California Executive Branch Action on Drought – Drivers

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Outline

- Water management in California – institutional background & setting
- Hydrology & drought background
- Historical comparison of executive branch actions

Institutional Background & Setting

Water Management Institutional Framework

- Major federal agencies: USBR and USACE (provide wholesale water supply & flood control)
- Major state agencies: DWR (provides wholesale water supply & flood control), SWRCB (regulates water quality & water rights)
- Local agencies: provide wholesale and retail water supply, flood control, water treatment, wastewater treatment

State Agencies

- Department of Water Resources
  - $3.8B FY15-16 budget, 3500 PYs
- State Water Resources Control Board
  - $2.1B FY 15-16 budget, 2500 PYs
- (In comparison, USBR's Westwide budget or NWS' nationwide budget about $1B annually, about the same as Metropolitan Water District of Southern California's budget)

Key DWR Responsibilities

- Operates State Water Project (4 MAF contractual allocations
- Operates Sacramento River Flood Control Project, provides flood forecasting and flood operations services
- Manages data programs: California Data Exchange Center, Calif Cooperative Snow Surveys program, groundwater, land and water use
- Administers local agency financial assistance programs, state water supply planning programs (5-year updates of State Water Plan), and dam safety program

Key SWRCB Responsibilities

- Administers water rights permitting program
- Administers water quality planning program
- Through Regional Boards, administers water quality permitting program to assure conformance with water quality plans, administers related local agency financial assistance programs

Setting

Major Rivers
State Projects
Federal Projects
Local Projects
Redding
Sacramento
San Francisco
Fresno
Los Angeles
San Diego

California's Groundwater Basins

Federal Central Valley Project

- Largest single water project in California
- Operated by U.S. Bureau of Reclamation
- 18 federal reservoirs plus 4 state-federal reservoirs, 12 MAF total storage capacity
- Largest generator of electrical power in California

The State Water Project

- California's 2nd-largest water project
- Operated by DWR
- 20 reservoirs, 660 miles of aqueduct, 26 power & pumping plants
- 4th-largest generator of electrical power in California

Sacramento-San Joaquin River Delta

- A hub for California water conveyance projects
- A highly altered ecosystem
- An infrastructure and resource management challenge
- SF Bay-Delta is largest estuary on the west coasts of North & South America

Hydrology & Drought Background

Tools for Managing Dry Conditions or Drought

- California's unparalleled system of water infrastructure (which facilitates water transfers)
- Groundwater
- Legal & regulatory framework for conservation, recycling, water transfers, local agency water planning, etc

Hydrology 101

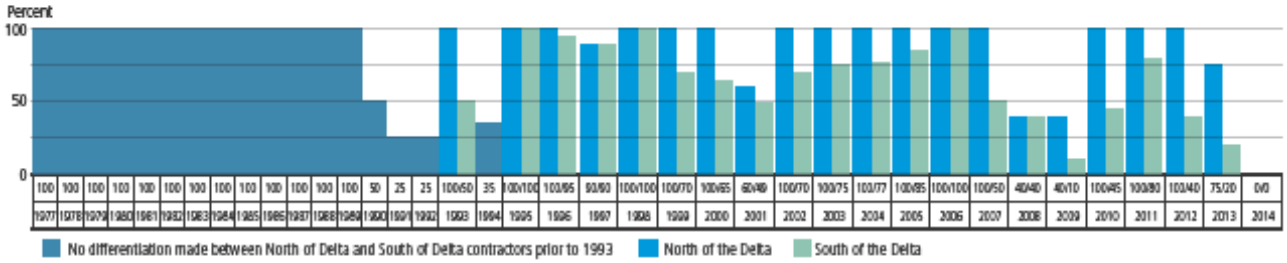
- On average 75% of statewide precip in November – March
- 50% of statewide precip in Dec – Feb
- Water storage in Sierra/Cascades mountain snowpack important
- Delicate balance between operating reservoirs for flood control & water storage
- Small number of storms determine California's annual water budget

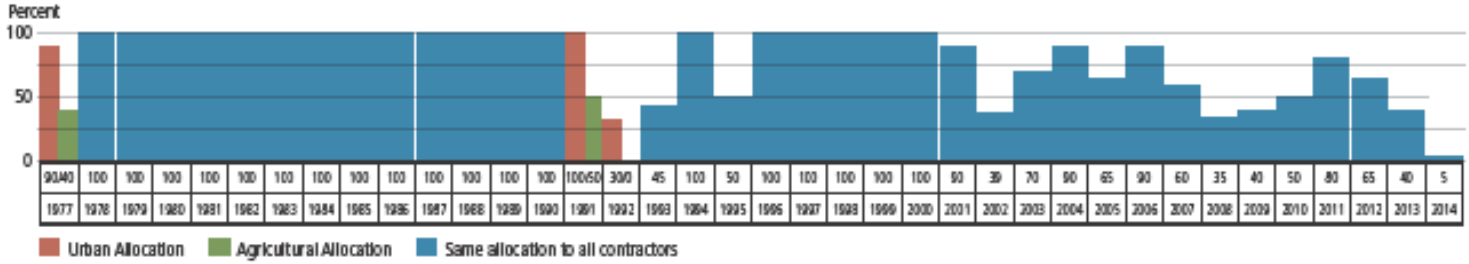
California's 20th & 21st Century Statewide Droughts

- 1918-20
- 1922-24
- 1929-34
- 1947-50
- 1959-61
- 1976-77
- 1987-92
- 2007-09
- 2012-??

Comparison of Water Project Allocations in Dry Years

	1991	2009	2014
SWP	30% / 0%	40%	5%
SWP water rts	50%	100%	100%
CVP N of Delta Ag	25%	40%	0
CVP S of Delta Ag	25%	10%	0
Friant	100%	100%	0
CVP Sac water rts	75%	100%	75%
CVP SJ water rts	75%	100%	65%


Percent
100
50
0
100 100 100 100 100 100 100 100 100 100 100 100 100 50 25 25 100/50 35 100/100 100/95 90/90 100/100 100/70 100/65 60/49 100/70 100/75 100/77 100/85 100/100 100/50 40/40 40/10 100/45 100/80 100/40 75/20 0/0
1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
No differentiation made between North of Delta and South of Delta contractors prior to 1993
North of the Delta
South of the Delta



Prior to 1994, differential allocations could be made for urban and agricultural contractors. The few years for which separate allocations were made are highlighted in contrasting colors.

Historical Comparison of State Executive Branch Actions

Decision Drivers

- Drought duration (> 1 year)
- Observed hydrology
  - Precipitation
  - Storage in major reservoirs
  - DWR runoff forecasts
- Expected impacts
  - SWP & CVP allocations
  - Water supply availability from other projects

USGS Computed CA WY Runoff
Dozen Driest years -- (rank out of 114)

1.	1977	114th
2.	1931	113th
3.	1924	112th
4.	2014	111th
5.	1991	110th
6.	1994	109th
7.	1990	108th
8.	2001	107th
9.	1934	106th
10.	1992	105th
11.	1976	104th
12.	1929	103rd

Most Recent Droughts w/ Exec Branch Action

Drought		Yr Taken	Immediate driver
1987-92		5/6	Drought duration, reservoir storage depletion
2007-09		2/3 & 3/3	New Biological Opinion, low precip
2012-15		3/4	Record low precip by mid-winter

It's Not Just Hydrology
Excerpt from S-06-08

WHEREAS diversions from the Sacramento-San Joaquin River Delta for the State Water Project (SWP) and federal Central Valley Project (CVP) are being greatly restricted due to various factors including federal court actions to protect fish species, resulting in estimated SWP deliveries of only 35 percent, and CVP deliveries of only 40 percent, of local agencies' requested amounts for 2008; and

Driest Three Consecutive Water Years, Based on Statewide Precipitation

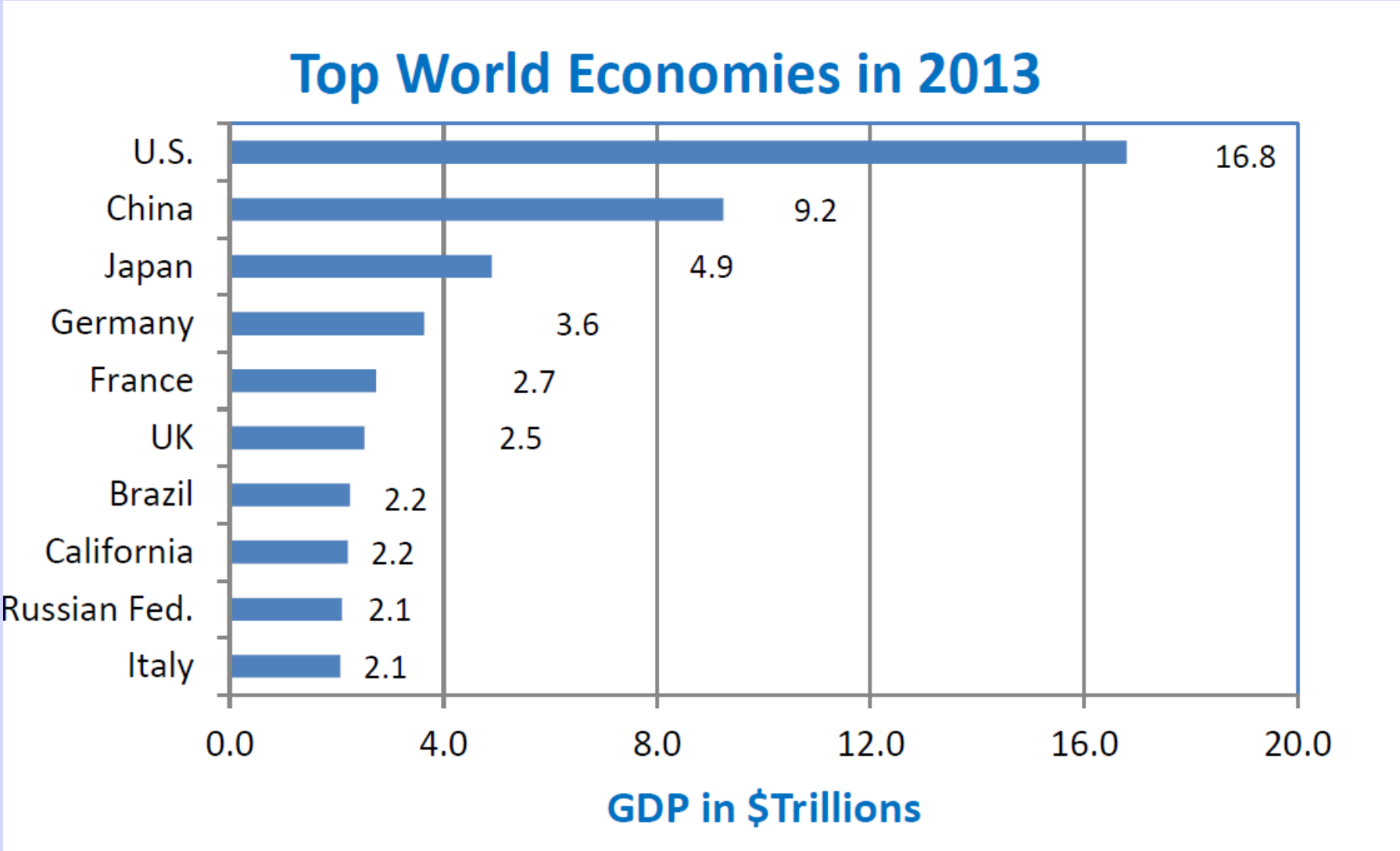
Years	Total Statewide Precipitation, inches
2012-14	44.5
1922-24	45.1
1918-20	46.1
1924-26	46.5
1929-31	46.7
1923-25	46.9
2007-09	48.2
1917-19	49.6
1975-77	49.8
1931-33	50.1

Data from Western Regional Climate Center

Decision-Making Considerations (e.g., in 2014)

- Lack of seasonal skillful precip forecasts
  - It's November – will this water year be wet or dry?
  - It's mid-January – will the rest of the season be wet or dry?
- Lead-time for response actions (longer is better)
  - State budget process
  - Negotiating contracts, transfers
  - Regulatory compliance (e.g., ESA)

Absence of forecast information implies conservative action


Top World Economies in 2013
U.S.
China
Japan
Germany
France
UK
Brazil
California
Russian Fed.
Italy
16.8
9.2
4.9
3.6
2.7
2.5
2.2
2.2
2.1
2.1
0.0
4.0
8.0
12.0
16.0
20.0
GDP in $Trillions

American
Red Cross
4880
25
MITSUBISHI