American Water Works Association
California-Nevada Section

2014 Drought Emergency: Turning Extreme Weather into Our Opportunity

California Drought Outlook Forum
Drought Impacts and Response Panel
February 20, 2014

Lisa Maddaus, P.E.
Maddaus Water Management, Inc.

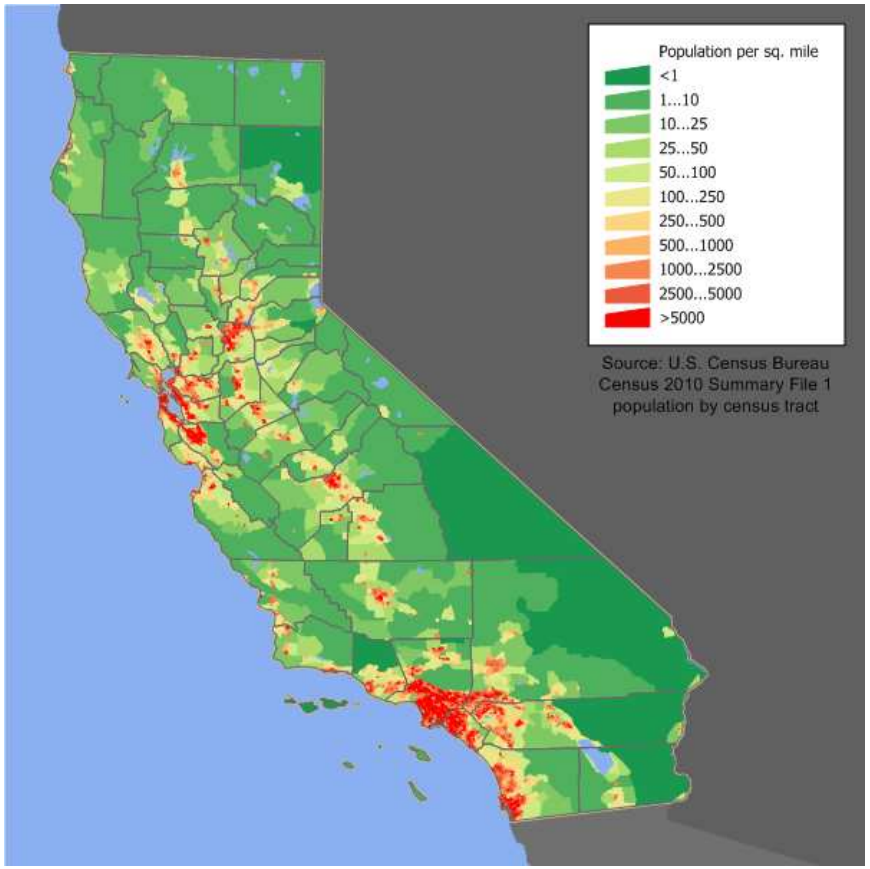
American Water Works Association
California-Nevada Section

Unprecedented Critically Dry Year Impacts

Gov. Brown,
Emergency Drought
Declaration
(Jan 17, 2014)

Gov. Schwarzenegger
Emergency Drought Declarations
(June 2008 & February 2009)

Where are the Impacts?



1976-77: $736B CA Economy

- $11.6B in damages (2014 dollars) (GAO, 1977)
- Population: 23 mil
- Employment: 9.5 mil

Today: $2 Trillion CA Economy

- Population 2013: 38 mil (70% coastal)
- Employment 2012: 16 mil
- Unprecedented conditions 2013-14
- Damages Unknown >$50-100B+?

Our Responsibility

- CA Water Code Chapter 3
- Section 353 – Priority of Uses
  - Human Consumption (domestic, health care)
  - Human Sanitation
  - Fire Protection
  - Next priorities for essential uses
    - Commercial & Agricultural (jobs)
    - Landscape
    - Construction
- CA Water Code Section 10
  - Urban systems with >3,000 AF or 3,000 connections plan for cutback 50% supply
  - Ag systems with >10,000 acres served

Photo credits: Tony Dunn, Joshua Sullivan, and Sac Bee

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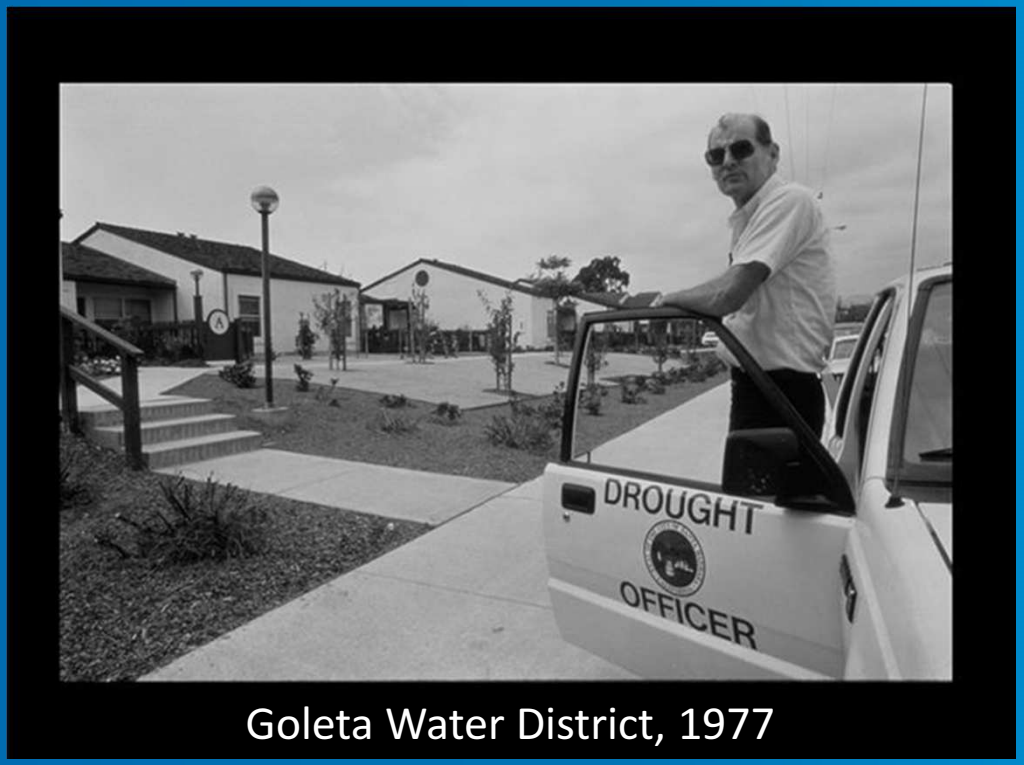
“We’re All In” Response



Goleta Water District, 1977

Utility Emergency Response

Operations:

- Command Centers
- Tracking drought conditions & response
- Water restrictions
- Emergency pumping permits from State
- Infrastructure changes
  - New equipment
  - Leak detection & repair
  - Pressure management

Legal & Political:

- Board Decisions
- Public hearings to invoke adopted Plans & Ordinances

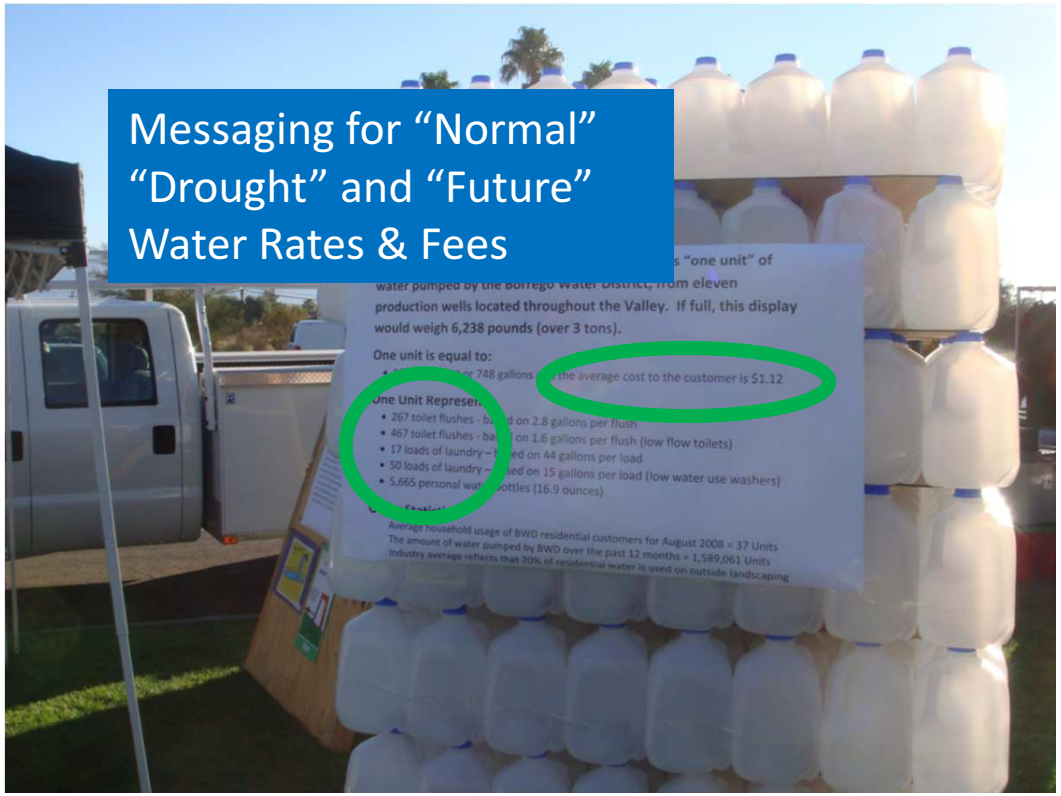
More Response Actions

Customer Education:

- Outreach & media
- Increased customer contacts
  - Water waste patrols
  - Customer surveys
  - Leak assistance
- New rebate incentives

Financial:

- Tracking increased costs
- Implement drought rates



Note: 748 bottles represent "1-unit of water" or cubic foot.
Rate and end water use statistics are outdated from 2008.
Photo courtesy of J Rowling, Borrego Water District

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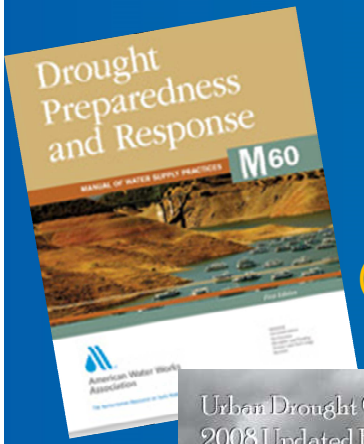
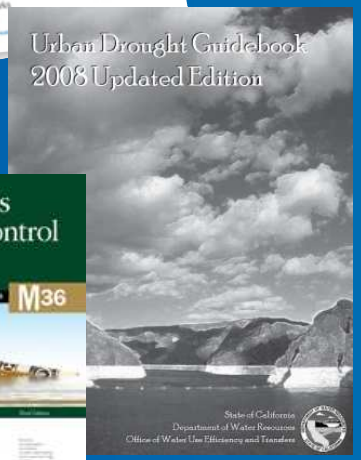
Networking, Peer Resources & Training Opportunities





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www.awwa.org and www.ca-nv-awwa.org

(AWWA Manuals and Water Use Efficiency Practitioner Training)

California Department of Water Resources

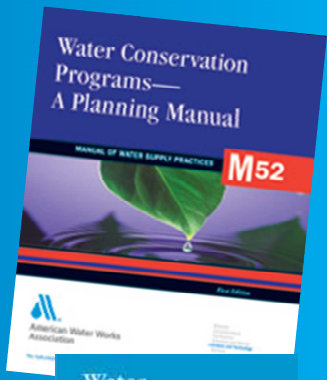
www.water.ca.gov/drought

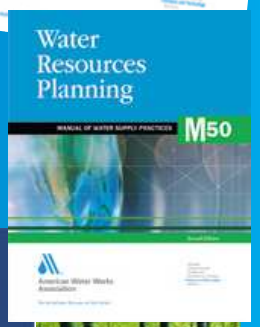
California Urban Water Conservation Council

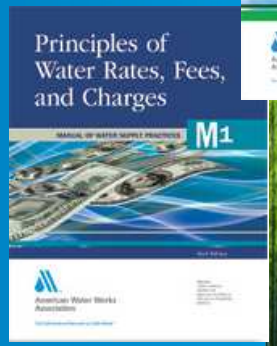
www.cuwcc.org

California Farm Bureau Federation

www.cfbf.com







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What are our opportunities going forward? Mid-term? Long-term?

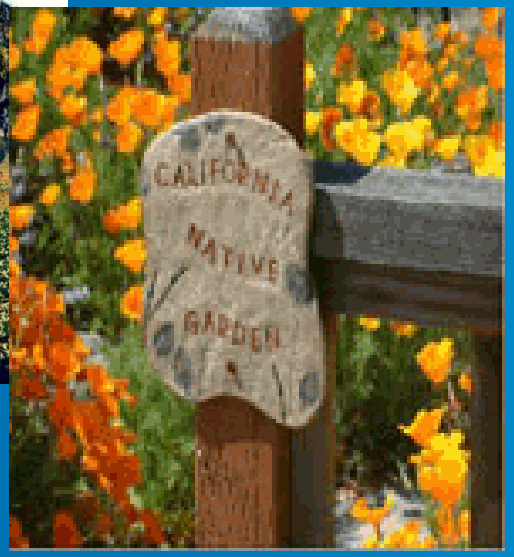
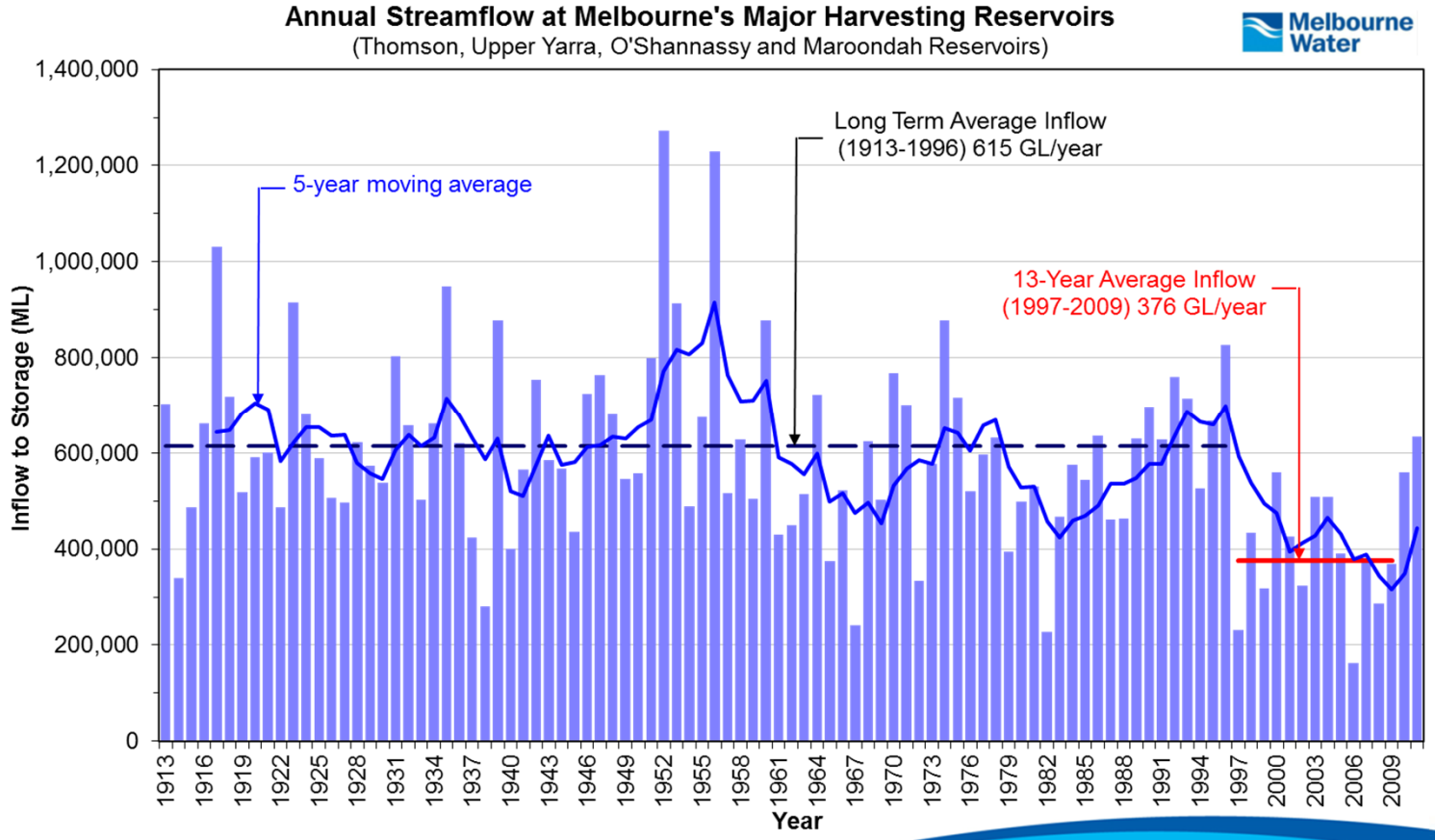


Photo source: Bay Area Water Conservation and Supply Agency

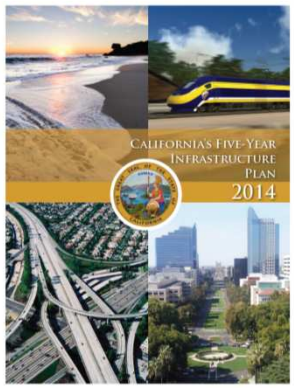
Will it get worse?
Resetting Our Baseline



Source: B. Rhodes, Melbourne Water, 2013

What is our Shared Vision for Extreme Climate Preparedness?

1. Reassess water balance scenarios for our Drought Models
2. Prepare Water Reliability & Shortage Contingency Plans for 2015 Urban & Agricultural Water Management Plans:
   - Local, regional, state/federal level plans
     - Drought Indicators and Triggers
     - Staged Actions for Demand Response
     - Supply-sides Options
3. Reinvest to have more climate resilient communities? Long term strategy like FloodSAFE? DroughtSAFE?



What do we need to accomplish to be more climate resilient to serve 50 million Californians by 2030?

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Connect with us to Continue our Dialogue…

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http://www.ca-nv-awwa.org

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Supplemental Information

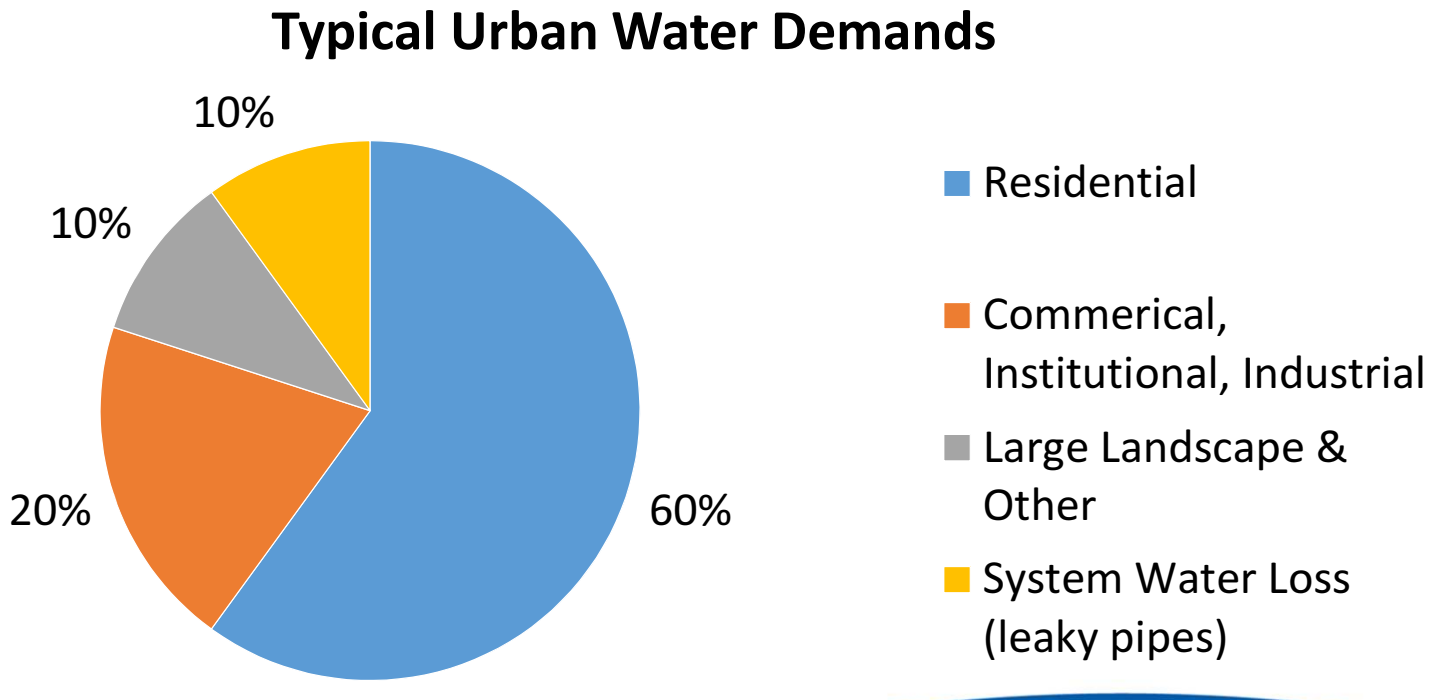
(Slides not presented on 2/20/2014)

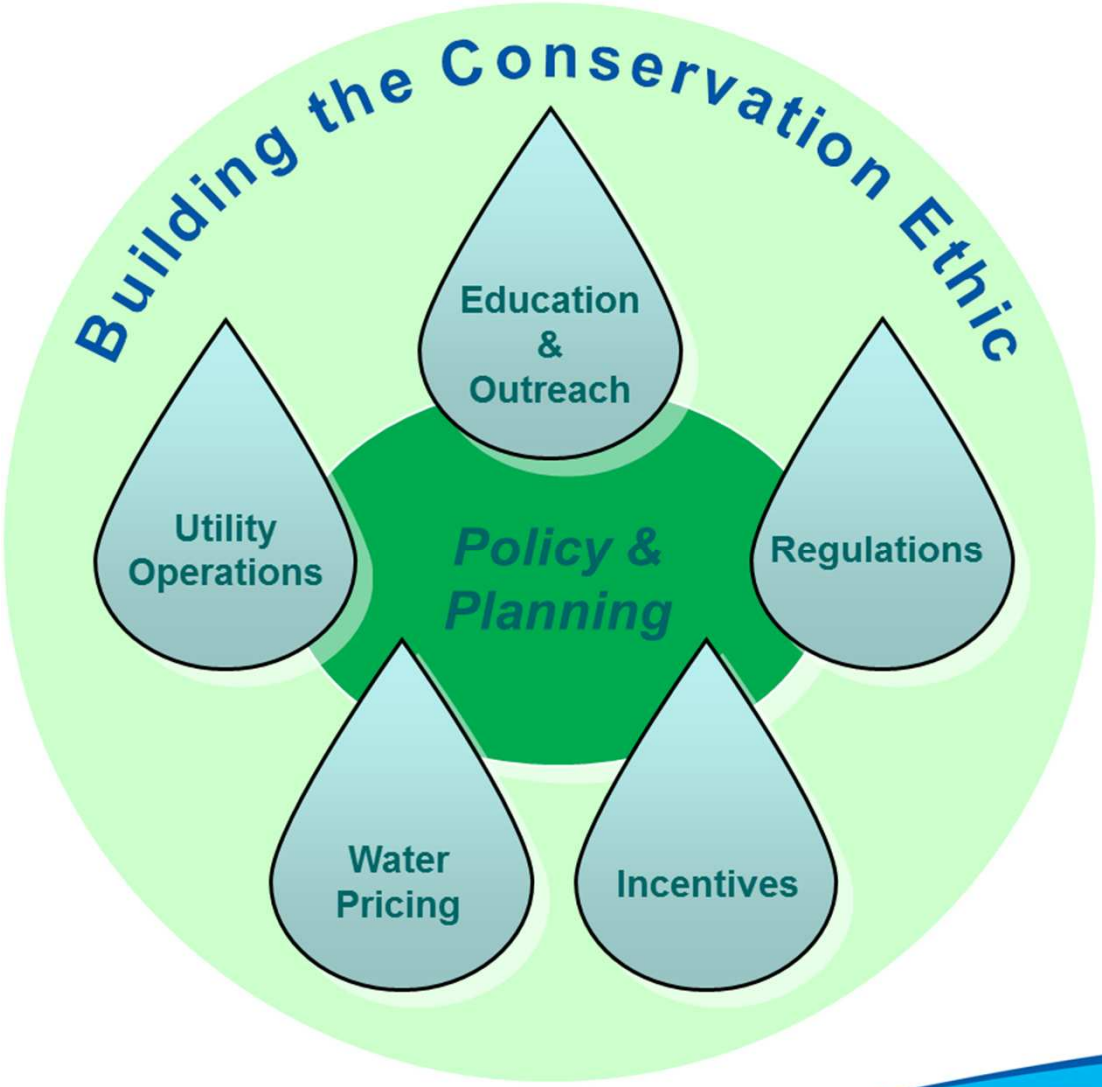
Impacts on Our Local Communities

More Opportunities for Recovery

- Reinvesting in more efficient equipment and practices:
  - Farms
  - Homes
  - Business Community
- Necessary changes in management and infrastructure of our water systems to support:
  - Ecosystems
  - Water supply
  - Water quality
  - Flood protection
  - Recreation

Where will the impacts & opportunities be in our Urban Communities in 2014?





5 key elements of long term water use efficiency strategies need to shift in times of drought shortage

Key Element 1: Utility Operations

Alternative Sources/Treatment:

- Bring online drought supplies
- Recycle/recirculate (i.e. NO-DES system)

Real Losses:

- More detection & repair due to increase break frequencies
- Pressure Management
- AMR/AMI to find customer side leaks

Monitoring Trends:

- Monitor production rates (dry year increase vs. customer conservation)
- Using metered billing data to track drought
- Track budget increases

2. More Education & Awareness to Eliminate Wasteful Use

- More direct messages
- More striking visuals
- Non-traditional locations
- Long term investment in outreach

Save Our WATER

Photo Source:
Regional Water Authority
www.bewatersmart.info

3. Enforce Regulations

- Already have regulations:
  - Drought Ordinances & Resolutions
    - Staged Actions
    - Drought Rates
  - Water Waste Ordinances
    - No gutter flooding
    - No lack of recirculation
    - Specific Watering Days
- Added vigilance
  - Customer hotline
  - Patrols
- Increased fines

4. Residential Indoor

Conscience Behaviors:

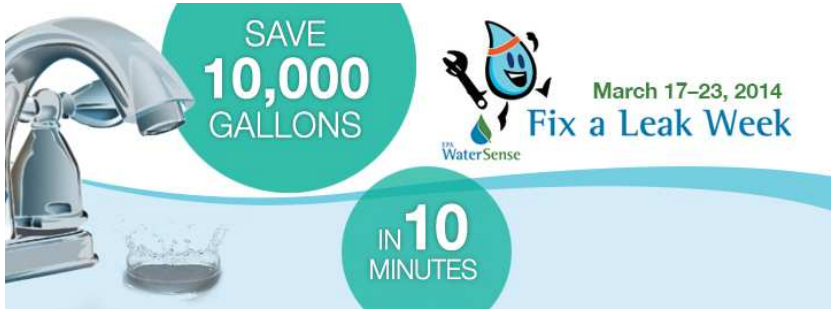
- Repair leaks (AMI leak notices)
- Shut off water
- Shorter showers
- Full loads, etc.
- Graywater

Upgrade Equipment:

- Showerheads
  - 2.5 gpm > 1.8 gpm
- Faucets
  - 2.2 gpm > 1.5 gpm
- Clothes Washers
  - Water Factor 11 > 4.5
  - 44 gpl > 15 gpl
- Toilets
  - 3.5 gpf > 1.28 gpf

Look for the WaterSense Label:

EPA WaterSense



gpm = gallons per minute
gpf = gallons per flush
gpl = gallons per load

4. Residential Outdoor & Large Landscapes

- Cutting back irrigation schedules
- Drought tolerant plants
- Irrigation equipment upgrades
- Cash for Grass
- New “weather-based” controllers on drought settings

4. Commercial, Institutional, Industrial

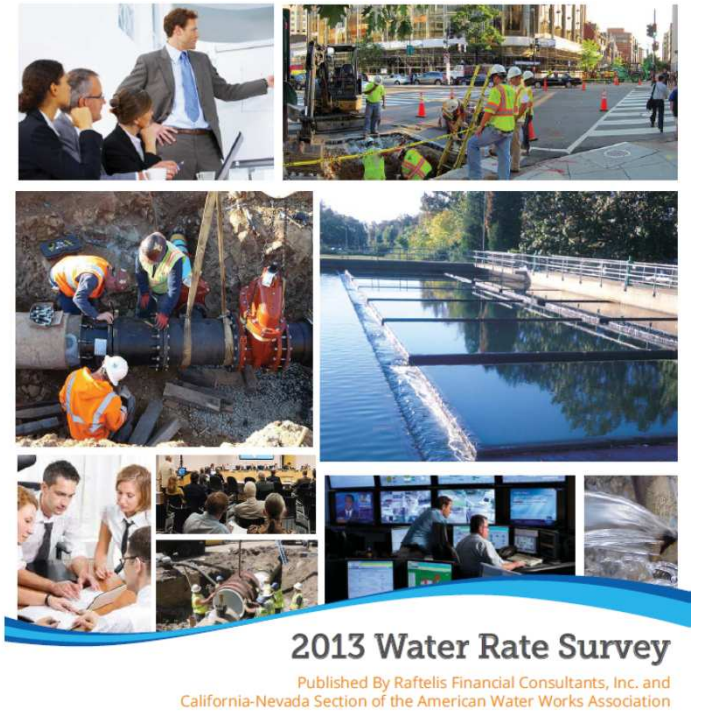
- Helping businesses, schools, hospitals & health care
- Leak repair & eliminate waste
- Signage for employees, customers, tourists
- Upgrade fixtures:
  - Pre-rinse valves
  - Toilets (High Efficiency)
  - Urinals (1-pint)

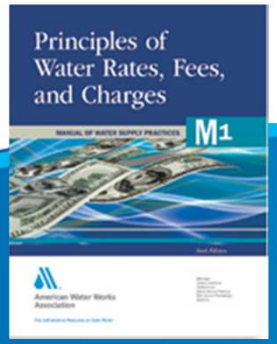
Water Smart Guidebook

http://www.ebmud.com/for-customers/conservation-rebates-and-services/commercial/watersmart-guidebook

5. Water Pricing

- Set-up billing systems for implementation of drought rates
- Include drought rates in every Prop 218 notice (avoid delays for adopting new rates)
- Compare to other community rate structures (2013 Survey)
- Build in future infrastructure costs to address drought risk





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Urban Water Use Efficiency & Case Studies

- **Most Recent Guide from International Water Association**
  - Price: £ 85.00 / US$ 153.00 / €114.75
  - IWA members price: £ 63.75 / US$ 114.75 / € 86.06

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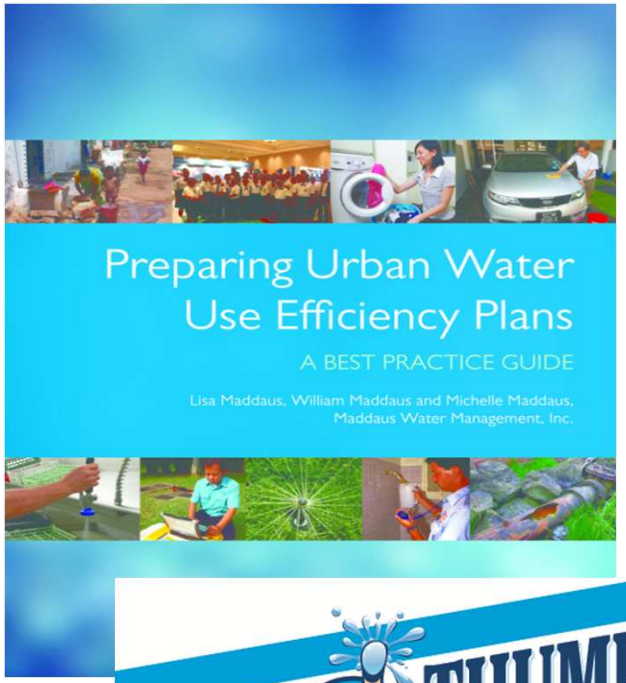
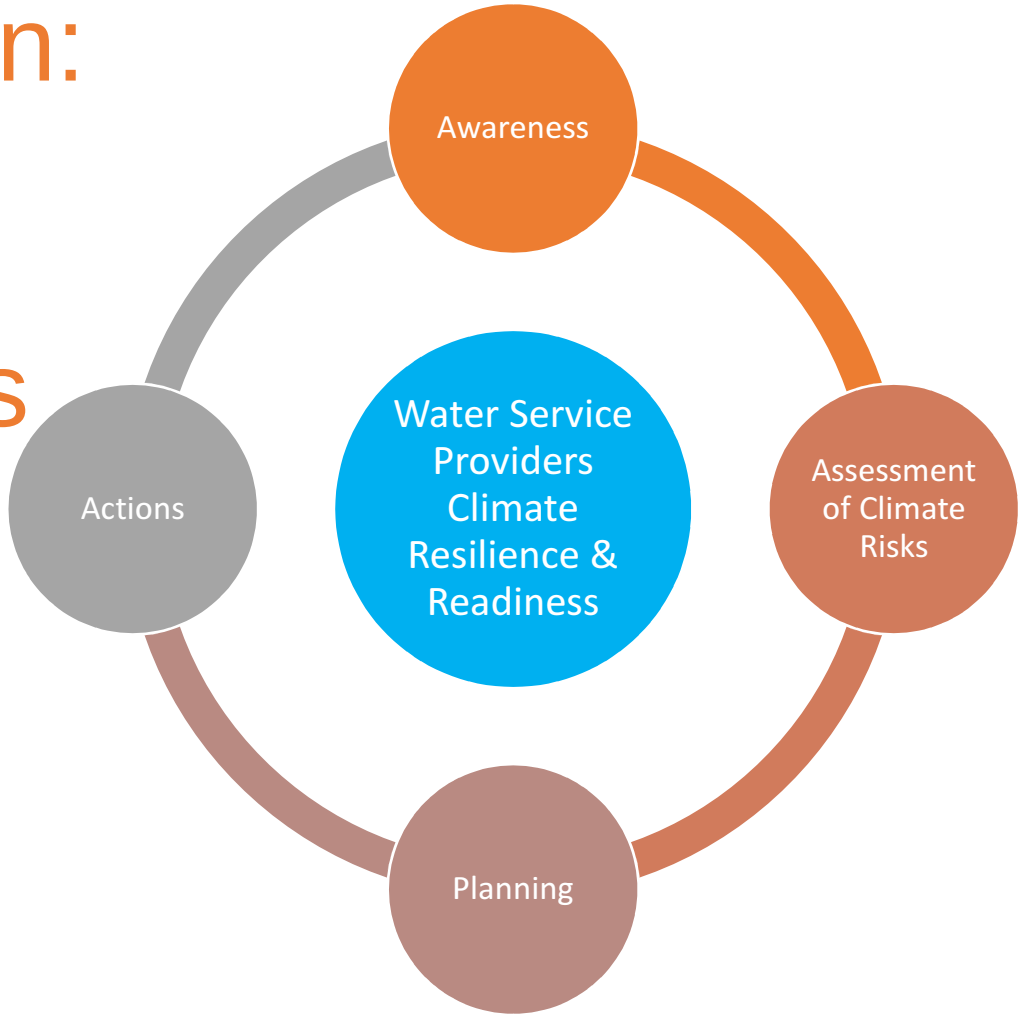


BLUE THUMB
BeWaterSmart.info
® AWWA

25 Case Studies like the Regional Water Authority WUE Program in Sacramento, CA

Be WATER SMART
Regional Water Authority

Global Solution: Formal Networking Relationships



Source: WaterLinks, 2013. http://www.waterlinks.org/climate-change-initiative

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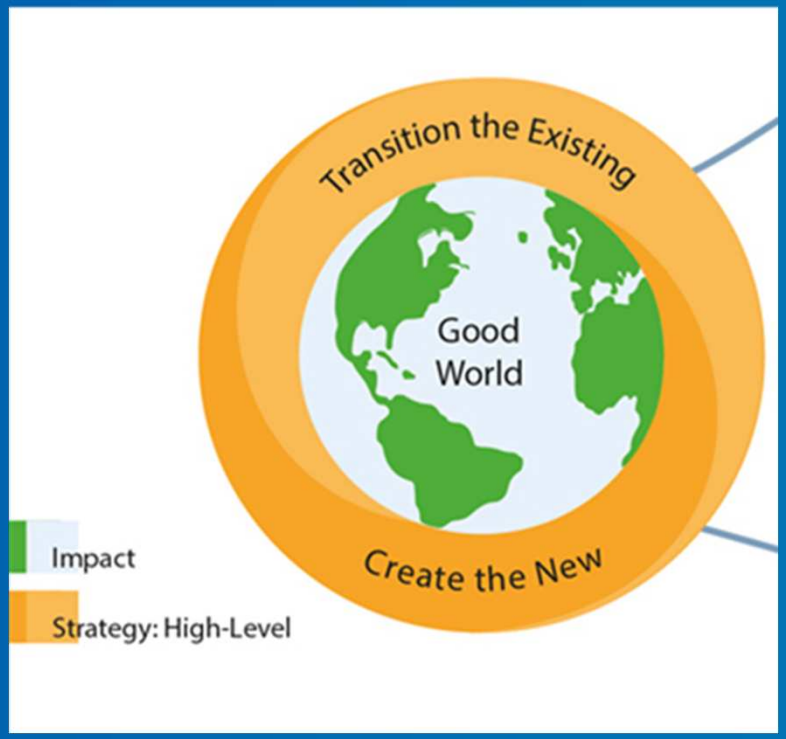
The Natural Step: Theory of Change



Continuously update our policies, regulations and plans to lower our drought risk

One Example:
California Plumbing Code helps to transition the existing fixtures replacements with higher efficiency models

CalGreen Building Code (build all residential and commercial structures with more efficient fixtures and equipment)

Source: http://www.naturalstep.org/en/theory-of-change

One Example Drought Model Graph:

No ability to pump by water rights permit into off-stream reservoirs under extreme conditions. Installing new well(s) via a Prop 84 grant.

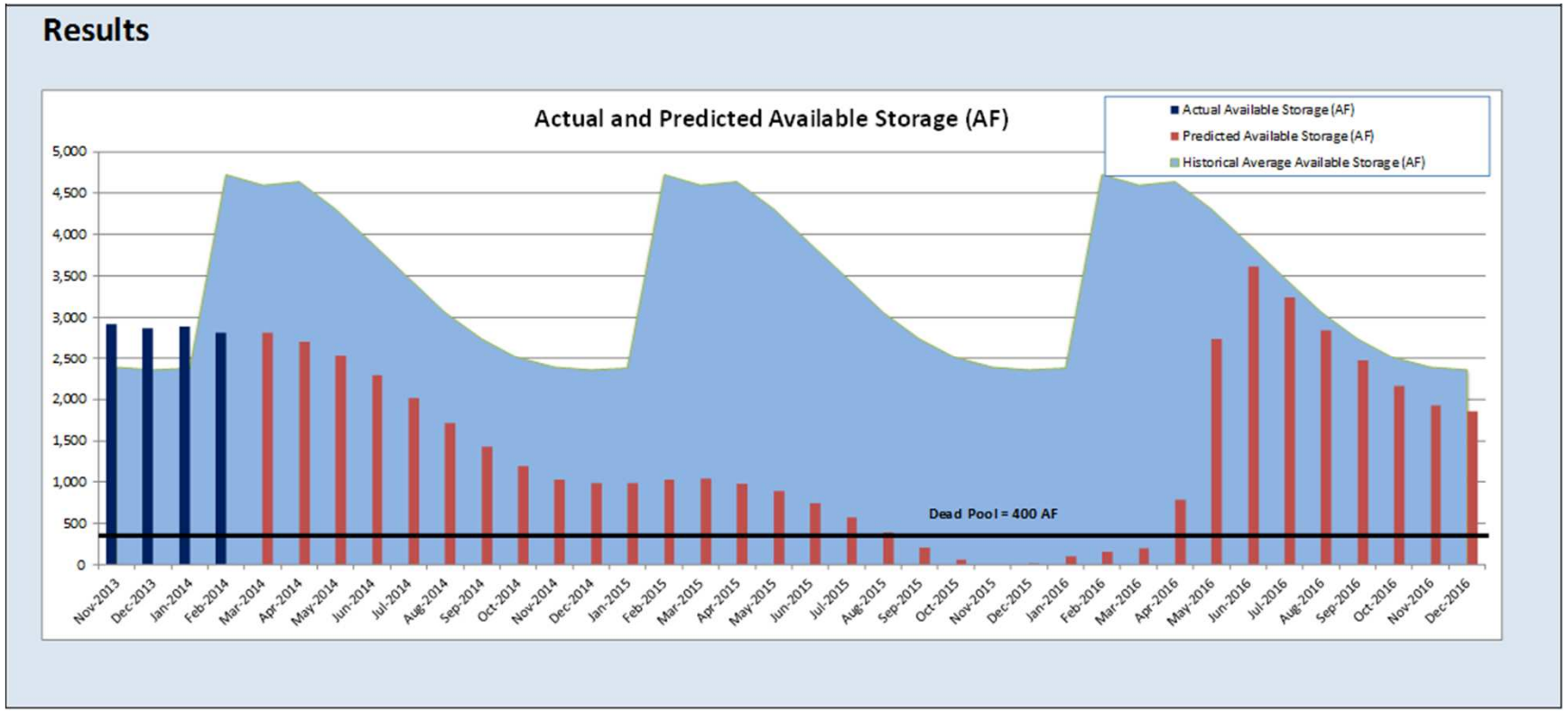


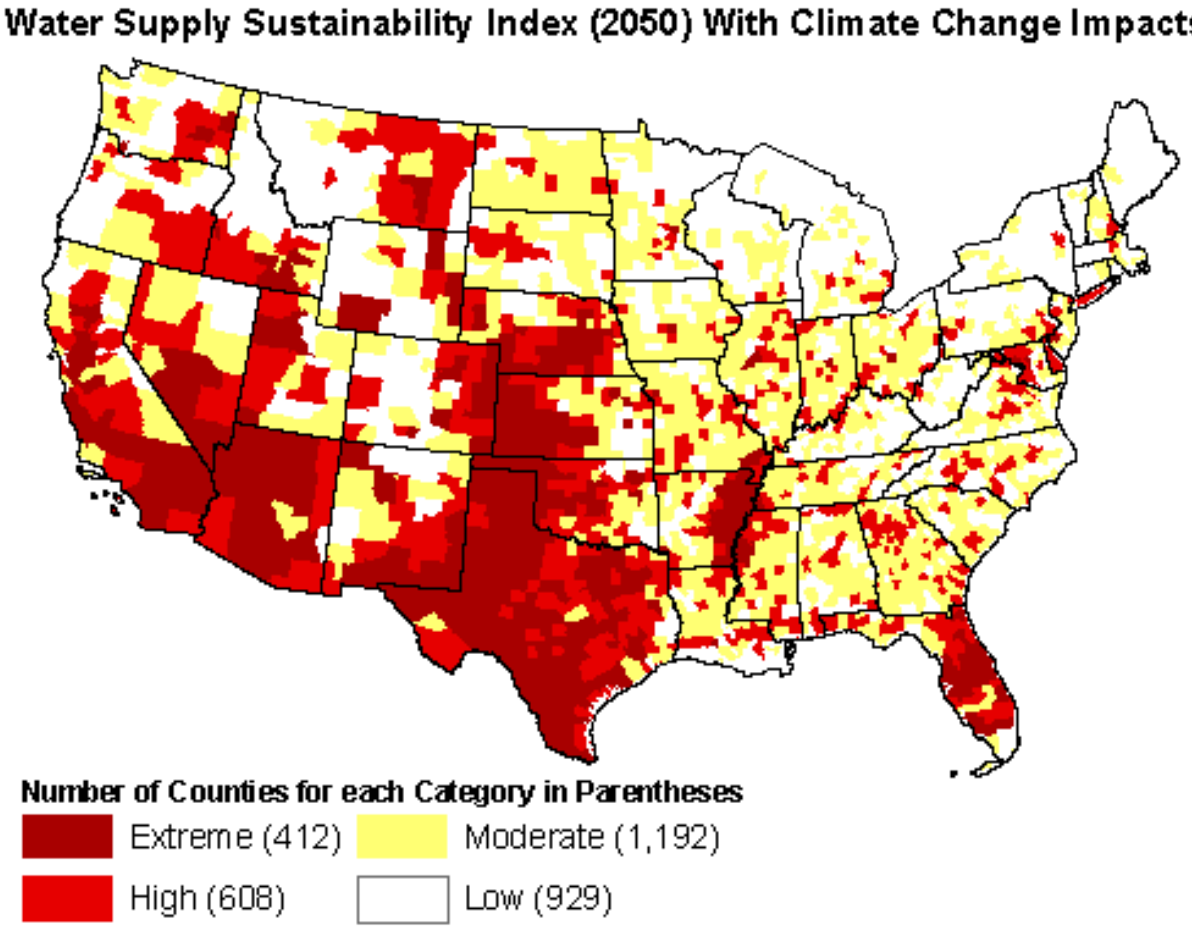
Illustration of drought scenario with current demands, 1977, 1977, 1978 hydrology (without climate shift).

Engaging Community Business Leaders

"There is only one institution on earth large enough, powerful enough, pervasive enough, and influential enough to really lead humankind in a different direction. And that is the institution of business and industry."

- Paul Hawken (author, The Ecology of Commerce)

As water leaders seek to lower our drought risk, we are assisting business leaders with managing their risk. Where is the value in more collaboration?



Our quality of life and economy thrive on the reliability of our water supplies

Source:
http://www.nrdc.org/globalWarming/watersustainability/index.asp

2013 Water Smart Innovations Keynote Presentation
by Kim Marrota, Director of Sustainability, MillerCoors
http://www.youtube.com/watch?v=YlWjcVt3mU8

http://www.watersmartinnovations.com/PDFs/2013/keynote/Kim%20Marotta%20Keynote%20WSI%202013.pdf