Southern California Groundwater & Climate Workshop

Three Key Elements for Water Supply Reliability in Southern California

February 24, 2012

Metropolitan Water District of Southern California

- Regional water wholesaler
  - Serves 6 counties, 19 million people
    - $1 trillion regional economy
      - Half of region's supply

Sources of Water for Southern California

Presentation Outline

- Characterize groundwater in MWD's service area
  - Physical characteristics
  - Management and use
- MWD's IRP—elements for water supply reliability
  - Imported water
  - Local resources
  - Water use efficiency
- Research questions—potential effects of climate change

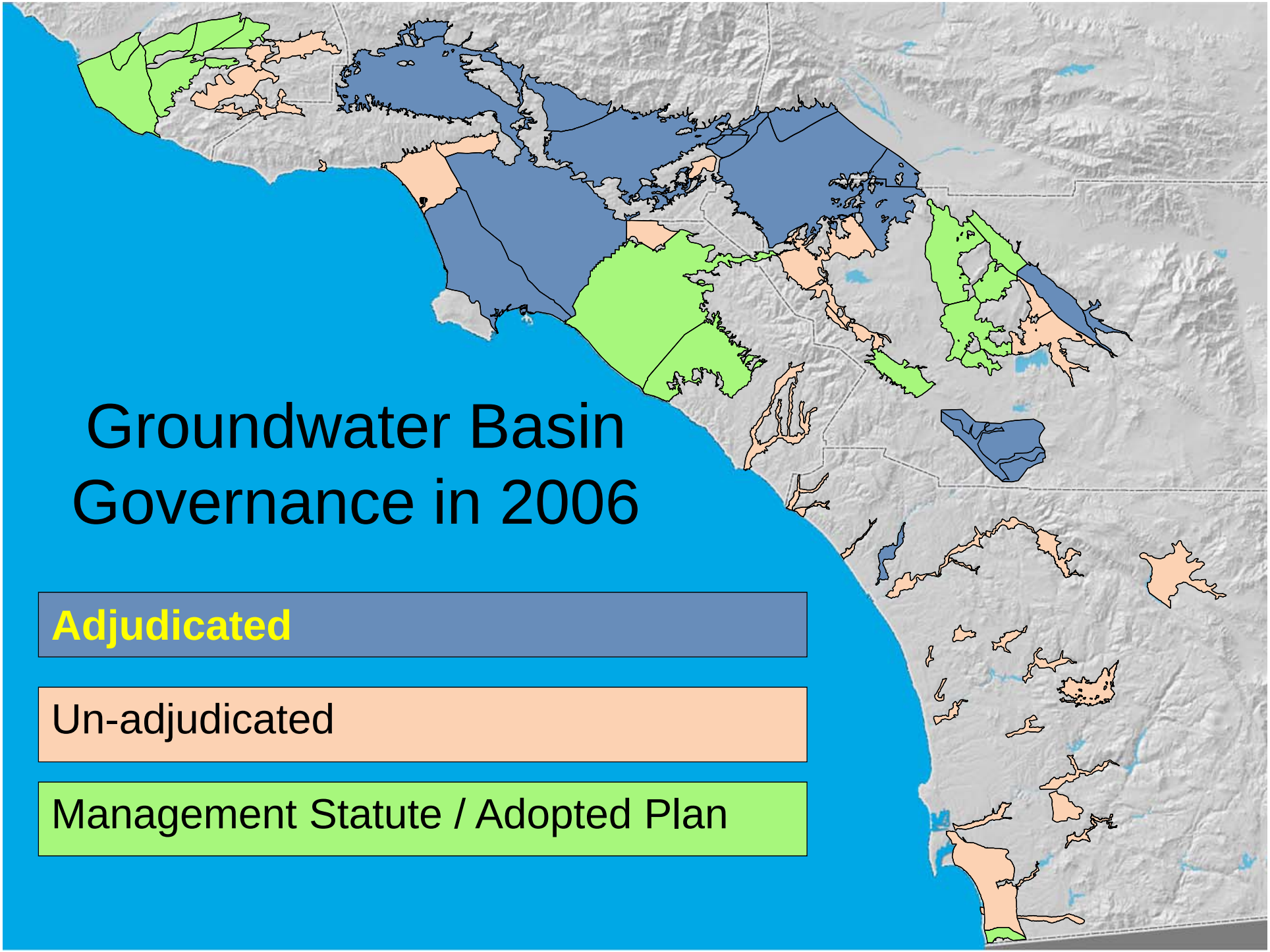
Changing Conditions

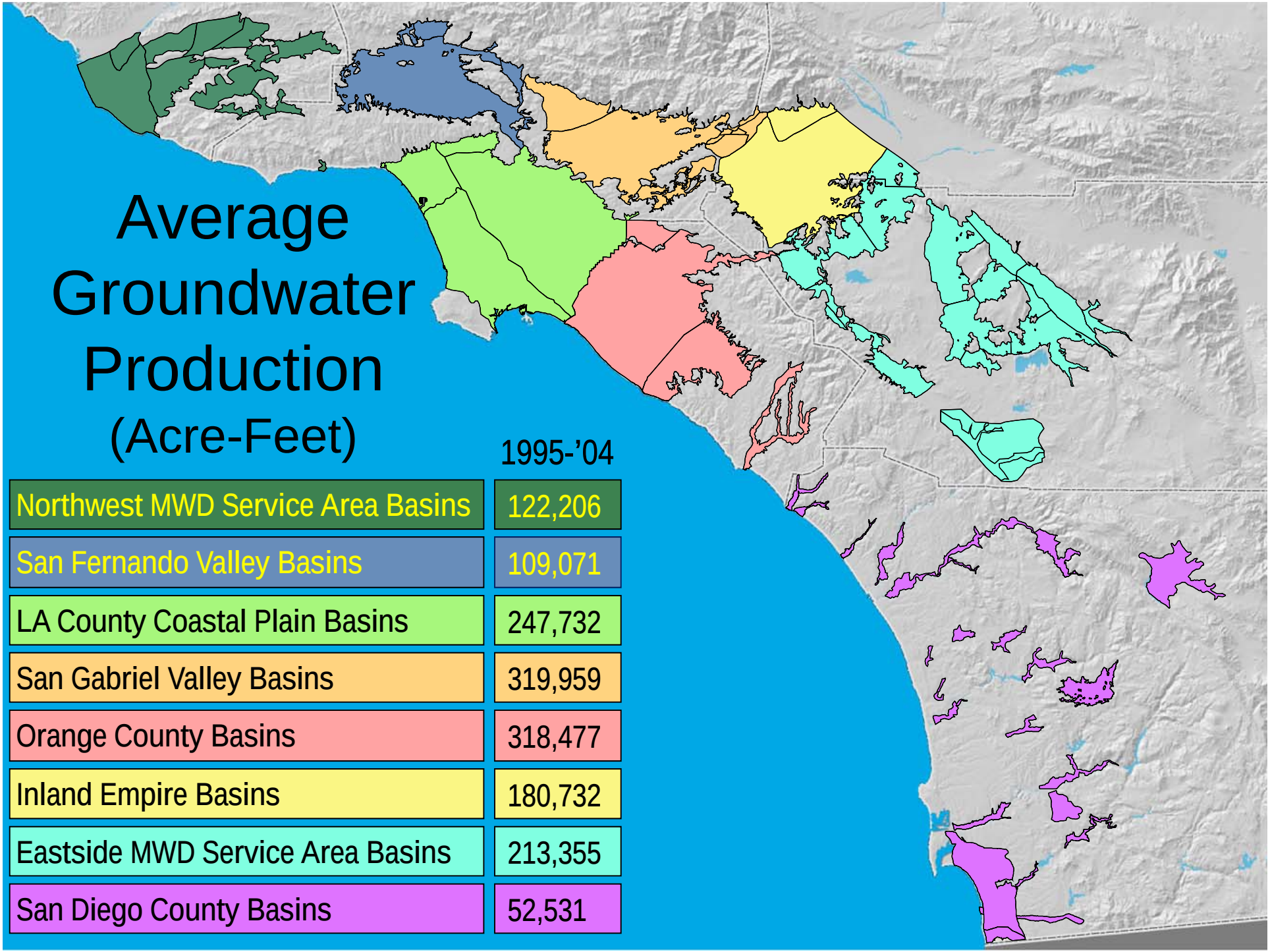
- Imported water shortfall mid-2007 through 2010
- Water supply allocation plan in effect July 2009 to April 2011
- Water use reduced by shortage and economy
- Change in availability of imported replenishment water from MWD at reduced price
- Data reported reflect average patterns 1995-2004
- Some trends consistent from 1985-2004
- Key updates since 2004 are noted—e.g. GWRS
- GW storage level data for key GW basins current through November 2011

Groundwater

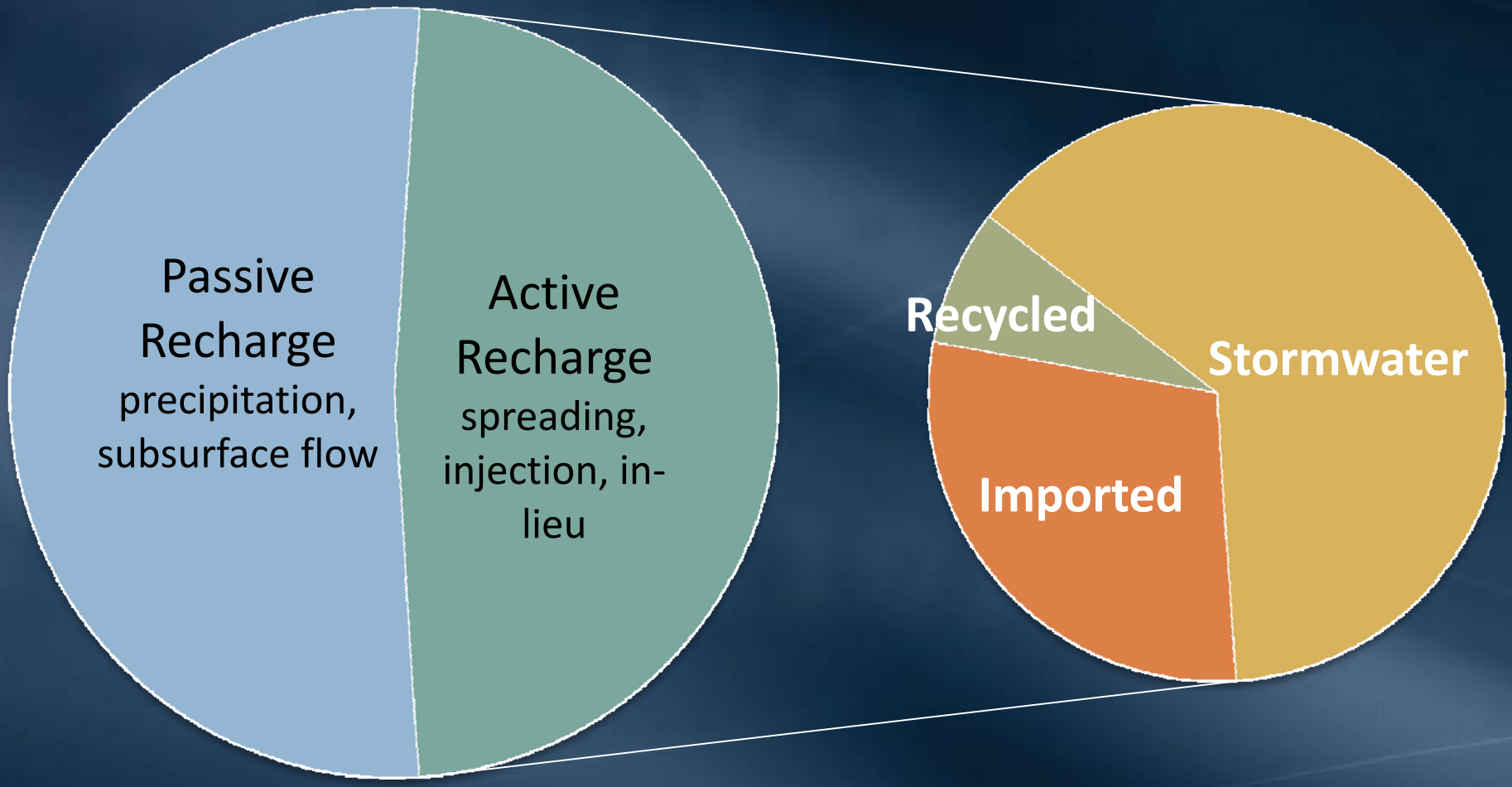
Status of In-Region Groundwater
1995-2004 average

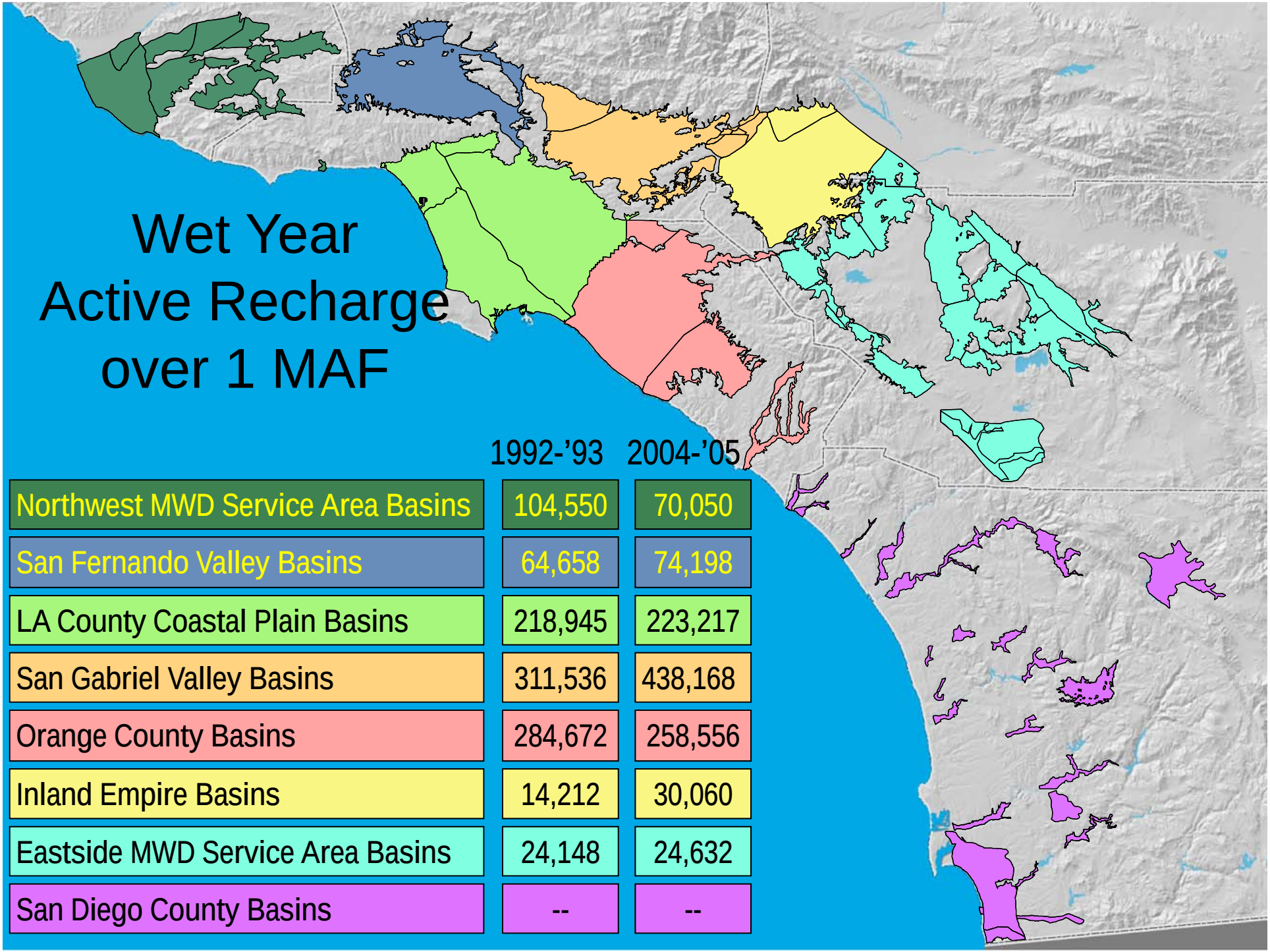
- Based on findings of 2007 Groundwater Assessment Study Report with key updates
- Over 90% of GW is managed or adjudicated
- 1,500,000 AFY GW production
- 750,000 AFY active recharge
  - 29% imported water—significant decline since 2008
  - 8% recycled water—doubled in 2008 to 16%
  - 63% stormwater runoff—increasing
- 750,000 AFY passive recharge


Groundwater Basin Governance in 2006
Adjudicated
Un-adjudicated
Management Statute / Adopted Plan


Average Groundwater Production
(Acre-Feet)
1995-'04
Northwest MWD Service Area Basins 122,206
San Fernando Valley Basins 109,071
LA County Coastal Plain Basins 247,732
San Gabriel Valley Basins 319,959
Orange County Basins 318,477
Inland Empire Basins 180,732
Eastside MWD Service Area Basins 213,355
San Diego County Basins 52,531

Groundwater Recharge (Average 1995-2004)





	1992-'93	2004-'05
Northwest MWD Service Area Basins	104,550	70,050
San Fernando Valley Basins	64,658	74,198
LA County Coastal Plain Basins	218,945	223,217
San Gabriel Valley Basins	311,536	438,168
Orange County Basins	284,672	258,556
Inland Empire Basins	14,212	30,060
Eastside MWD Service Area Basins	24,148	24,632
San Diego County Basins	--	--

GW Facility Investments as of 2005

- More than 4,300 active production wells
- 36 ASR wells
- 5,000 acres of spreading basins
- 7 seawater intrusion barriers
- 16 desalters
- 400 acres of water quality wetlands
- GWRS on-line in 2008 doubling recycled water

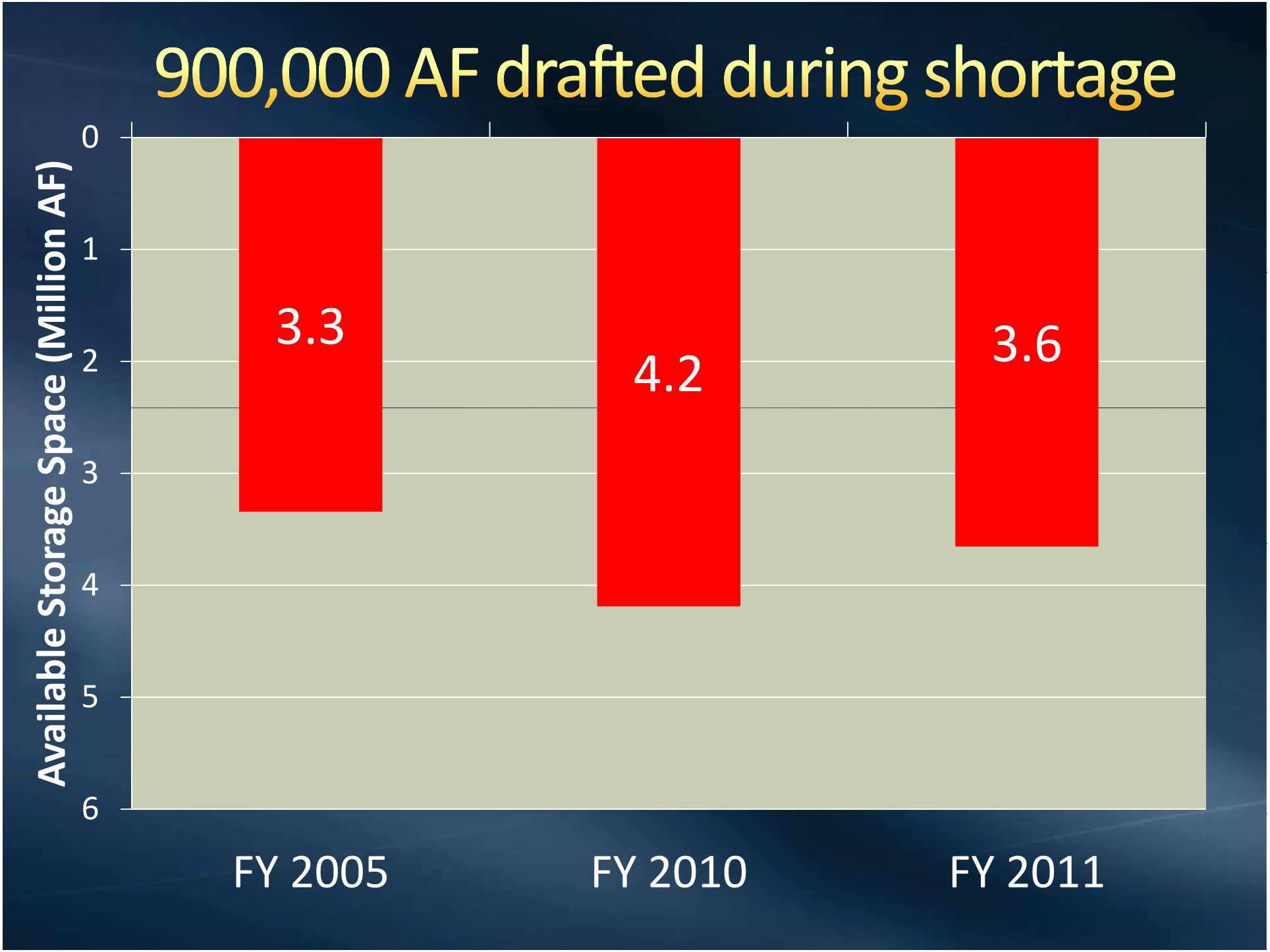
Regional GW Study Findings

- In 2004/05, active recharge utilized 60% of the reported available capacity
- In 2004/05, 21% of production was reported as treated or blended for water quality purposes
- Over 3 million AF of basin capacity is available for storage subject to resolution of issues and determinations of institutional, operational and economic feasibility

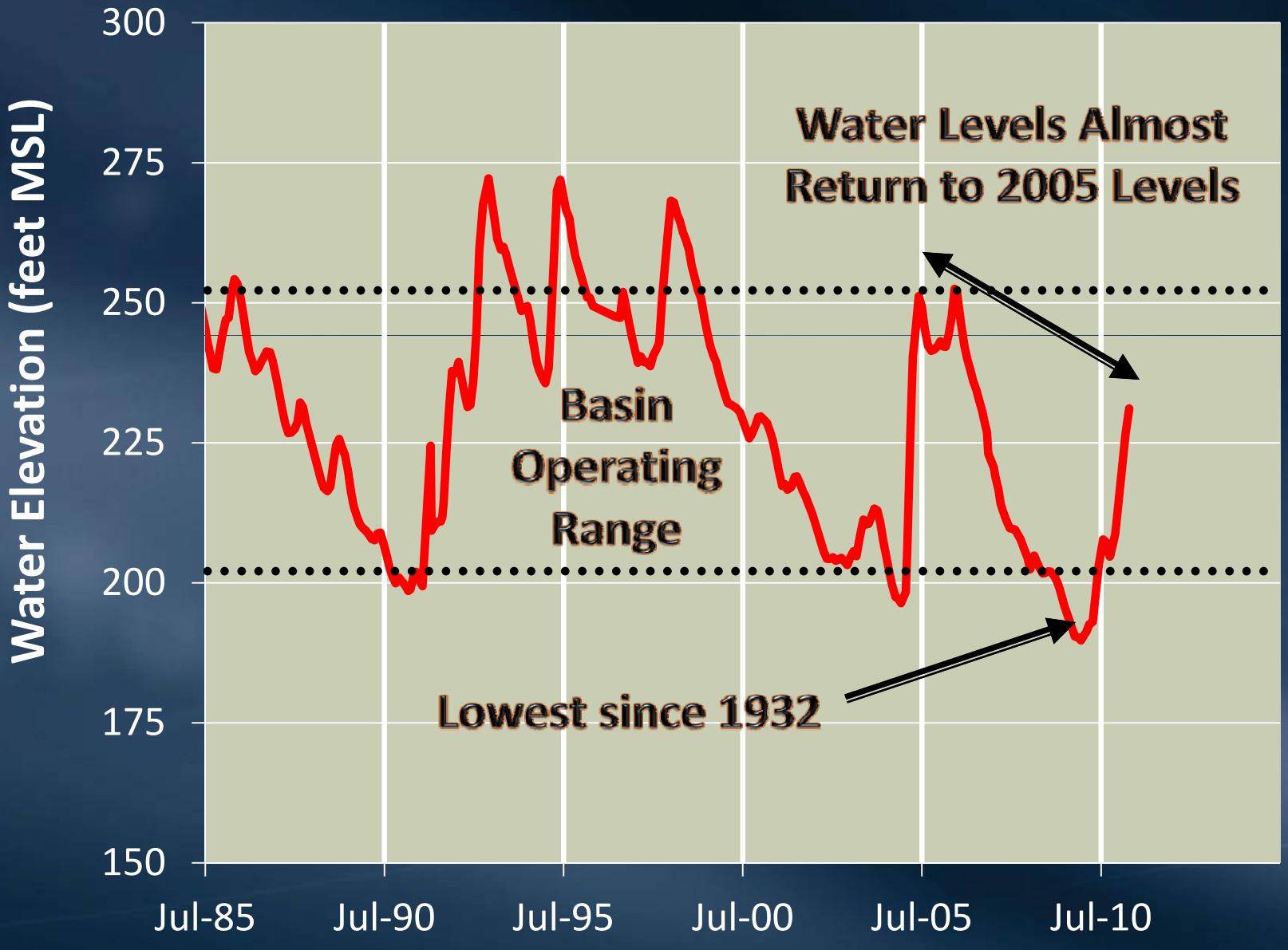
Issues for Storage

- Need for funding
  - Water quality treatment
  - Capital infrastructure
- Mismatch of storage with overlying demand
- Resolution of institutional disagreements
- Regulatory issues
- Availability of surplus water to store

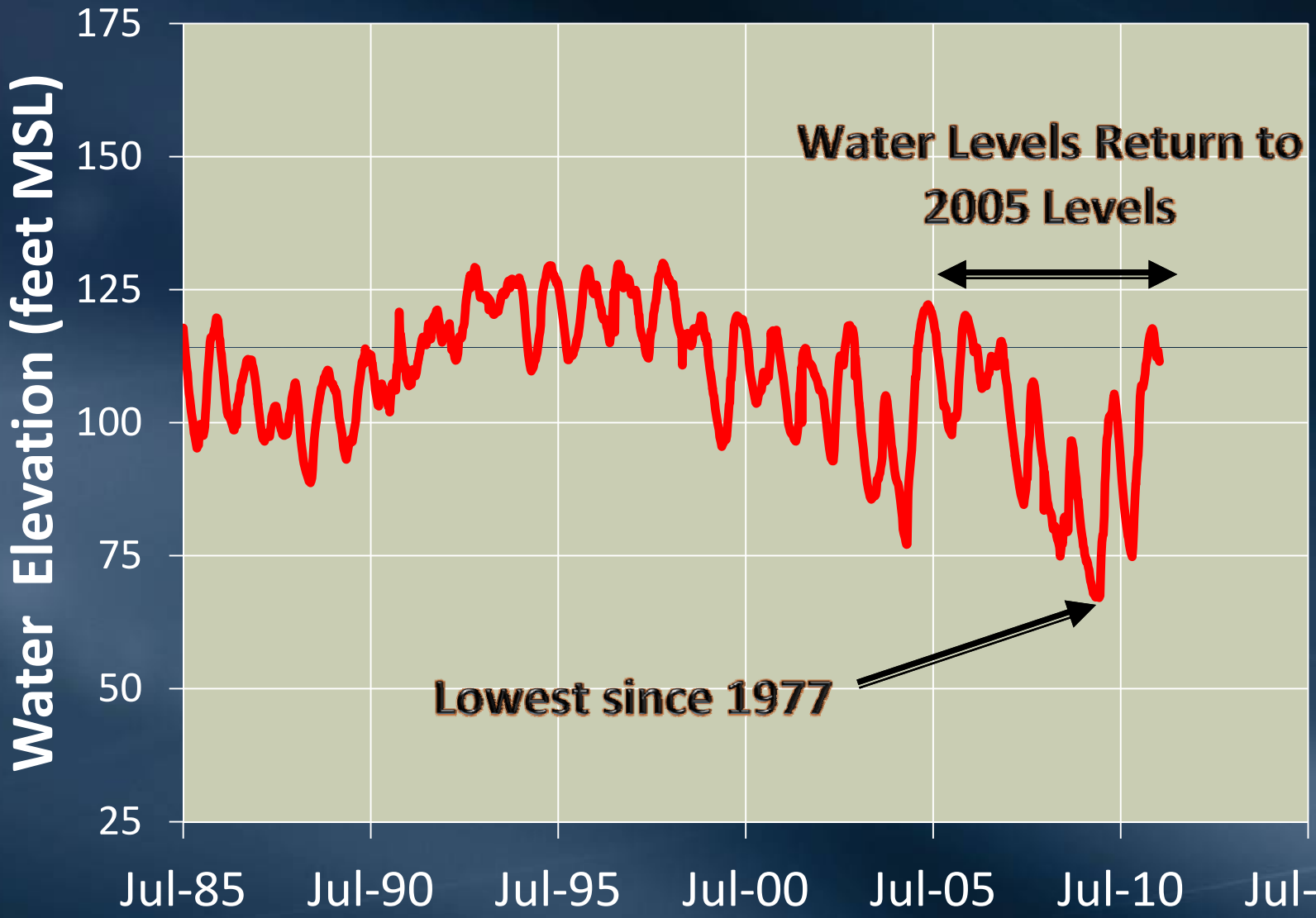
900,000 AF drafted during shortage



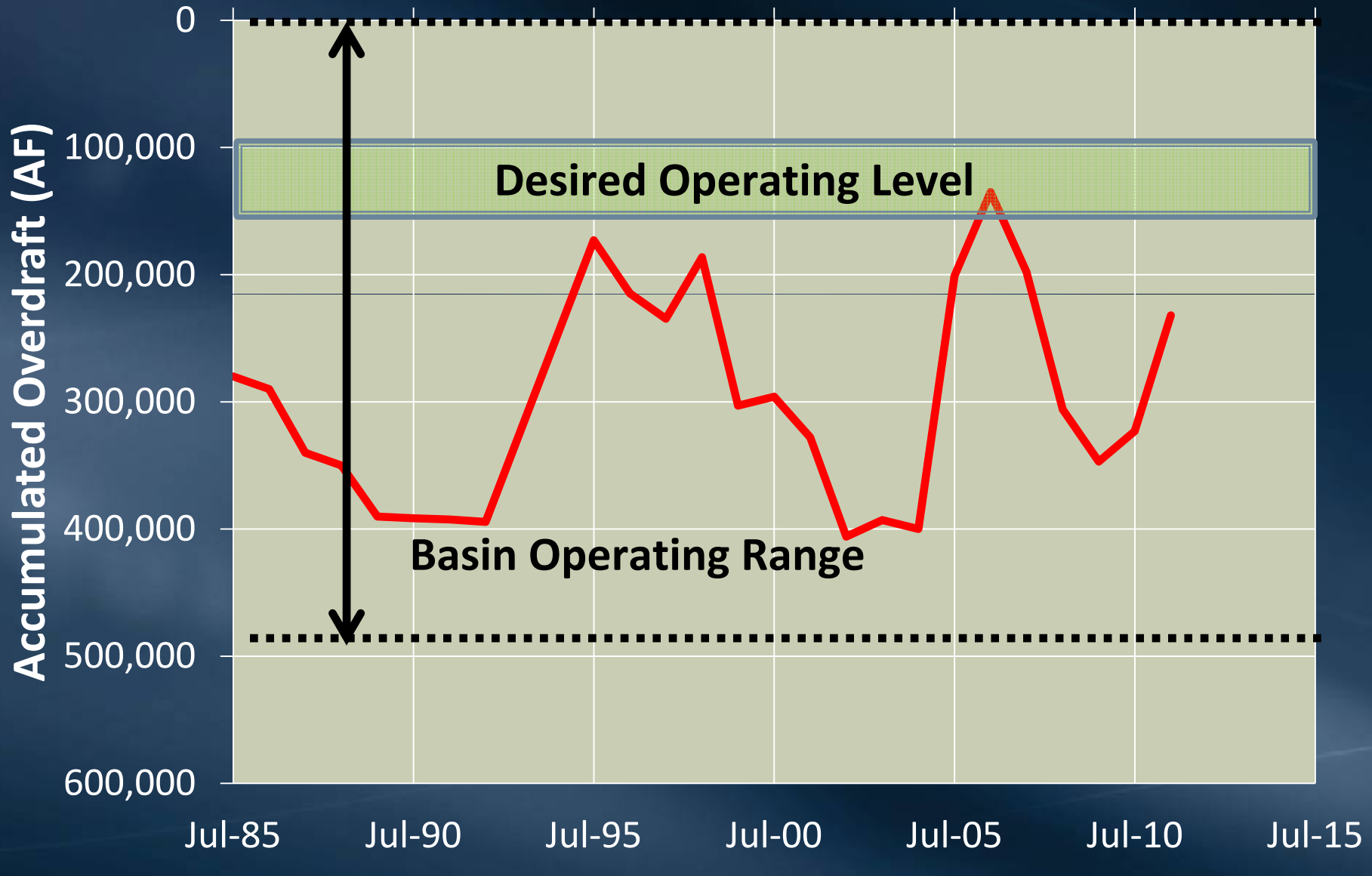
Main San Gabriel Basin

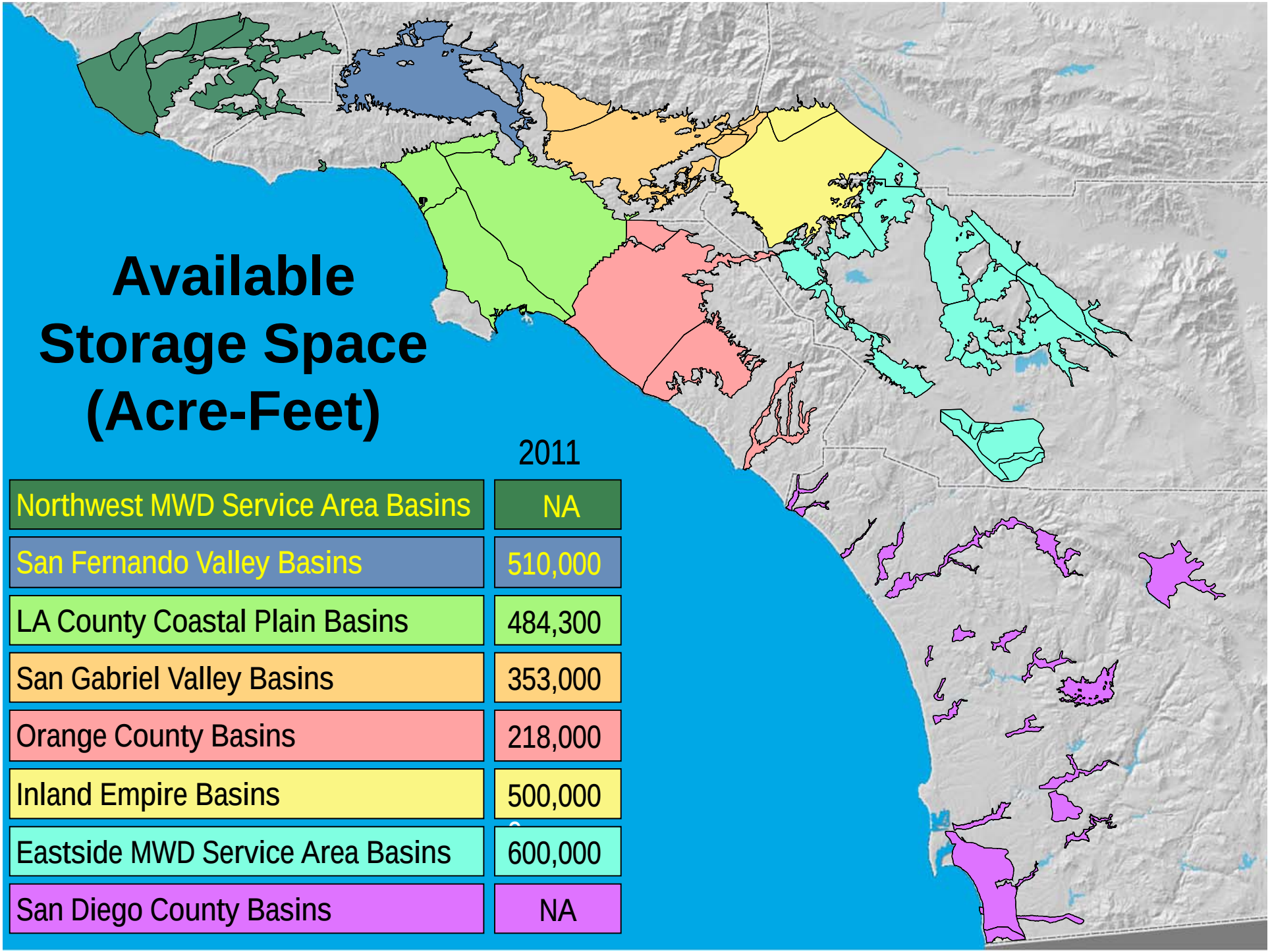


Central Basin



Orange County Basin

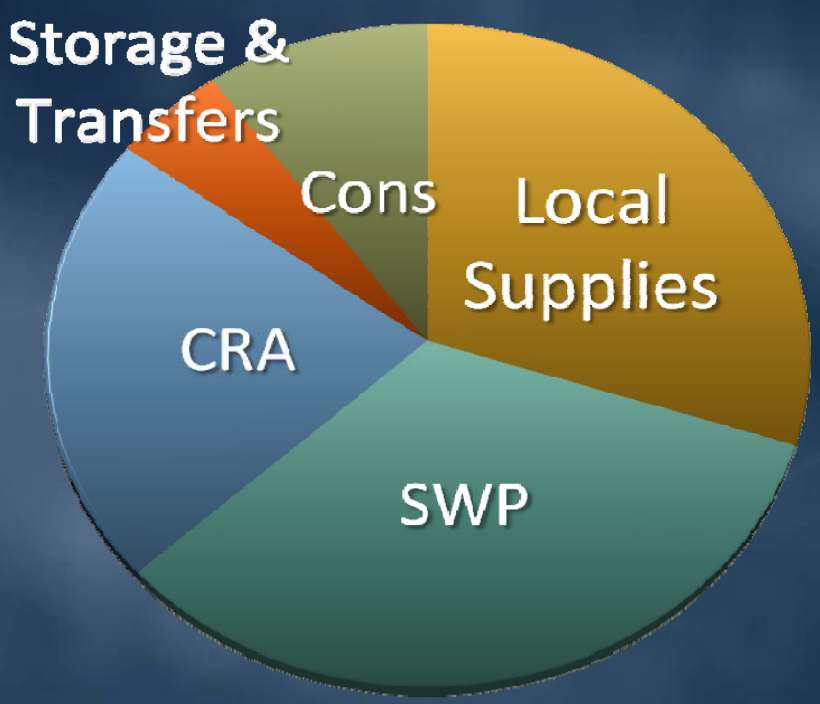




	2011
Northwest MWD Service Area Basins	NA
San Fernando Valley Basins	510,000
LA County Coastal Plain Basins	484,300
San Gabriel Valley Basins	353,000
Orange County Basins	218,000
Inland Empire Basins	500,000
Eastside MWD Service Area Basins	600,000
San Diego County Basins	NA

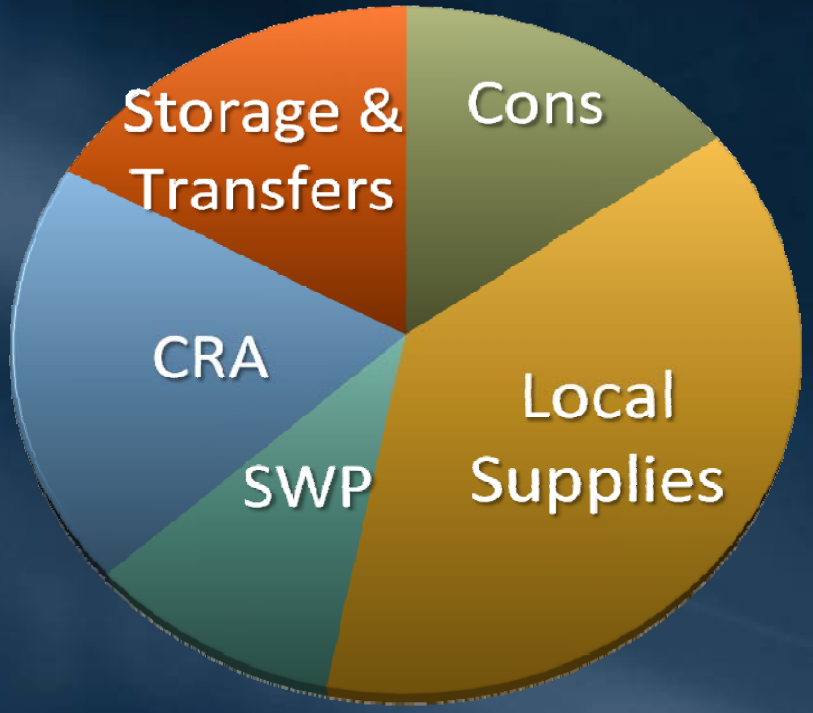
Three Key Elements for Supply Reliability

MWD's Balanced Approach
Dry-Year Strategy



Early 1990's

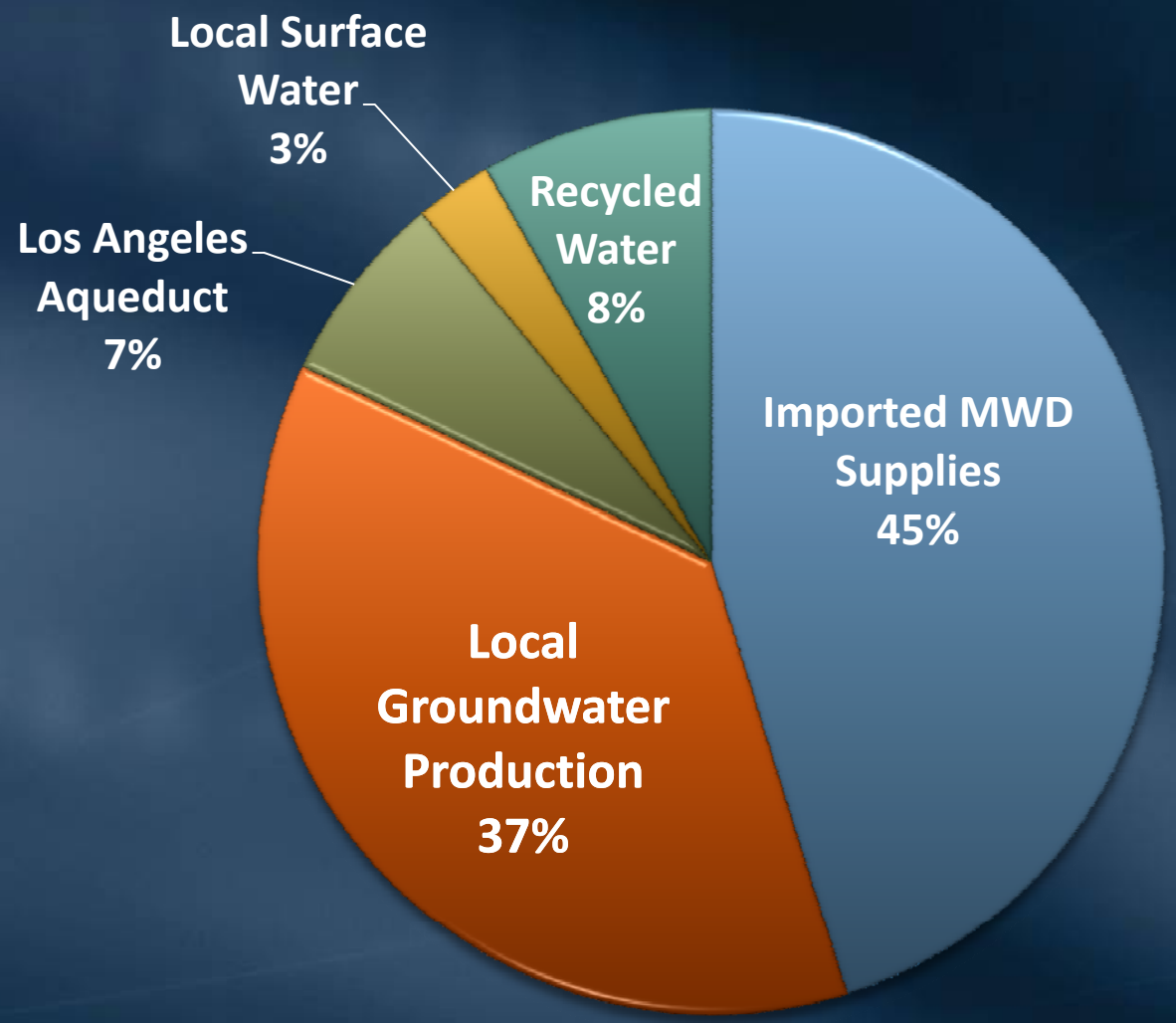
Heavy dependence on imported supplies



Current Strategy

Emphasis on conservation, local supplies, storage & transfers

2010 Service Area Water Supplies
Total Retail Demand: 3.6 MAF



Element 1
Imported Water

IRP Strategies for Imported Supply Reliability

- Achieve a Delta solution to restore sustainable supply reliability and ecosystem conditions
  - Recover reliability to 2005 levels by 2025
- Implement programs and agreement on the Colorado system to allow a full aqueduct in dry years
  - Storage and conjunctive use, surplus when available
  - Dry-year fallowing in Palo Verde Irrigation District

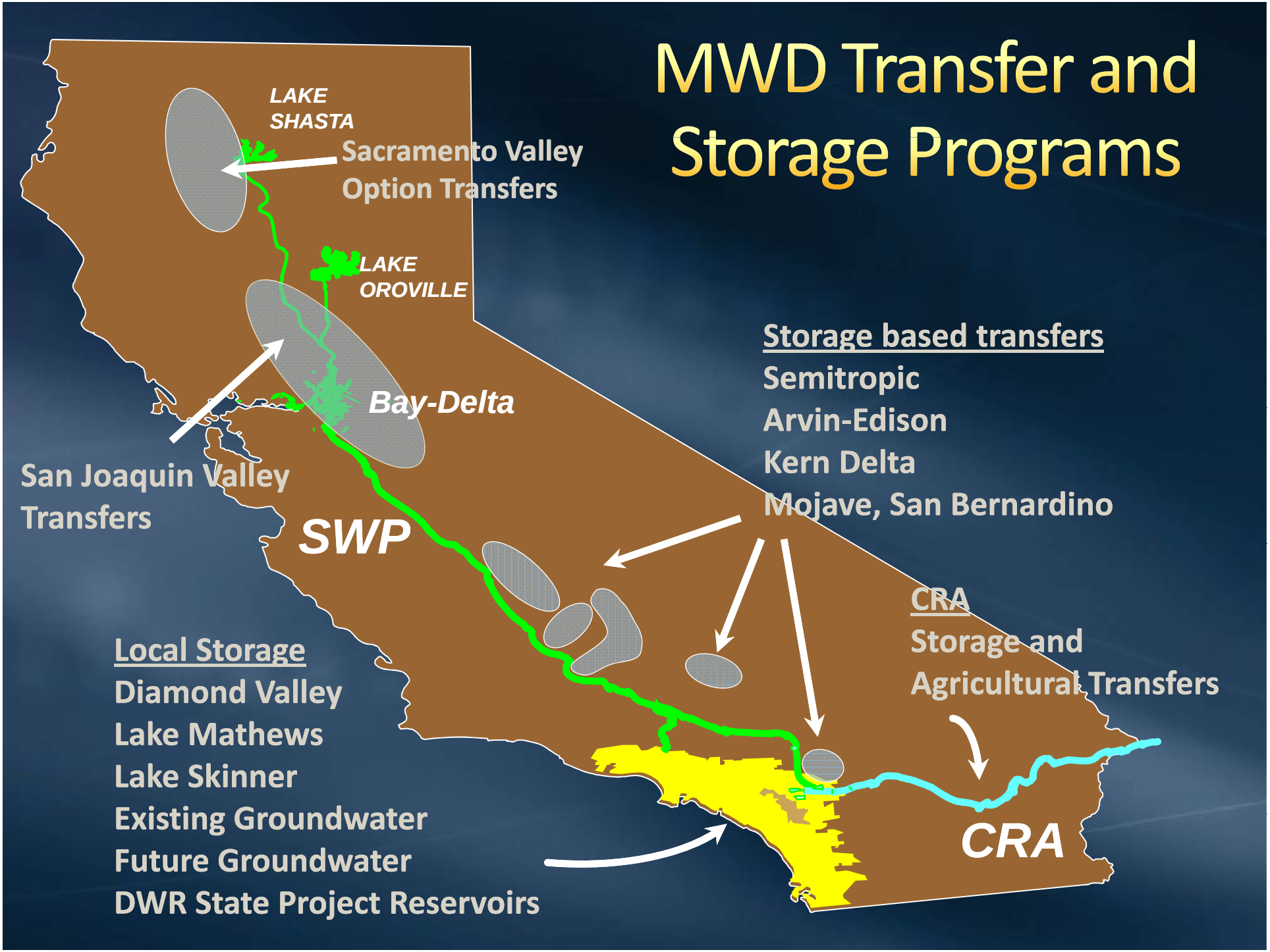
State Water Project

SWP Supply

Total SWP Contract: 4.2 MAF
Historical Range to MWD: .400 – 1.9 MAF

29 State Water Contractors
28 dams
26 pumping & generating plants
660 miles of aqueducts

MWD Transfer and Storage Programs



Colorado River

Lake Mead


CRA Supply
California 4.4 MAF
- Metropolitan .550 MAF
- Water Management > .700 MAF
WY
CO
UT
NV
CA
UPPER BASIN
LAKE POWELL
LEE FERRY
LAKE MEAD
LAKE MOHAVE
LAKE HAVASU
LOWER BASIN
CRA
All-American Canal
AZ
NM
MEXICO

Element 2
Local Resources

IRP Strategies for Local Resources

- Investigate regional partnerships and incentive programs to further local supply development and multi-benefit projects
  - Increase use of recycled water
  - Increase capture of storm water
  - Ocean desalination
- Identify lower-cost planning and feasibility actions to prepare new supply options for long-term risks
  - Foundational actions to improve ability to implement local resources development
  - Evaluation of capability of possible resources

Foundational Actions

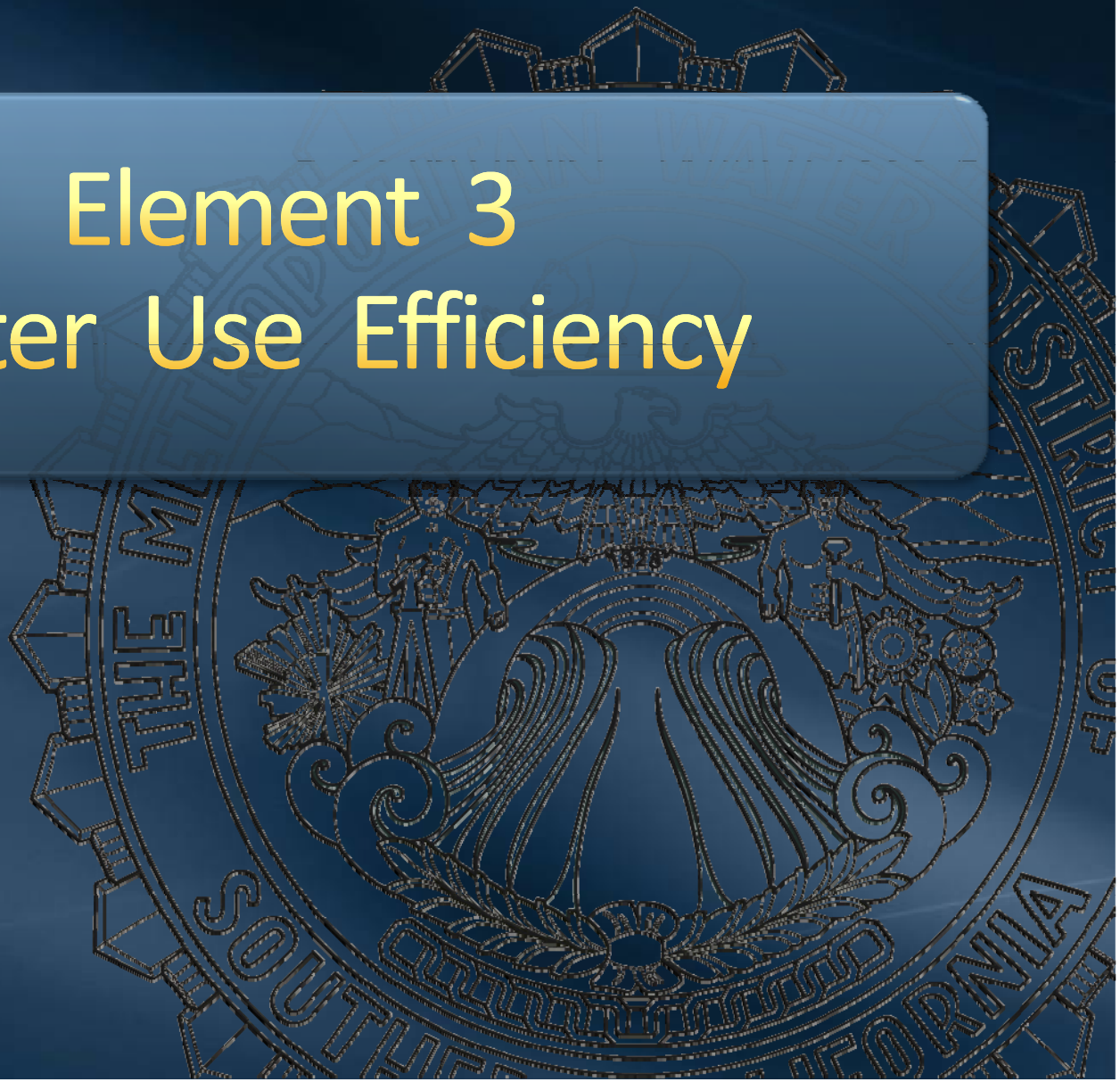
Areas

- Recycled Water
- Stormwater
- Seawater Desalination

Processes

- Operations
- Public Perception
- Legislative
- Regulatory
- Funding
- Science

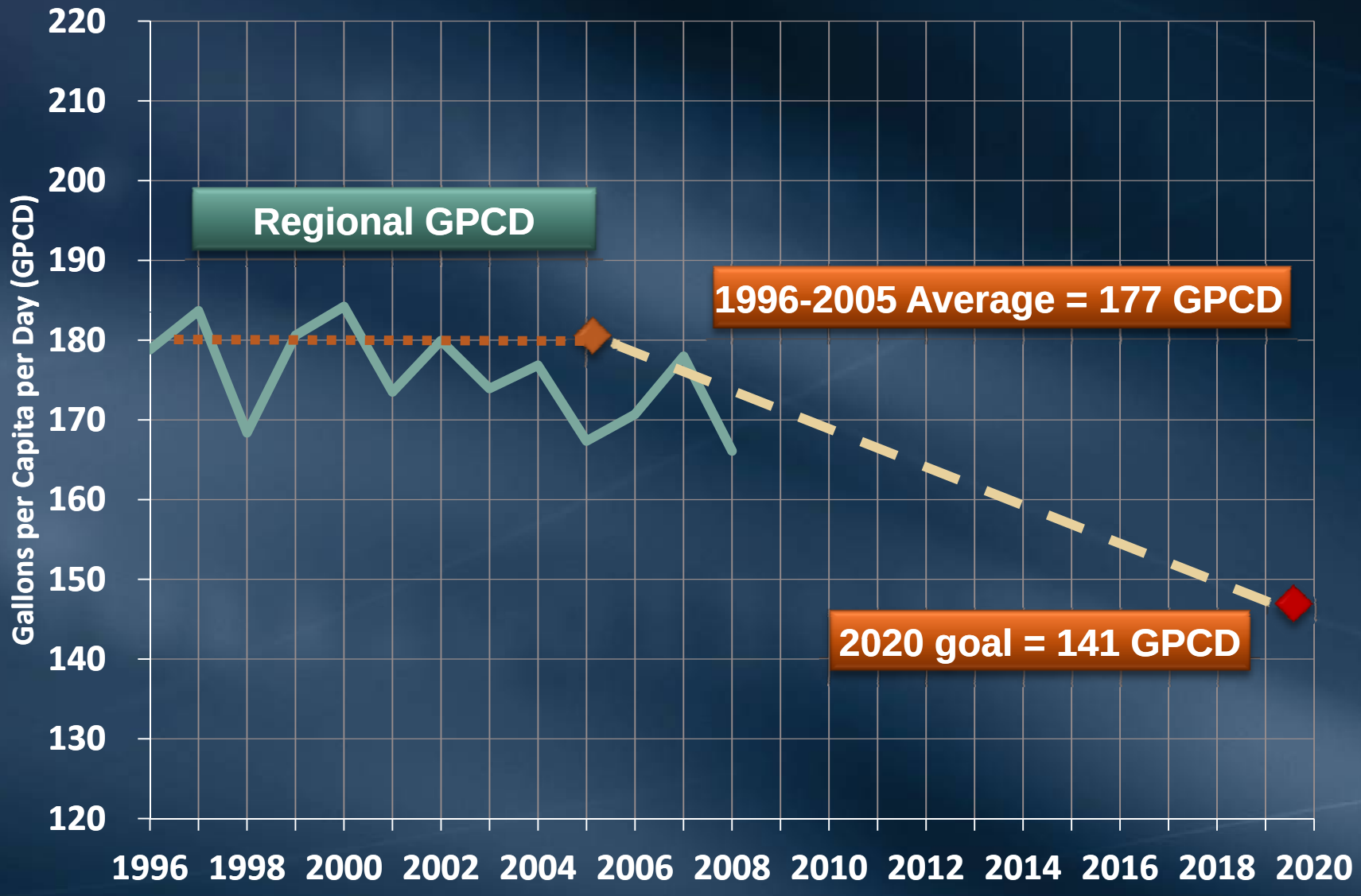
Element 3
Water Use Efficiency



IRP Strategies for Water Use Efficiency

- 20% reduction in regional daily per capita use of potable water through conservation and recycling
  - Early focus on indoor WUE
  - Landscape—California Friendly
  - Commercial and Industrial
  - Innovation

Regional Per Capita Water Use



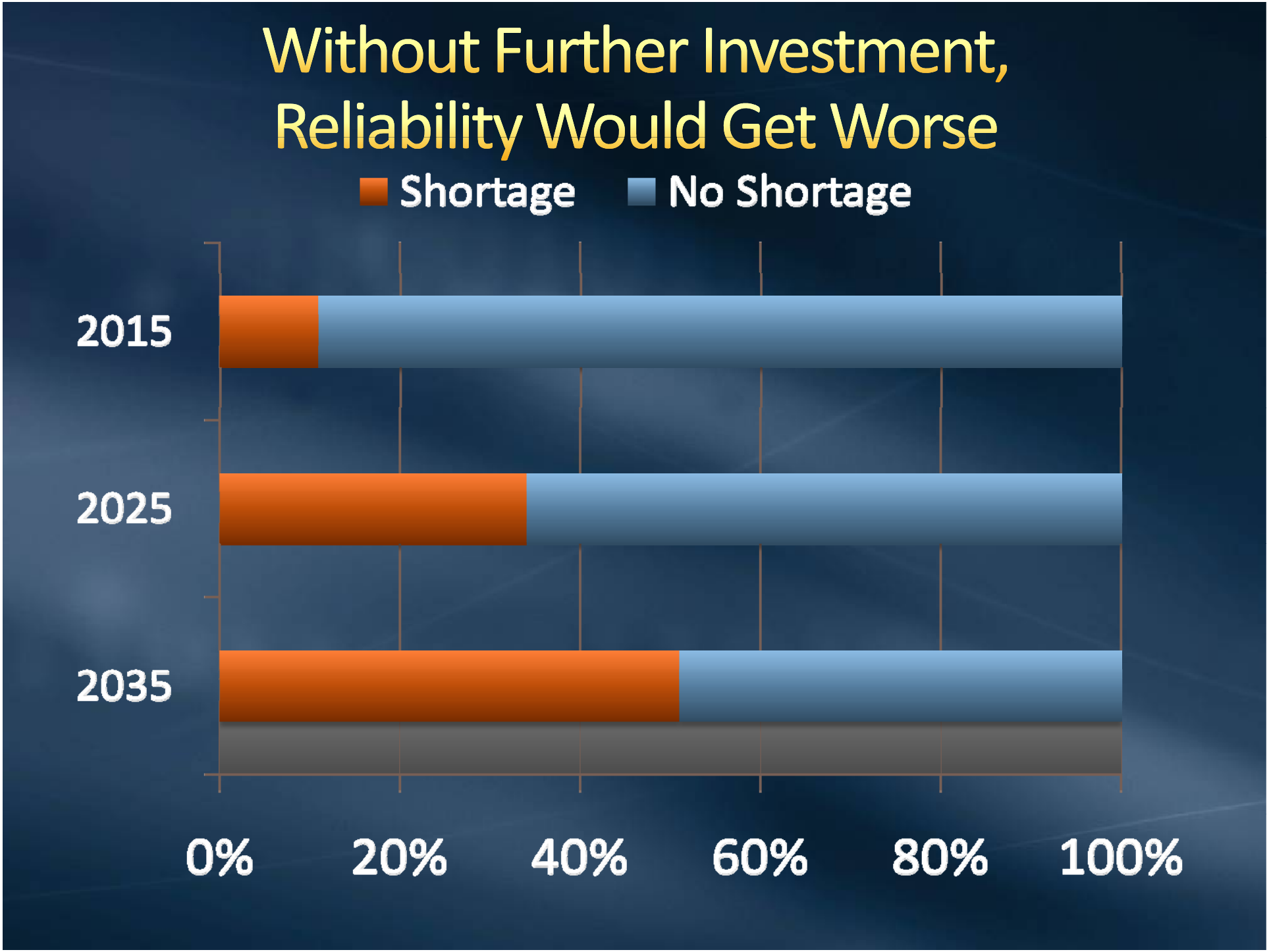
Focus of MWD's Conservation Program is Market Transformation

- Lasting change in market for water-efficient technologies and services
- Changing consumer preferences
  - Public messaging and education
  - Collaboration
  - Technology and incentives
  - Retail water rates
- Advancing water efficiency standards

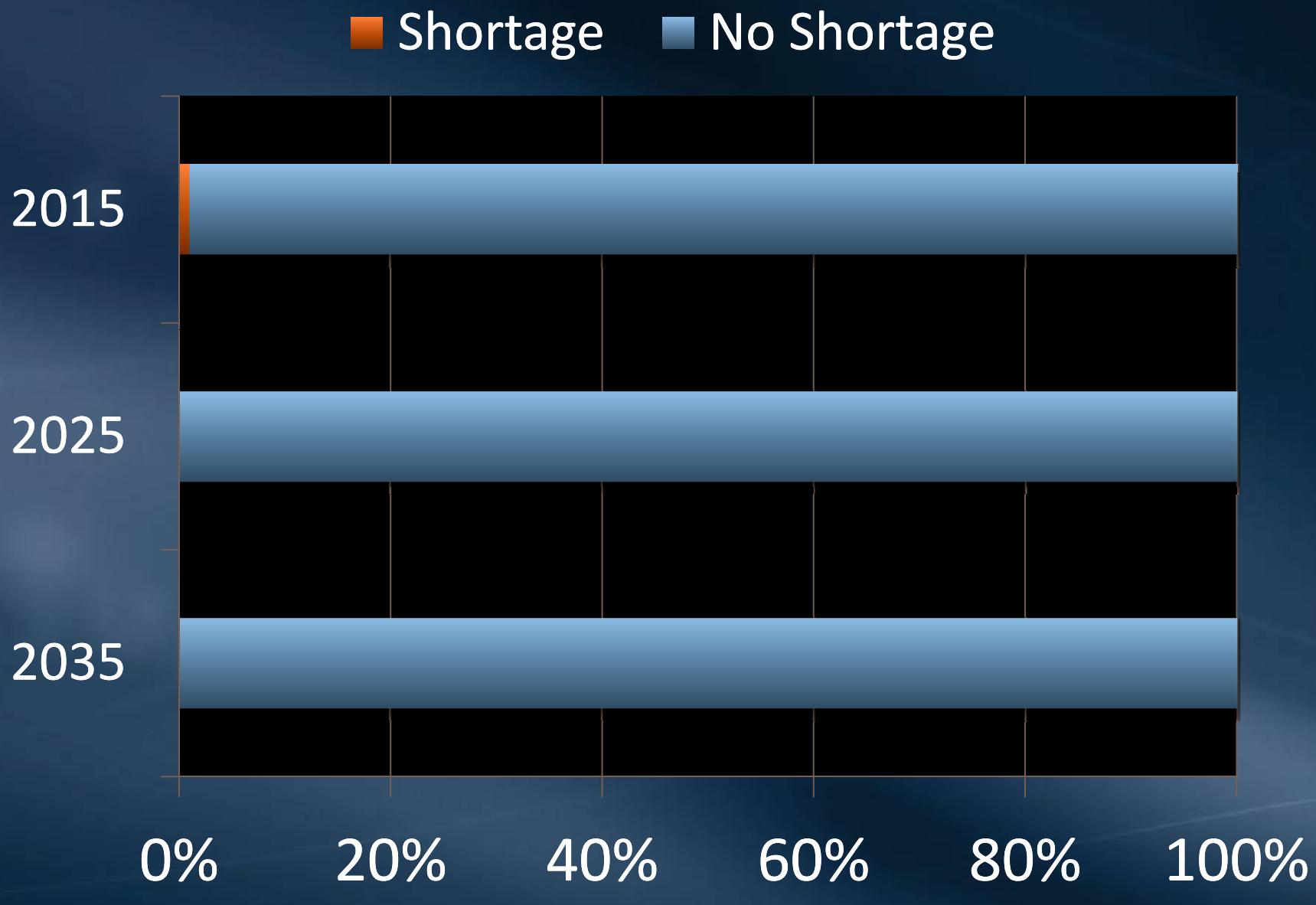
look for WaterSense Meets EPA Criteria

Closing

Without Further Investment, Reliability Would Get Worse



Reliability Improves Under The IRP



Review

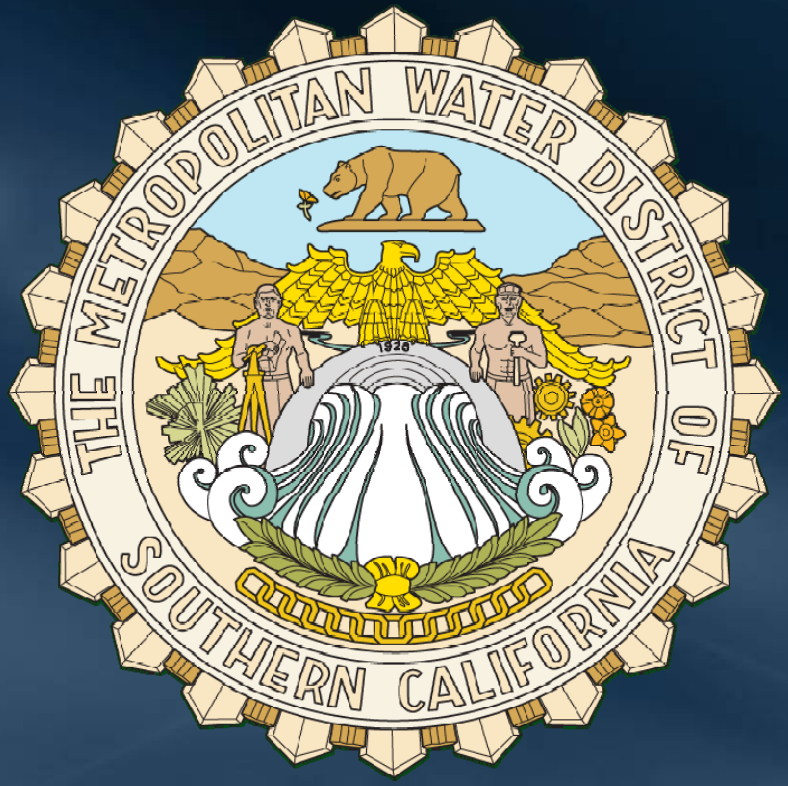
- Total annual retail demand in ranges from 3.6 MAF (2010) to 4.1 MAF (2008)
- Annual GW production is about 1.5 MAF – 37% of retail water use
- On average, GW production is supported 50/50 by active and passive recharge
- Need increased GW recharge using stormwater and recycled water for future reliability
- Over 3 MAF of usable storage space is available for increased conjunctive use if a variety of issues can be resolved

Conclusions

- Groundwater basins are a key resource:
  - Expansion of stormwater capture
  - Indirect potable use of recycled water and reduction of per capita potable water use
  - Contribute to dry-year reliability
- Foundational actions for groundwater include:
  - Evaluation of potential of increased stormwater capture including new methods and tools
  - Evaluation of the potential for increased recycled water recharge and identification of issues—technical, institutional, regulatory
  - Evaluation of climate change effects on runoff, fire, sedimentation, recharge

Climate Change: Questions for Research

- Impacts on Imported Supplies
  - How may agricultural water requirements for a given crop be altered?
  - How may ET by natural vegetation in watersheds change due to warmer temperatures and longer growing seasons? What's effect on runoff?
- Impacts on GW Recharge
  - How will recharge be affected by altered storm patterns?
- Implementing Water Use Efficiency
  - What contributes most to reduced water use: Public education campaigns or water pricing mechanisms (inclining block rates, water budgets)?



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