprising a greater proportion of Delta inflows.

For more information, see DWR Dayflow Program.

DELTA WATER EXPORTS HAVE RISEN OVER THE PAST FOUR DECADES

Project Exports by Water Year Type



Source: Delta Stewardship Council. 2011. Letter to State and Federal Water Contractors Agency. September 29. Export figures adapted from DWR Dayflow Program and Water Year Classifications (Sacramento River Indices) are adapted from the California Data Exchange Center. *Total exports include the Contra Costa Water District Los Vaqueros Pipeline, the State Water Project, Central Valley Project, and North Bay Aqueduct.

- Exports have been rising over the past four decades. Historically, California has exported more of the water available during dry years than wet years. Increasingly, science is showing that reducing Delta outflows may have severe environmental consequences.

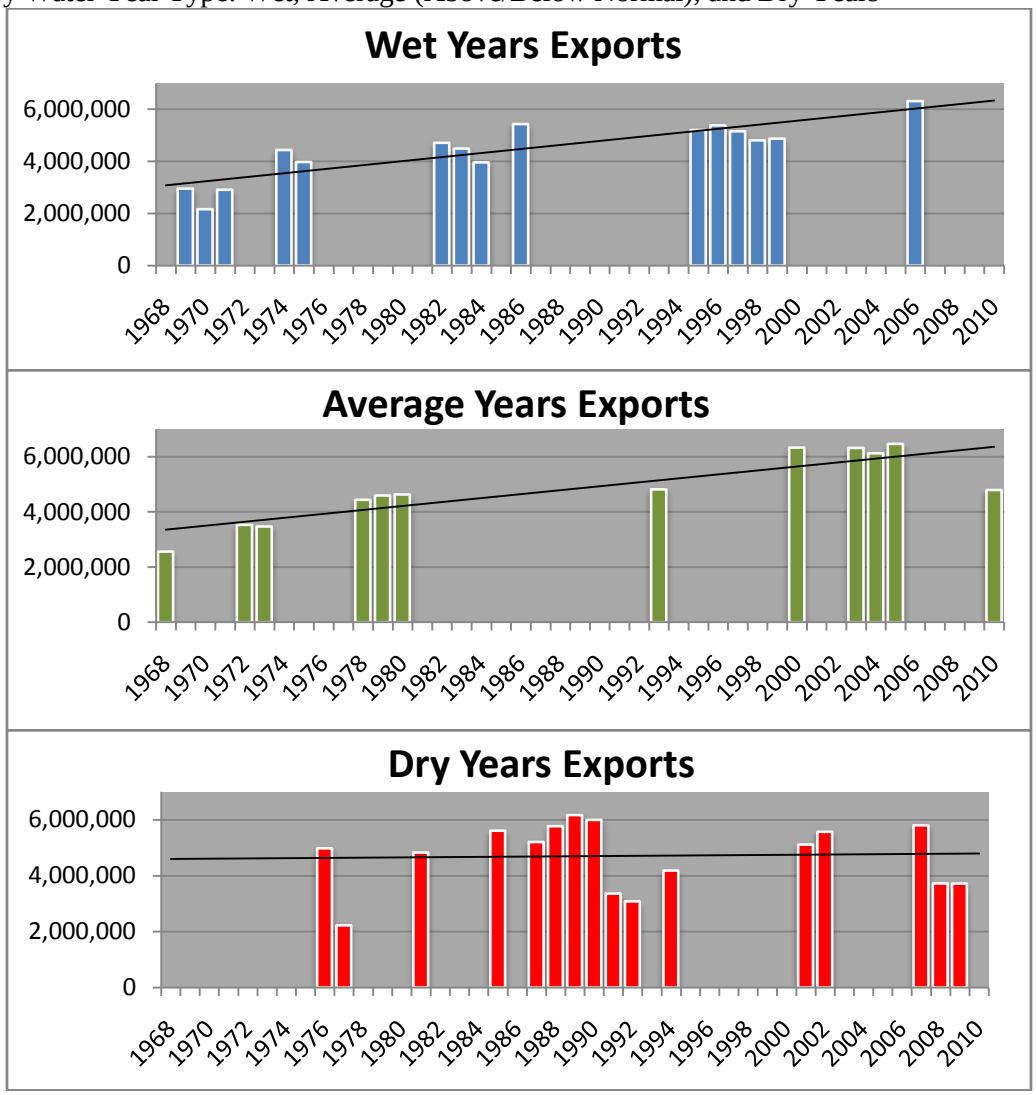
- Exports have been increasing for all major water projects in the Delta including the State Water Project, the Central Valley Project, the Contra Costa Los Vaqueros Pipeline, and the North Bay Aqueduct.

- Each of these projects reached record exports in the past ten years.

For more information on exports, see DWR Dayflow Program and for information on water year types, see the California Data Exchange Center.

CALIFORNIA EXPORTS MORE WATER IN DRY YEARS THAN WET OR AVERAGE YEARS

Project Exports by Water Year Type: Wet, Average (Above/Below Normal), and Dry Years



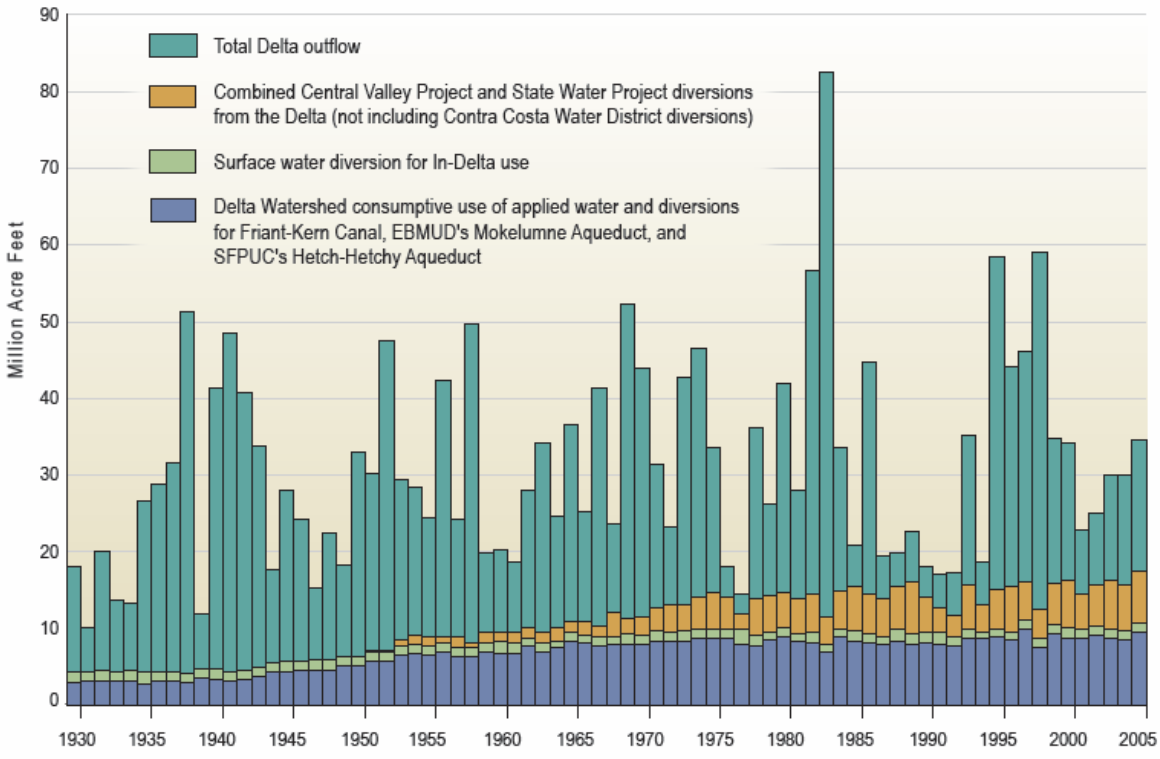
Source: Delta Stewardship Council. 2011. Letter to State and Federal Water Contractors Agency. September 29. Export figures adapted from DWR Dayflow Program and Water Year Classifications (Sacramento River Indices) are adapted from the California Data Exchange Center. Average years exports includes above normal and below normal water year types. Dry years exports includes dry and critical water year types. *Total exports include the Contra Costa Water District Los Vaqueros Pipeline, the State Water Project, Central Valley Project, and North Bay Aqueduct.

- Every water year is different but a comprehensive look at the operation of the State and Federal projects shows that over time exports have increased in all water year types.
- More water is historically exported in dry years when demand is greatest, but increased south of Delta storage is driving an increase in wet and average years' exports.
- Increased south of Delta water storage has led to more ag-urban water transfers, creating more flexibility regarding project entitlements.

For more information on exports, see DWR Dayflow Program and for information on water year types, see the California Data Exchange Center.

UPSTREAM USE, IN-DELTA USE, AND EXPORTS HAVE REDUCED DELTA OUTFLOWS

Delta Watershed Consumptive Use



Trends in Destinations and Uses

Period	Average Annual Total (MAF)	Outflow	in-Delta	Exports	Delta Watershed
1930 to 1949	25.80	81%	5%	0%	14%
1950 to 1969	31.71	67%	4%	4%	24%
1970 to 1989	34.34	51%	5%	15%	29%
1990 to 2005	32.85	48%	4%	17%	31%

Source: Delta Vision Blue Ribbon Task Force. Delta Vision Strategic Plan 2008. Also see California Water Plan Update 2009, Volume 3, Figure D-5. Measured, calculated, and modeled data from an array of sources as compiled by Tully and Young, Inc. with data and assistance from DWR, the Bay Institute, and the State Water Contractors.

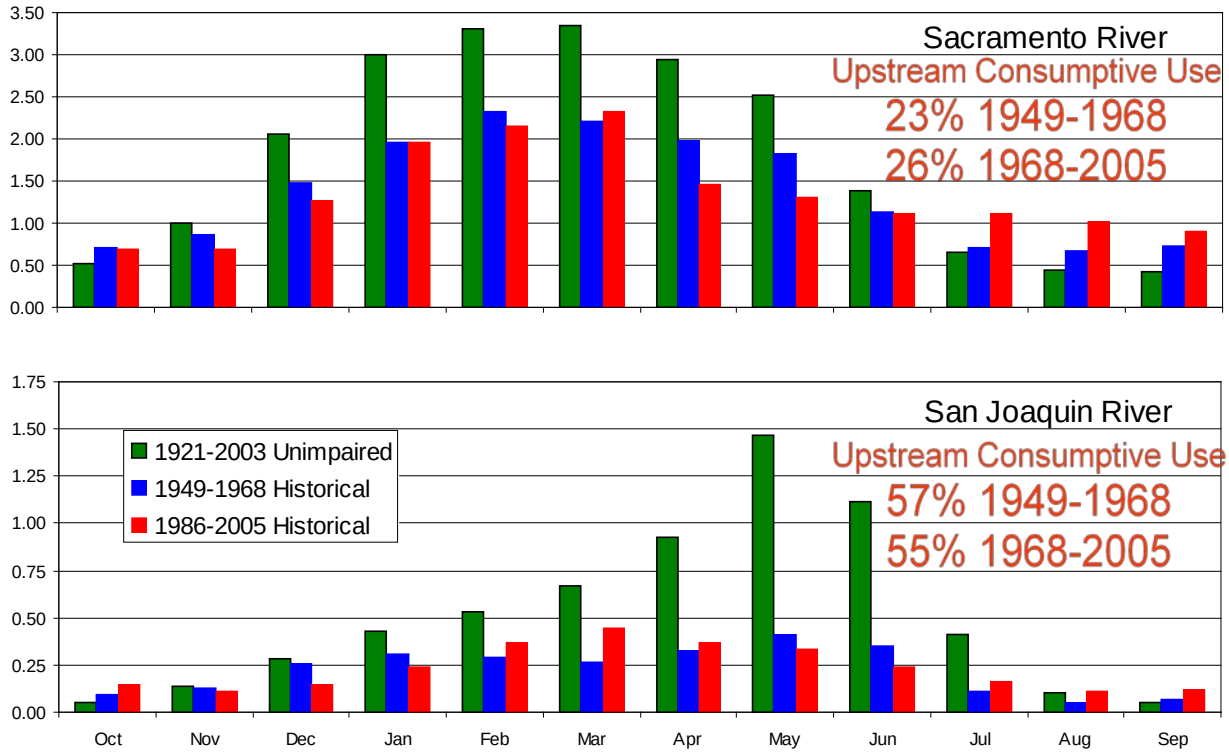
- While exports are sometimes viewed as the sole cause for reduced outflow, upstream diversions consume about two times as much of the water that would otherwise flow out to the Bay.

- Increases in upstream diversions, in-Delta use, and project exports have dramatically reduced ocean outflows from the Delta. Since the start of the State Water Project, exports have reduced outflows by 4.6 MAF on average.

For more information, see Delta Vision Strategic Plan and the California Water Plan Update 2009 Regional Report on the Delta.

THE NEED FOR A CONSTANT STATEWIDE WATER AND POWER SUPPLY HAS ALTERED THE TIMING OF FLOWS INTO THE DELTA

Historical Delta Unimpaired Flow and Inflow



Source: Delta Stewardship Council. 2011. Fifth Staff Draft Delta Plan. Adapted from State Water Resources Control Board, 2010 Final Report on Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem. Unimpaired flow figures are adapted from 2003 California Central Valley Unimpaired Flow Data, fourth edition, DWR Bay-Delta Office, November 2006 and DWR Dayflow Program. Data synthesized by Fleenor, W., W. Bennett, P. Moyle, and J. Lund. 2010, On developing prescriptions for freshwater flows to sustain desirable fishes in the Sacramento-San Joaquin Delta. Submitted to the State Water Resources Control Board regarding flow criteria for the Delta necessary to protect public trust resources.

- Unimpaired flow is the amount of water which would flow into the Delta if not exported, consumed or diverted upstream, or stored for human use. The calculation of unimpaired flow helps compare the natural timing and volume of flows to current conditions. Unimpaired flow helps give a sense of the conditions under which native species thrived.

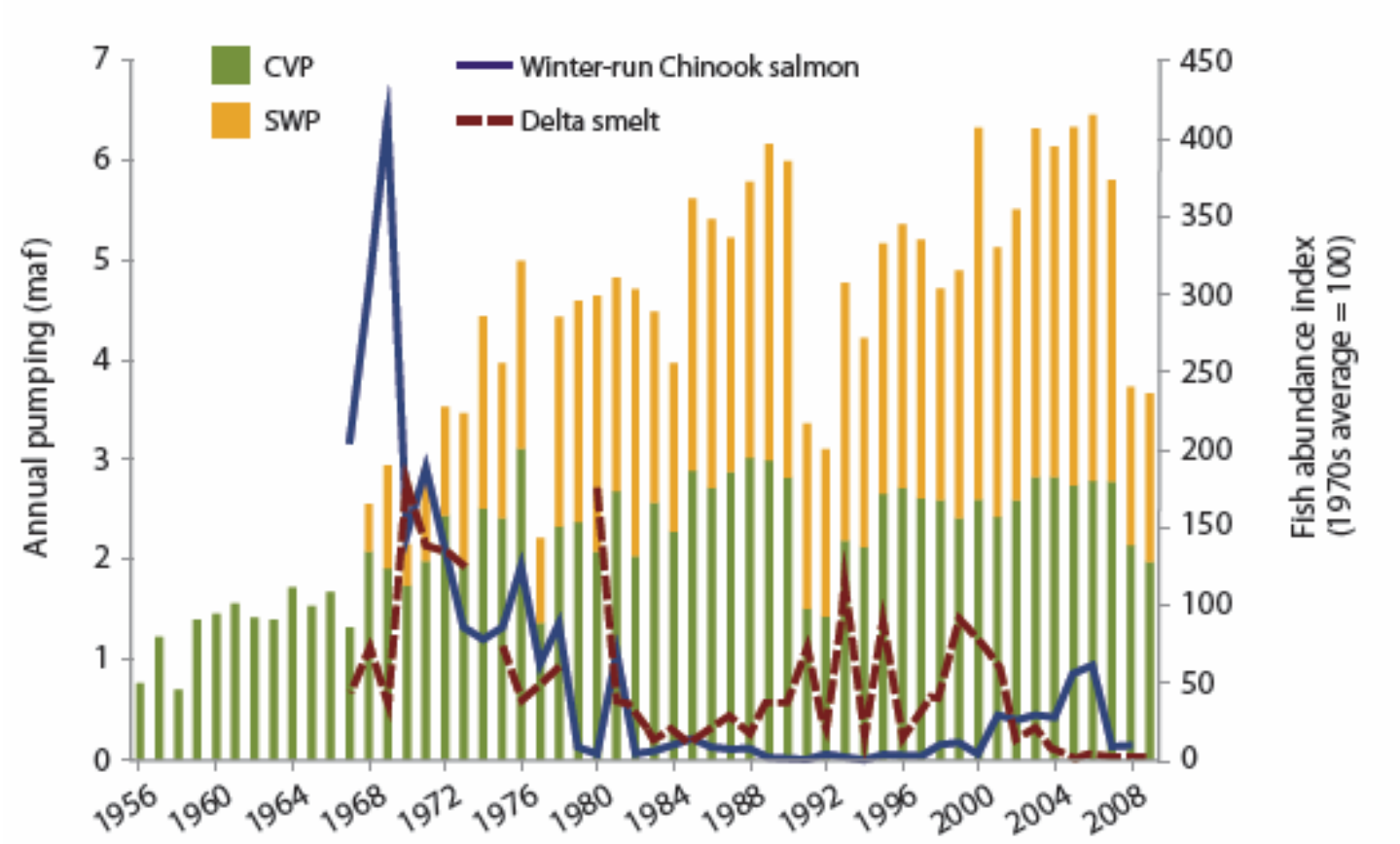
- Since the start of the State Water Project in 1968, peak winter and early spring flows have been increasingly stored to be stretched through the summer to provide exports when demand is greatest.

- The stretching of peak flows for water supply needs flattens the rate of flow into the Delta, reducing the natural variability apparent in the unimpaired flow estimates.

For more information, see the State Water Resources Control Board Final Report on Development of Delta Flow Criteria and SWRCB On Developing Prescriptions for Freshwater Flows to Sustain Desirable Fishes in the Sacramento-San Joaquin Delta.

AS EXPORTS AND UPSTREAM USE HAVE INCREASED, FISH SPECIES HAVE COLLAPSED

Project Exports and Fish Populations



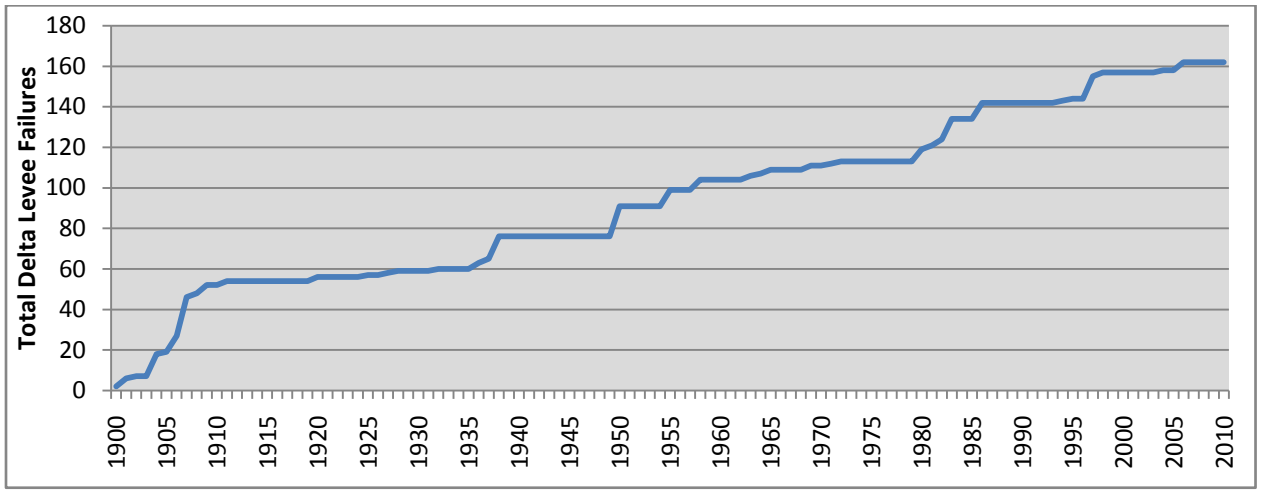
Source: Hanak, E., J. Lund. A. Dinar, B. Gray, R. Howitt, J. Mount, P. Moyle, and B. Thompson. 2011. Managing California's Water: From Conflict to Reconciliation. San Francisco, CA. Public Policy Institute of California. Calculations by J. Viers using data from PRISM, CIMIS, and the U.C. Davis Soil Resource Laboratory. For exports, DWR Dayflow data; for fish populations, California Department of Fish and Game survey data.

- As exports and upstream consumptive use have increased, current fish populations are less than one percent of 1968 population levels.
- Increased exports reduce ocean outflows, affecting salmon runs and the instream flow needs of other native aquatic species.
- Some invasive fish species such as striped bass have thrived over the existence of the State and federal projects.

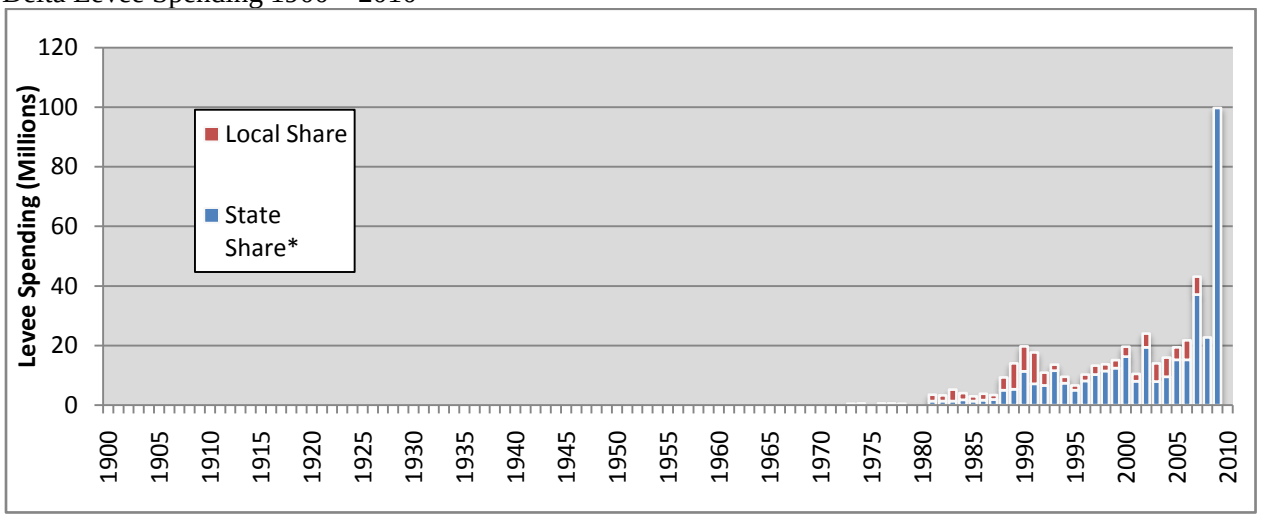
For more information, see Managing California's Water: From Conflict to Reconciliation, DWR Dayflow Program, and California Fish and Game survey populations.

RATE OF DELTA LEVEE FAILURES SLOWING BUT CONTINUING IN SPITE OF RECENT STATE INVESTMENT

Cumulative Historical Delta Levee Failures 1900 – 2010



Delta Levee Spending 1900 – 2010



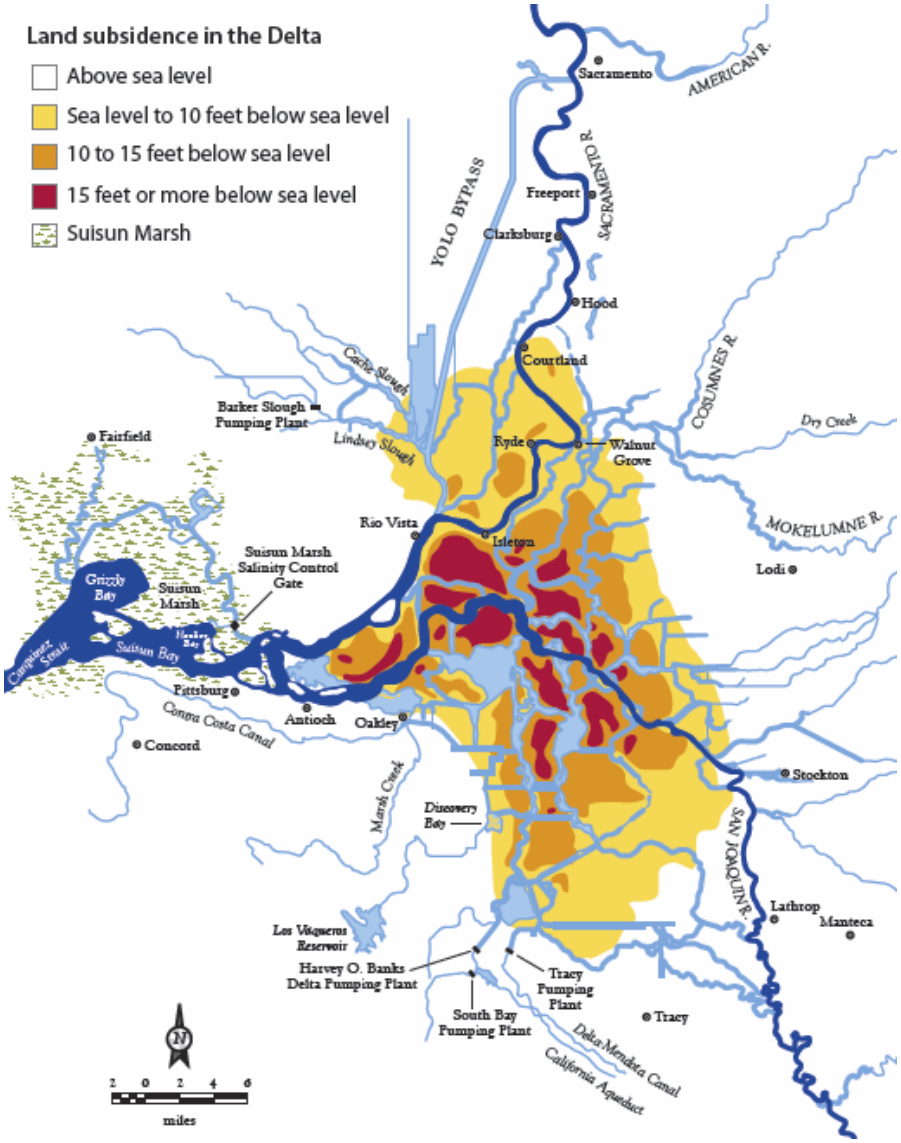
Source: Delta Stewardship Council. 2012. Delta levees failures adapted from Delta Risk Management Strategy Phase 2 Risk Reduction Report. Program spending adapted from information compiled by Sean Bagheban, DWR Floodsafe Program. The Program Spending is state and local expenditures through the "Way" Bill, Delta Levees Special Flood Control Projects, and the Delta Levees Maintenance Subventions Program. The local share represents only the local share of the Delta Levees Maintenance Subventions Program. It is based on year spent, not appropriations. Since 1992, the Subvention Program has been approximately half of the residual after deducting state operating costs and has recently been about $6 million per year. Delta Levees Maintenance Subventions Program spending is not included for 2008-2010. Program spending does not include local investment or routine levee maintenance funded and performed by reclamation districts.

- In the past 20 years, the rate of Delta levee failures has gone from the historical average of one failure per year to one failure every other year.
- Since 1973, the State has provided over $300 million for levee rehabilitation while local agencies have spent over $100 million as their share of the Delta Levees Maintenance Subventions Program.
- Of the 1,100 miles of Delta levees, approximately two-thirds are privately owned and maintained by local reclamation districts. The remaining third are within federally authorized flood control projects.

For more information, see the Delta Risk Management Strategy Report, DWR AB 1200 Report 2008, and the Levee Decisions and Sustainbility Technical Appendix for PPIC's Comparing Futures for the Sacramento-San Joaquin Delta.

CONTINUED SUBSIDENCE OF DELTA ISLANDS INCREASES FLOOD RISK

Delta Subsidence Map



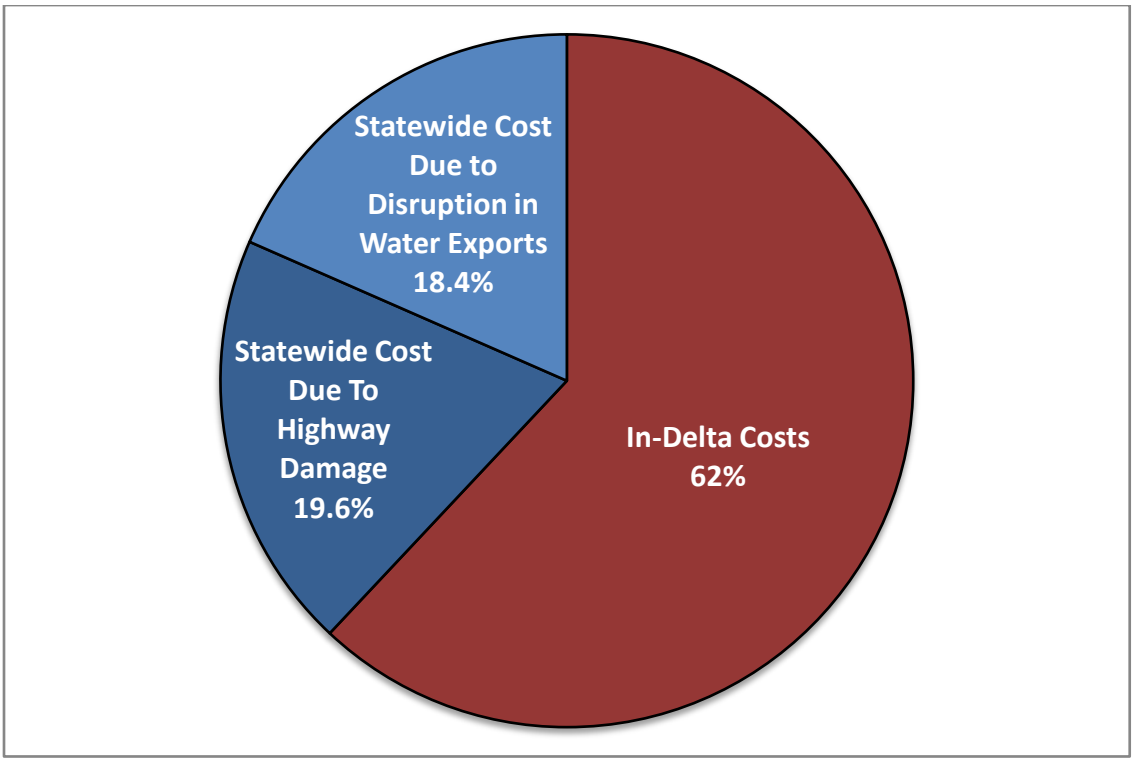
Source: Hanak, E., J. Lund. A. Dinar, B. Gray, R. Howitt, J. Mount, P. Moyle, and B. Thompson. 2011. Managing California's Water: From Conflict to Reconciliation. San Francisco, CA. Public Policy Institute of California. Also DWR. 1995. Delta Atlas

- Despite levee improvements, flood risk is increasing in the Delta due to subsidence and sea-level rise.
- Due directly to agricultural activities, some Central Delta islands may have subsided to more than 15 feet below sea level, increasing pressure on levees and threatening emergency management.

For more information, see Managing California's Water: From Conflict to Reconciliation.

PRELIMINARY STUDY SUGGESTS THE POTENTIAL DAMAGE FROM MAJOR DELTA EARTHQUAKE AND MULTI-ISLAND FAILURE IS MOSTLY TO LOCAL ECONOMY

Percentage of Total Costs and Impacts of Seismic Event Causing 20-50 Flooded Islands



Source: Delta Stewardship Council. 2012. Adapted from Delta Risk Management Strategy Phase 2 Risk Report: Section 18, Scenario Evaluation. Table 18-2a. This scenario considers a seismic event that would disrupt water supplies. Water exports, under a flood event causing catastrophic levee failure, would not be affected by salinity intrusion into the Delta due to the large inflows of freshwater.

- Statewide costs are defined as the cost of water export disruptions and costs due to damage to the 3 state highways crossing the Delta. 38 percent of the total cost of a Delta earthquake and major levee failure are considered statewide costs, of which just over half would be due to water export disruptions.

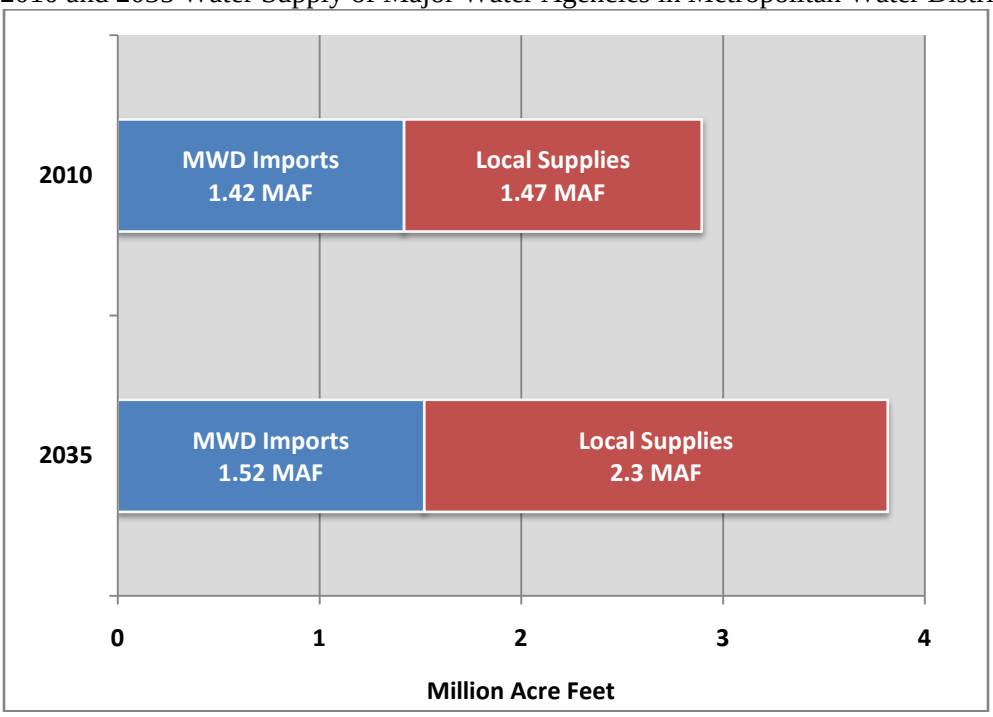
- 62 percent of the cost of the total cost of a major earthquake in the Delta causing catastrophic levee failure would be in-Delta costs such as losses to property, infrastructure, farm production, local water supplies, and transportation.

- 100 percent of statewide cost due to a flood event causing catastrophic levee failure would be due to highway damage. Due to the large inflows of freshwater during a flood event, water exports would not be affected by salinity intrusion. The DRMS report does not consider the effects of increased turbidity or dissolved organic carbon on water treatment and uses.

For more information, see Section 18, Phase 2 Delta Risk Management Strategy Report

LOCAL SUPPLIES WILL MAKE UP MORE OF SOUTHERN CALIFORNIA'S FUTURE WATER SUPPLY

2010 and 2035 Water Supply of Major Water Agencies in Metropolitan Water District Service Area



Source: Adapted from 2010 Urban Water Management Plans for the 11 biggest MWD customers: Eastern Municipal Water District, Inland Empire Utilities Agency, Los Angeles Department of Water and Power, Long Beach Water, Municipal Water District of Orange County, San Diego County Water Authority, Three Valleys Water District, West Basin Municipal Water District, and Western Municipal Water District. These 11 agencies represent 90% of current MWD sales. Local supplies include water imported through the Los Angeles Aqueduct and additional conservation. Data compiled for Imported vs. Local Water Supplies: the planning decisions facing Southern California Water Agencies, Caitrin Philips, UC Berkeley Goldman School of Public Policy.

- Metropolitan Water District's service area in Southern California expects to meet most of its future water supply needs through local supplies. The percent of the region's total water supply imported from Metropolitan Water District falls from 50 percent in 2010 to 40 percent in 2035.

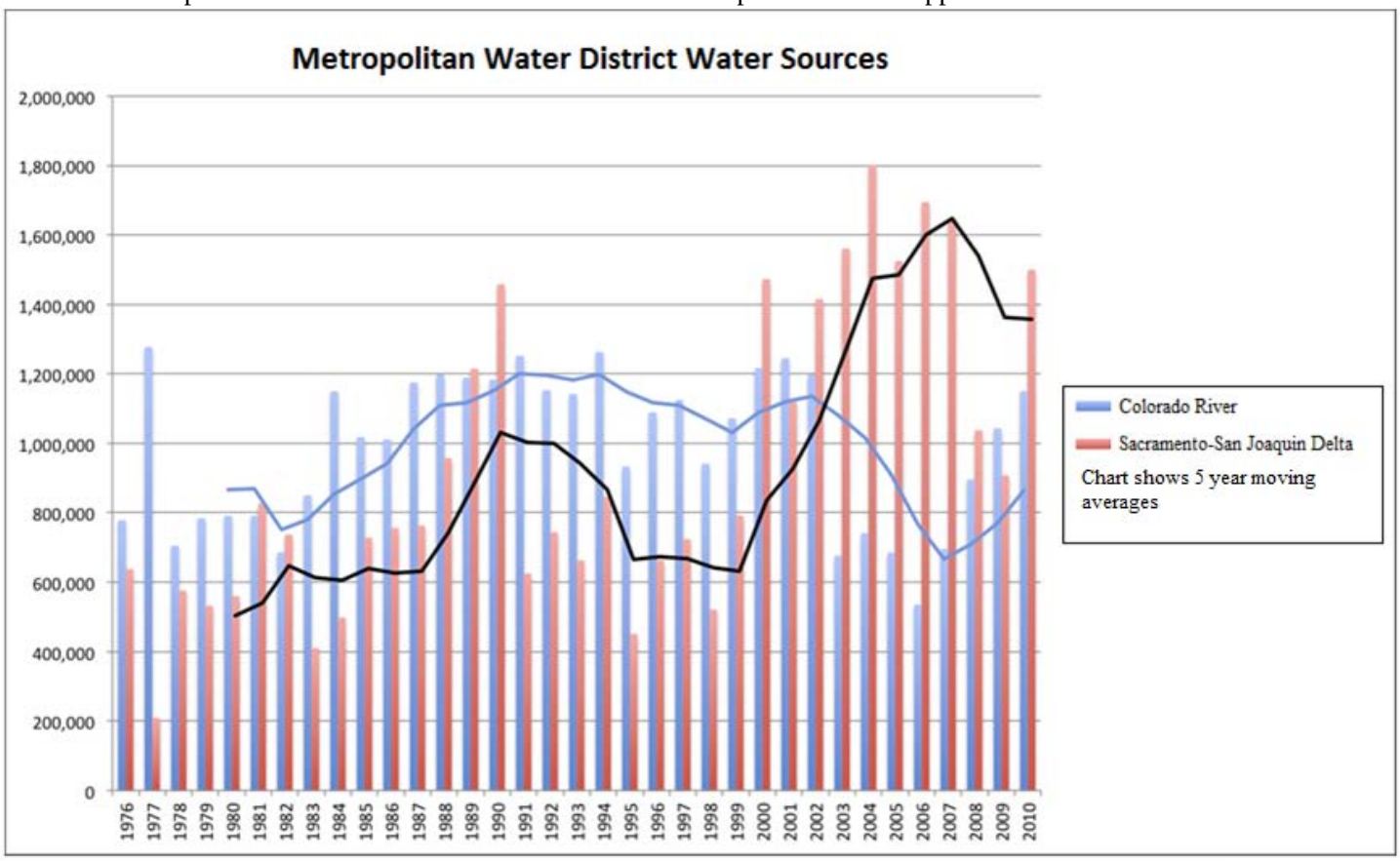
- With California forced to reduce its use of the Colorado River, State Water Project exports will make up more of Metropolitan Water District's imported water sources. Delta exports will likely have to increase to meet member agencies' projected needs for imported MWD water.

- This projection is the current water supply trajectory without the Delta Plan.

For more information, see the DWR Database of 2010 Urban Water Management Plans and Imported vs. Local Water Supplies Report.

END OF COLORADO RIVER SURPLUSES HAS MEANT INCREASED DELTA EXPORTS FOR SOUTHERN CALIFORNIA

Historical Metropolitan Water District of Southern California Imported Water Supplies



Source: Delta Stewardship Council. 2012. Adapted from U.S. Bureau of Reclamation. 2011. Colorado River Basin Water Supply and Demand Interim Report No. 1.

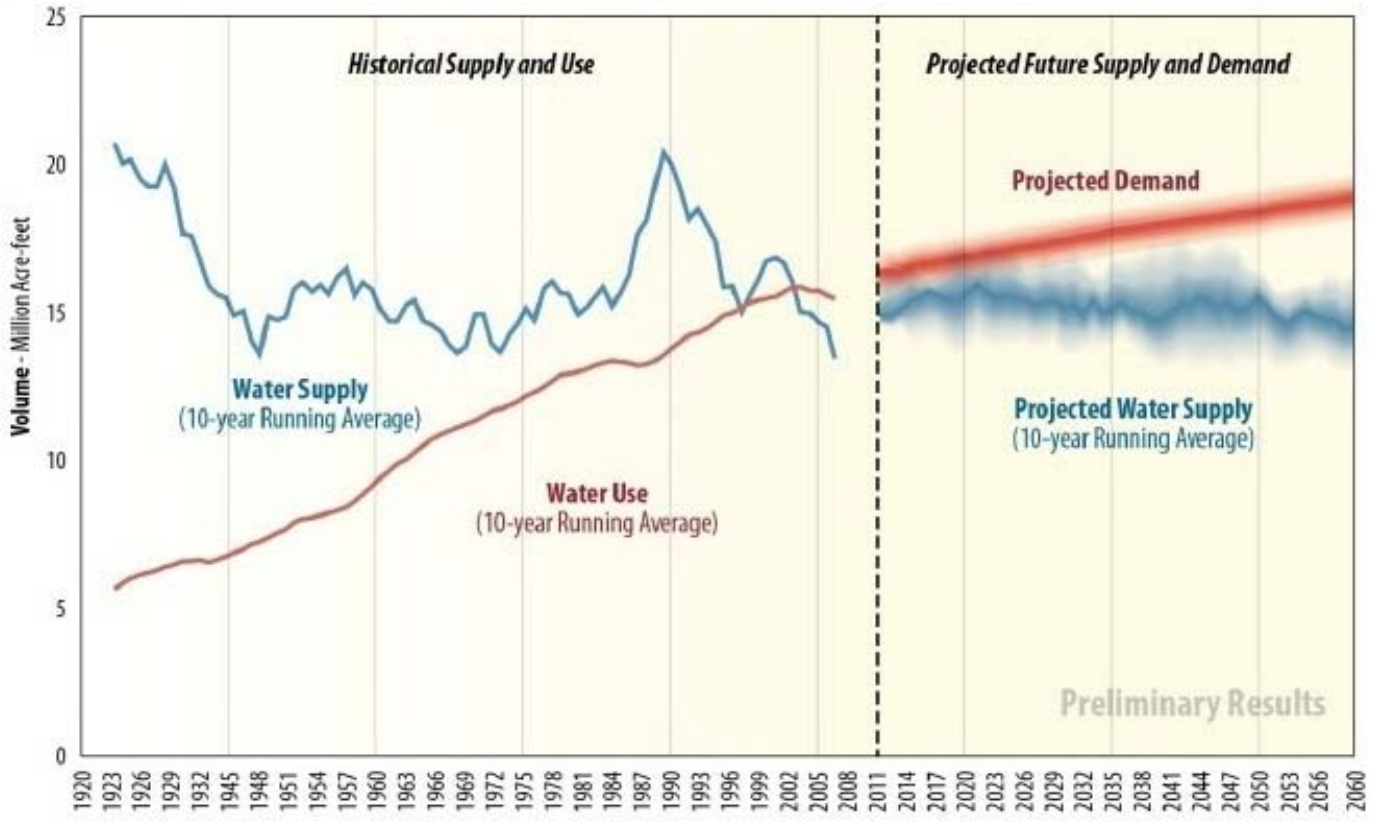
- California historically received surplus water from the Colorado River as other states did not fully use their water rights. However, as other Lower Basin states grew in population and began to use their full entitlement, Metropolitan Water District has had to reduce its use of imported Colorado River water.

- Since 2000, there has been a significant shift in Metropolitan Water District's imported water sources with increased use of the State Water Project to make up for the reduction in Colorado River use.

For more information, see the U.S. Bureau of Reclamation River Basin Water Supply and Demand Study and the Metropolitan Water District 2010 Regional Urban Water Management Plan.

FUTURE DEMAND ON THE COLORADO RIVER EXCEEDS WATER SUPPLY

Historical Supply and Use and Projected Future Colorado River Basin Water Supply and Demand



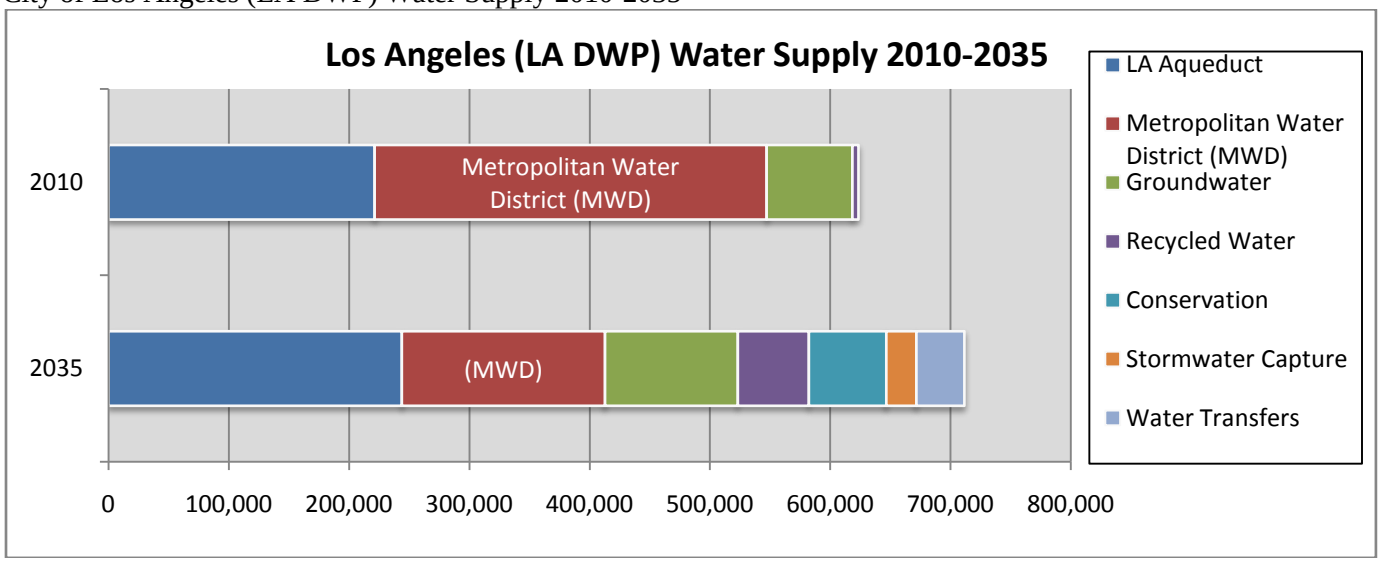
Source: U.S. Bureau of Reclamation. 2011. Colorado River Basin Water Supply and Demand Interim Report No. 1.

- In the past 15 years, water use exceeded the water supply of the Colorado River for the first time. The gap between supply and demand will only become more dramatic in coming years.
- Population increases throughout the Southwest will increase Colorado River demand. Surplus Colorado River water that California historically depended on will become less frequent.
- Climate change will is expected reduce snowpack in the Rocky Mountains. Less snow means more rain and reduced Colorado River flows in the spring and summer when demand is greatest.

For more information, see the U.S. Bureau of Reclamation River Basin Water Supply and Demand Study and the USGS Study: The Unusual Nature of Snowpack Declines in the North American Cordillera.

SOUTHERN CALIFORNIA IS DEVELOPING ARRAY OF LOCAL SOURCES TO REDUCE RELIANCE ON IMPORTED WATER

City of Los Angeles (LA DWP) Water Supply 2010-2035



Source: Adapted from Los Angeles Department of Water and Power Urban Water Management Plan 2010.

- Recognizing the vulnerability of Delta water supplies, regions are diversifying their water portfolios and developing costly, local water supplies such as water recycling and stormwater capture.

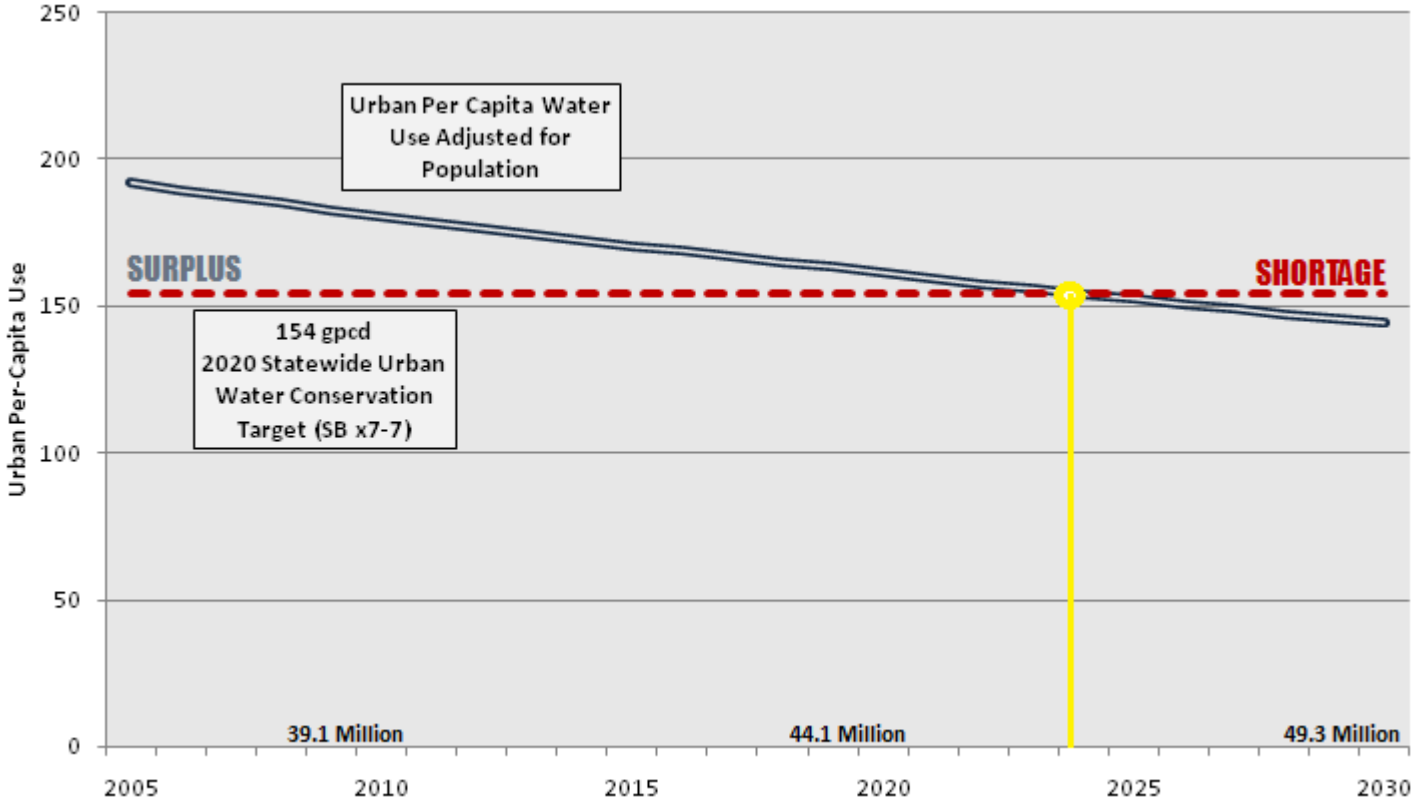
- Los Angeles has already conserved 100,000 AF through measures such as efficient landscaping and has set a goal to reduce water use by 50,000 AF by 2030. Some recent reductions in per capita water use may be attributable to the recession.

- The cost-competitiveness of member agencies' new local water supplies threatens MWD's long-term health as a water wholesaler.

For more information, see Los Angeles Department of Water and Power 2010 Urban Water Management Plan.

WATER CONSERVATION IS ESSENTIAL BUT THE NEW 20% SAVINGS WILL BE USED UP BY 2024

Urban Per Capita Water Use For Projected California Population Based on 2005 Urban Water Supply



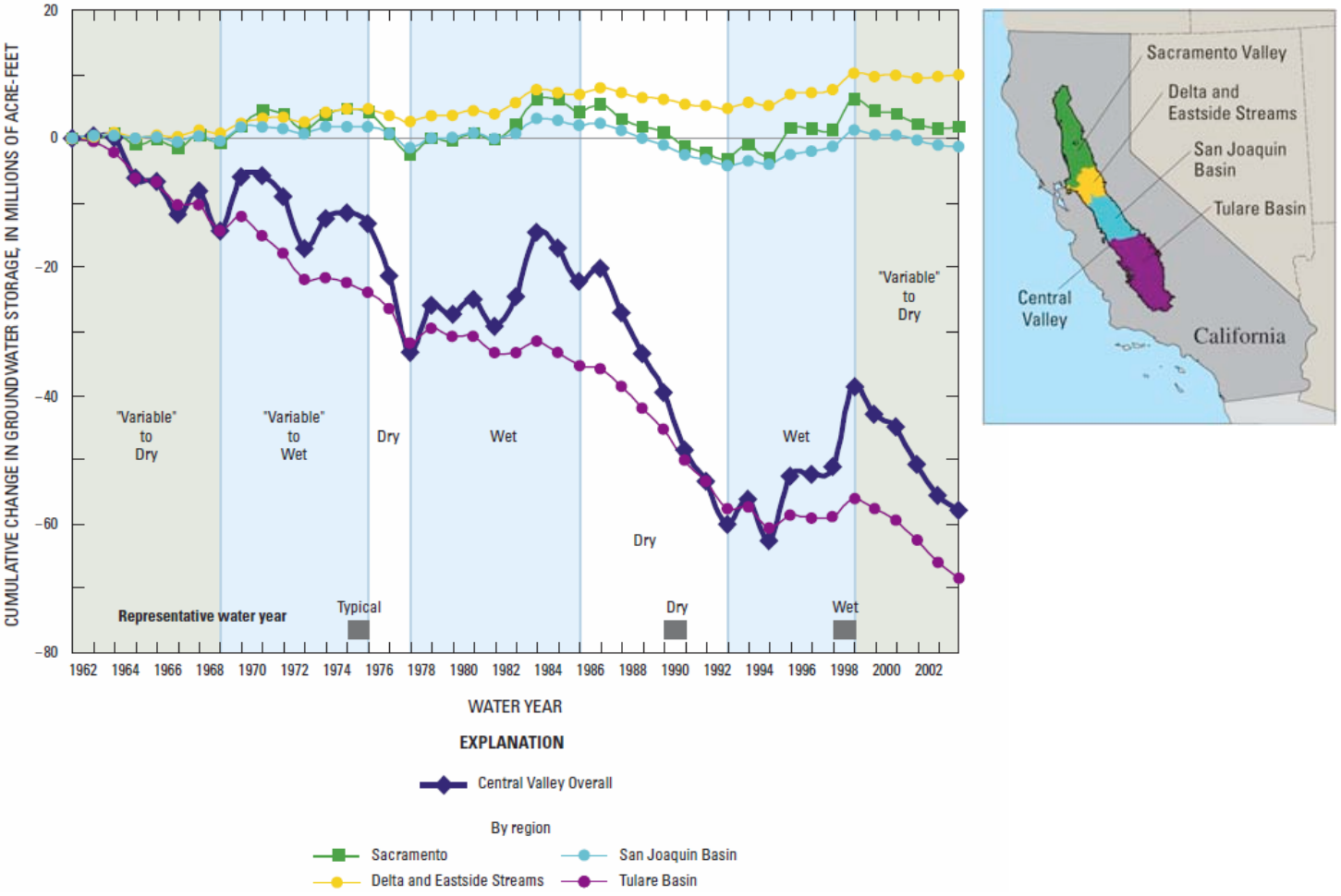
Source: Delta Stewardship Council. 2012. Adapted from DWR 20x2020 Water Conservation Program Final Report, California Water Plan Update 2009, and Department of Finance Population Projections. Urban water use is based on 2005 urban water use of 7.9 MAF from 20x2020 Final Report. Population projections are based on 2007 Department on Finance projections, which predict greater population growth than the U.S. Census results. According to the U.S. Census, California's 2010 population was 37.3 million. Water use projections are based on statewide per-capita use not growth in individual hydrological regions which may have higher or lower per-capita use.

- SB x7 7, the Urban Water Conservation Act of 2009 mandates a 20 percent reduction from 2005 statewide urban per-capita water use. The 2005 statewide baseline water use set in the law is 192 gallons per capita per day. A 20 percent reduction represents 1.59 MAF in statewide savings.
- Assuming California meets population projections and the 20 percent savings goal, new conservation measures will be needed by 2022.
- To meet the demands of a projected 2030 State population of 49.3 million on its current urban water supply, California would have to reduce per-capita water use to 144 gpcd.

For more information, see the DWR 20x2020 Water Conservation Program Final Report, Department of Finance Population Projections, and the California Water Plan Update 2009.

MOST BASINS ARE IN GOOD SHAPE, BUT SOME FACE CRITICAL OVERDRAFT

Groundwater Storage by Central Valley Basin and Water Year Type



Source: Faunt, C.C. ed., 2009, Groundwater Availability of the Central Valley Aquifer: U.S. Geological Survey Professional Paper 1766, 225 p.

- While cumulative changes in groundwater storage does not directly show overdraft, sustained decline in groundwater levels strongly implies systemic overdraft.
- The greatest declines in groundwater storage levels are occurring in regions most dependent on groundwater. Groundwater can make up almost 70 percent of supply for the Tulare Basin region in dry years.
- Groundwater is a depletable resource. Some regions dependent on groundwater are far from surface water and will be hard-pressed to find new water sources if groundwater becomes unusable.

For more information, see USGS Groundwater Availability of the Central Valley Aquifer.

THE DELTA STEWARDSHIP COUNCIL HAS A VARIETY OF ROLES IN ESTABLISHING STATE POLICY FOR THE DELTA INCLUDING AN APPELLATE ROLE FOR BDCP

Delta Stewardship Council Roles

Source: Fifth Staff Draft Delta Plan

- The Delta Stewardship Council is an independent agency of the State that is charged with achieving the coequal goals of providing a more reliable water supply for California, and protecting, restoring, and enhancing the Delta ecosystem.

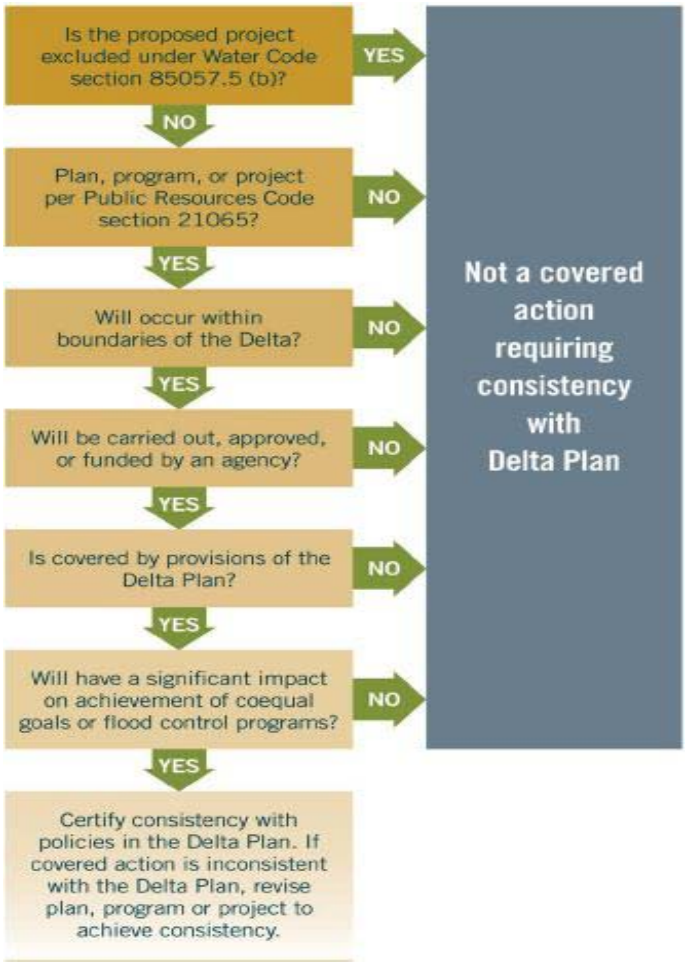
- The Council is intended to be both foundational and adaptive. It is foundational in that the Council has built on previous efforts and will incorporate other consistent plans into the Delta Plan. It is adaptive in that it the Plan will be revised at least every five years and as needed.

- Following completion of the Delta Plan, the Council will determine whether covered actions are consistent with the Delta Plan. The Council also has a limited appellate role for the Bay-Delta Conservation Plan.

For more information, see the Fifth Staff Draft Delta Plan.

COVERED ACTIONS REQUIRE CONSISTENCY WITH THE DELTA PLAN

Decision Tree for Covered Actions



Source: Delta Stewardship Council. 2011. Fifth Staff Draft Delta Plan.

- The requirement of consistency with the Delta Plan applies only to covered actions. The decision must be carried out, approved, or funded by the State or a local public agency.
- In addition, the covered action must have a significant impact, meaning it directly or indirectly affects the achievement of the coequal goals.
- There are statutory exemptions to covered actions such as routine maintenance of the State Water Project and Central Valley Project.

For more information, see the Fifth Staff Draft Delta Plan.