

# A Water Reuse Policy Perspective

---

**Presented at:**  
**Saudi Arabia MoWE/NWC**  
**Water Reuse Summit**  
**Riyadh, Kingdom of Saudi Arabia**  
**April 5-6, 2011**

**Presented by:**  
**Wade Miller**  
**Executive Director**  
**WaterReuse Association and Foundation**  
**Alexandria, VA, USA**

# Topics

---

- The WateReuse Association – Mission, Strategic Initiatives, Geographic Reach
- Water Scarcity: The New Paradigm
- Global Water Reuse Trends
- How California, Florida, and Australia are Dealing with Water Scarcity
- Conclusions
- Potential Areas of Collaboration with Saudi Arabia

# WateReuse Association

## *A Trade Association*

---

### **Four Strategic Initiatives**

- Advocacy (Lobbying) -- National & State
  - Obtain Funding for Local Projects
  - Obtain Funding for Research
  - Influence National Water Policy
- Research (through WateReuse Research Foundation)
- Education & Outreach (Publications, Conferences)
- Membership (>400 Organizational Members)
  - U.S.
  - Australia
  - Canada
  - Europe (Spain and Belgium)
  - Mexico
  - India

# Mission

---

*To advance the beneficial and efficient uses of high-quality, locally produced, sustainable water sources for the betterment of society and the environment through advocacy, education and outreach, research, and membership.*

# Membership

---

- Evolution from State to National to International Association
- Organizational Membership Totals More than 400
- ~180 Water Agency Members
- Virtually all Major Consulting Engineering Firms (e.g., CH2M Hill, Black & Veatch)
- Many Major Equipment Suppliers (e.g., GE Water, Siemens, Acciona Agua, Veolia)
- Membership Growing at Approximately 10%/Year

Sustainable Solutions  
...for a Thirsty Planet.



[www.athirstyplanet.com](http://www.athirstyplanet.com)

Disinfection  
Removal of pathogens, emerging contaminants

Environmental impacts  
RO reduces energy costs, nutrient discharges

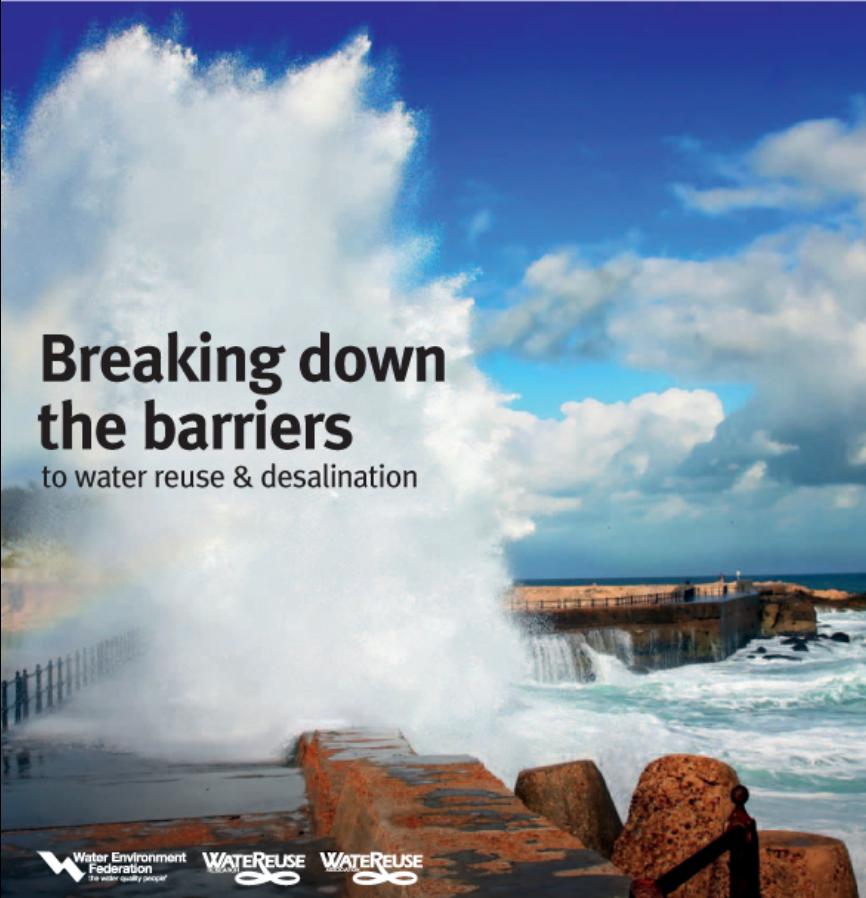
Public acceptance  
Education and technology transparency

Water recycling  
GE reclaims coal mine water

worldwater

# water reuse & desalination™

Volume 1 / Issue 1  
Autumn 2010



**Breaking down  
the barriers**  
to water reuse & desalination

Water Environment Federation **WATER REUSE** **WATER REUSE**



# WateReuse Australia

---

- First International Division of WateReuse
- Formed through an MOU with WSAA
- Focus is on Shared Experiences, Technology Transfer
- WateReuse will Convene Specialty Conference in Australia Every Three Years
- Currently, 8 Utilities/5 Engineering Firms are Members
  - Sydney Water
  - Melbourne Water
  - Barwon Water
  - ACTEW Corporation
  - South East Water
  - Water Corporation of Western Australia
  - WaterSecure
  - MidCoast Water

GHD

Black & Veatch

CH2M Hill

Nestis Consulting

IBL, Inc.

# Water Reuse & Desalination

CONFERENCE  
REGISTRATION

WATER SCARCITY SOLUTIONS FOR THE 21ST CENTURY



Dockside Conference Centre  
Darling Harbour  
Sydney Australia  
NOVEMBER 15-17, 2010



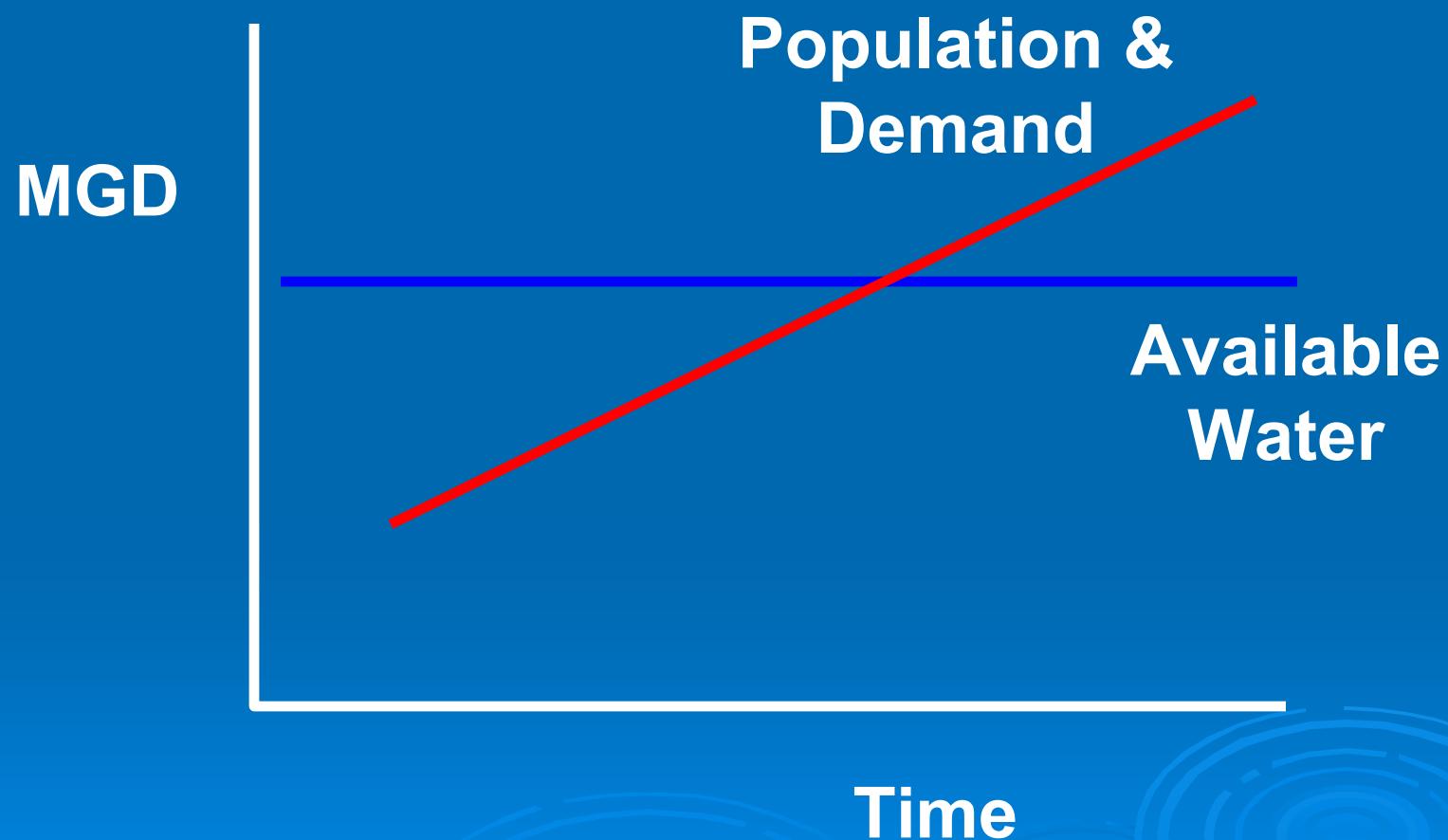
---

# *Water Scarcity – A New Global Paradigm*

Abstract water droplets and ripples are depicted in the bottom right corner of the slide, rendered in a light blue color that matches the background.

# Supply & Demand

---

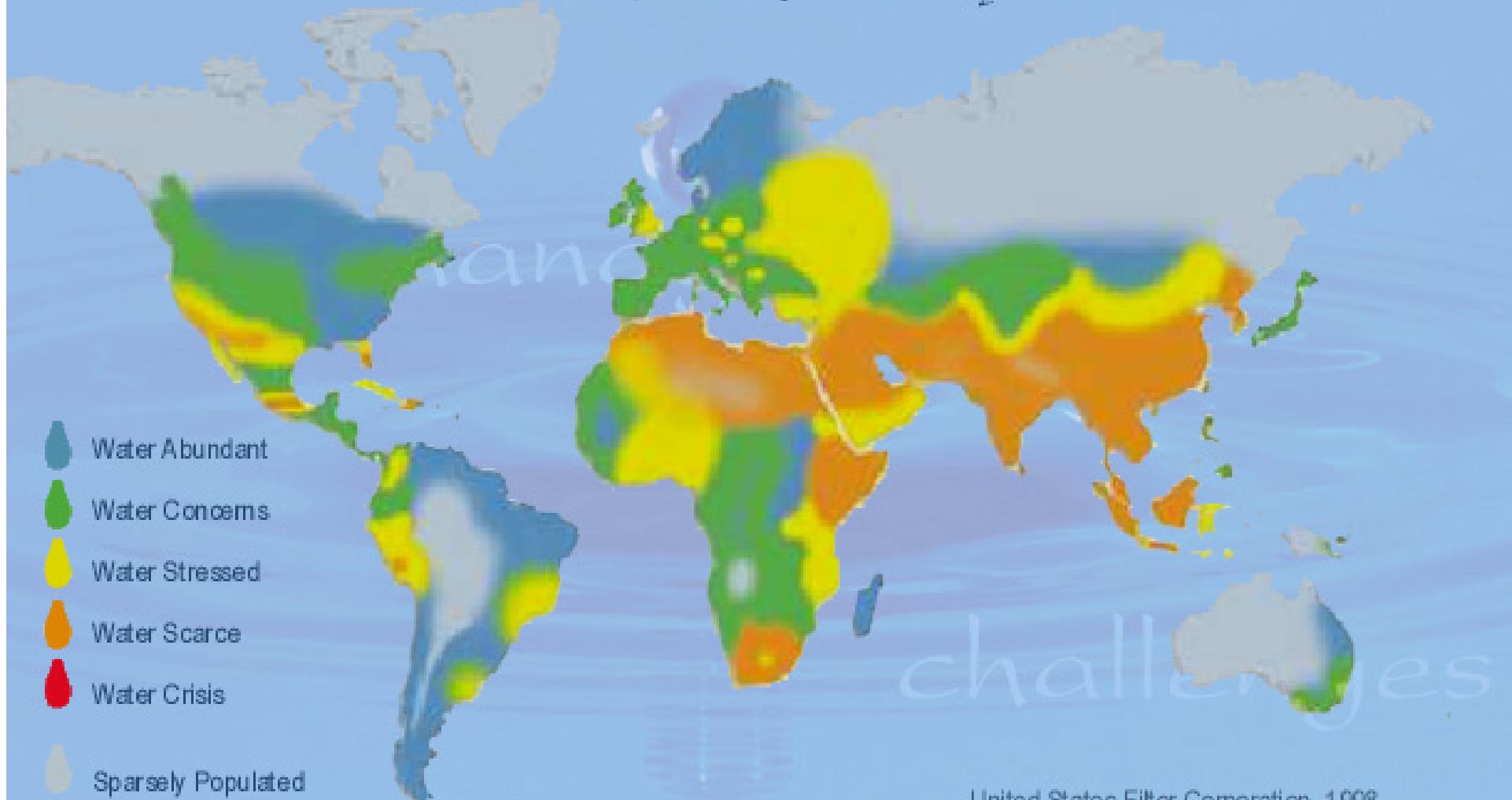


# Most of World's Water is in the Ocean!

- 97.2 % - Saline Water
- 2.1 % - Ice Caps & Glaciers
- 0.6 % - Groundwater
- 0.1 % - Surface Water & Moisture

# Areas of Water Stress in 2020

Worldwide Fresh Water Availability in 2020



United States Filter Corporation, 1998

---

# *Water Reuse – An Overview*

A decorative graphic in the bottom right corner of the slide. It features several stylized, concentric circles of varying sizes, resembling ripples on water or the rings of a water droplet. The circles are rendered in a light blue color, matching the background of the slide.

# All Water is Reused!



# Some Basic Facts

---

- All Water is Reused
- There is Substantial Unplanned Reuse (e.g., the Mississippi River, Thames, Rhine, Seine, etc.)
- Water is a Manufactured Product
- “Purity” of Water Should be Matched to its Intended Use
- History of Water is of Little Importance
- In Planned Water Reuse, we Emulate “Mother Nature” – With Technology, can do it better and faster
- Water reuse is “green” and “eco-friendly”

# Factors Driving Water Reuse (and Desalination)

---

- Drought
- Population growth
- Increased municipal, industrial, and agricultural demand
- Dependence on single source of supply
- TMDLs/Nutrient load caps



“Water scarcity”

# Issues in Water Reuse

---

- Public Perception/Acceptance
- Chemical Risks
- Poor Differentiation by Public and Politicians of Planned vs. Unplanned Reuse
- The Media
- Lack of Political Support
- More Cost-Effective Technologies
- Funding
- Better Understanding of Economics
- Energy/Water Nexus
- Climate Change

---

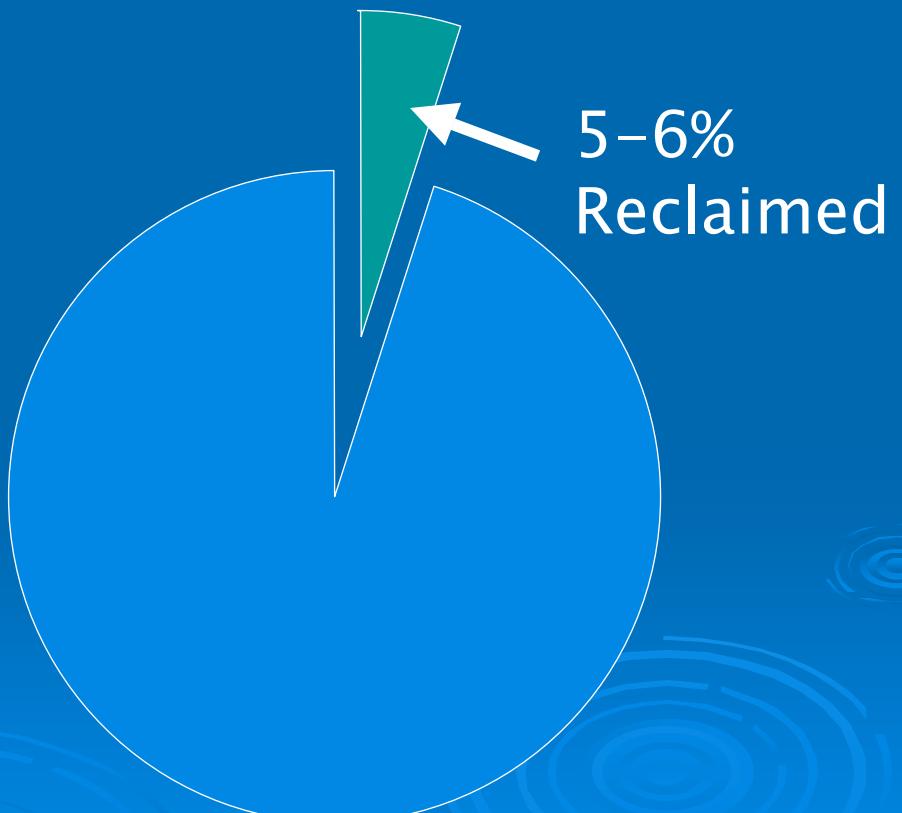
# *Global Water Reuse Trends*



# Potential for Water Reuse

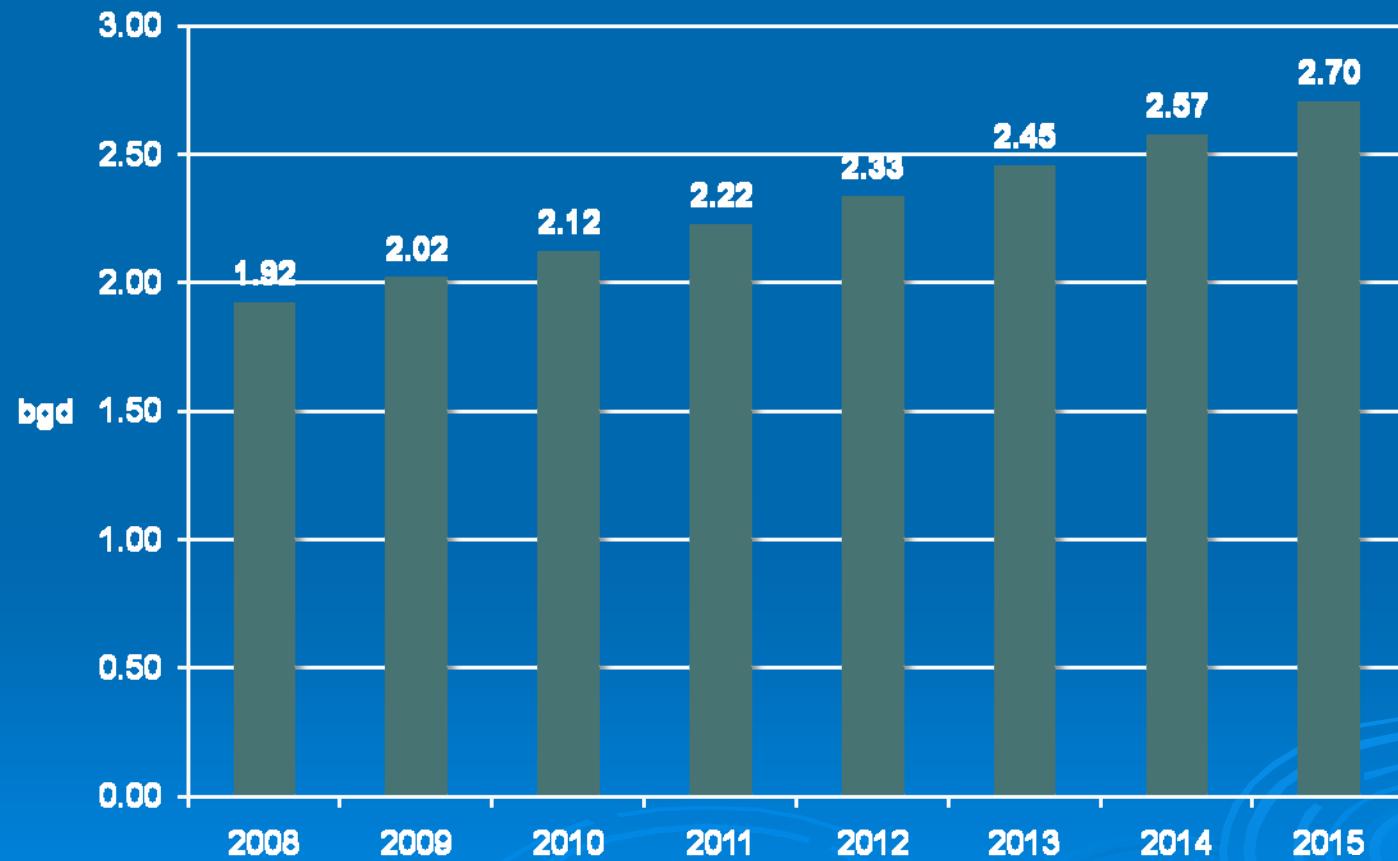
- About 5-6% of municipal wastewater effluent in the U.S. is reclaimed and beneficially reused
- Israel reuses more than 70%
- Singapore reuses 30%, up from 15% in recent years
- Australia, now at 8%, has a national goal of 30% by 2015

About 34.9 bgd Municipal Effluent in the U.S.



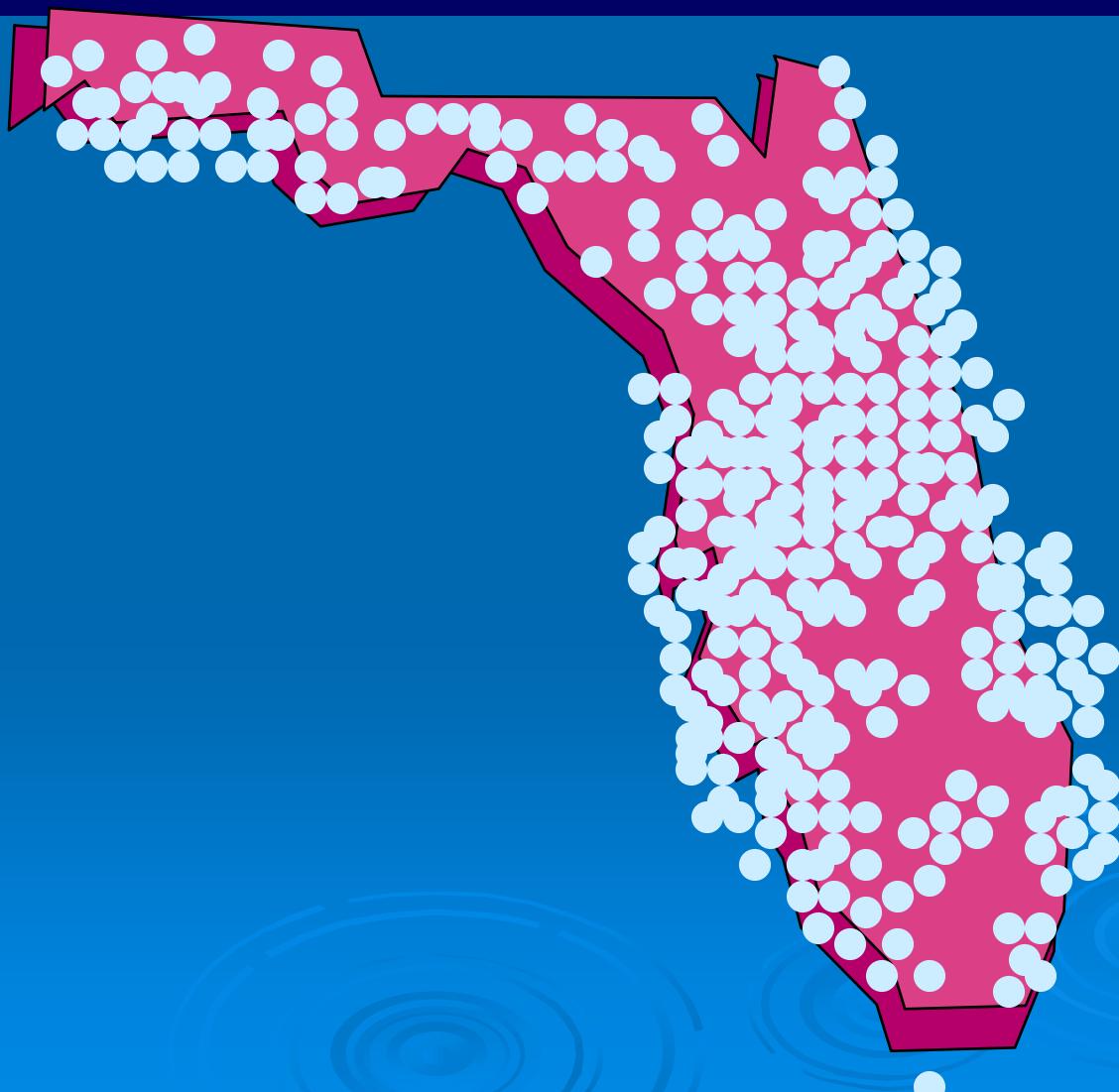
# Projection of Water Reuse levels through 2015

---



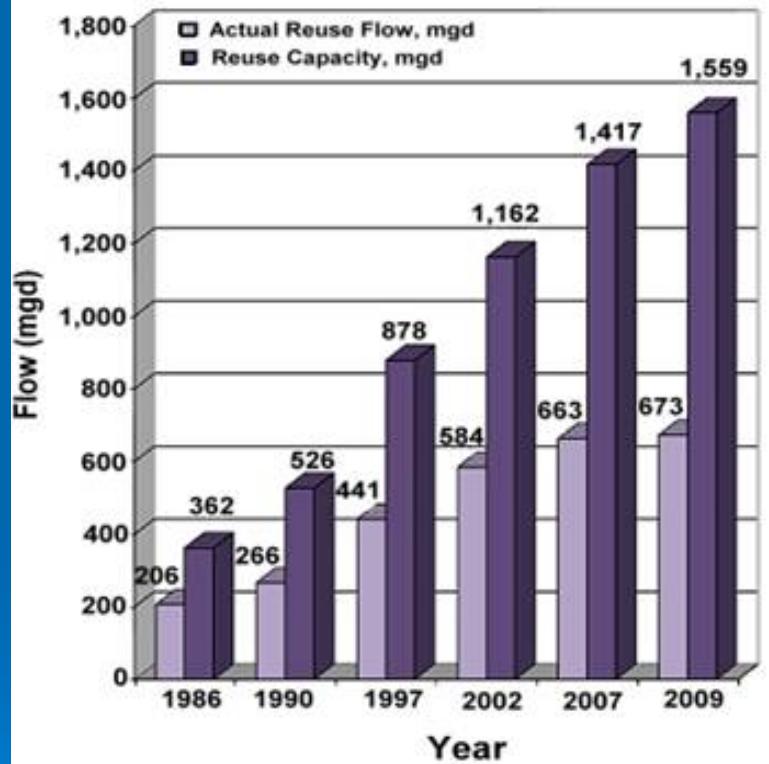
# Reuse Projects

---

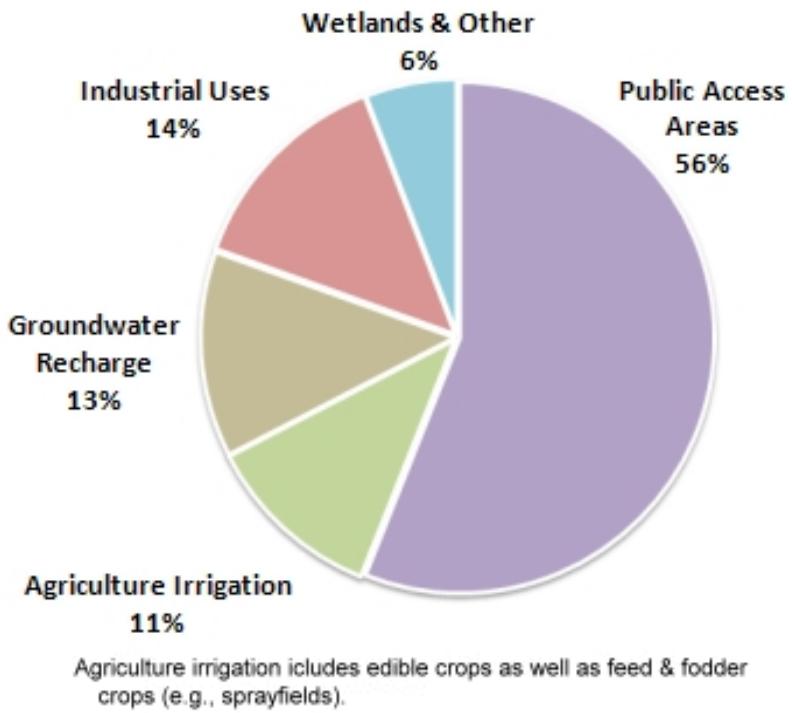


# Current Florida Reuse

Florida's Reuse Growth, 1986 to 2009



Reclaimed Water Utilization by Flow, 2009



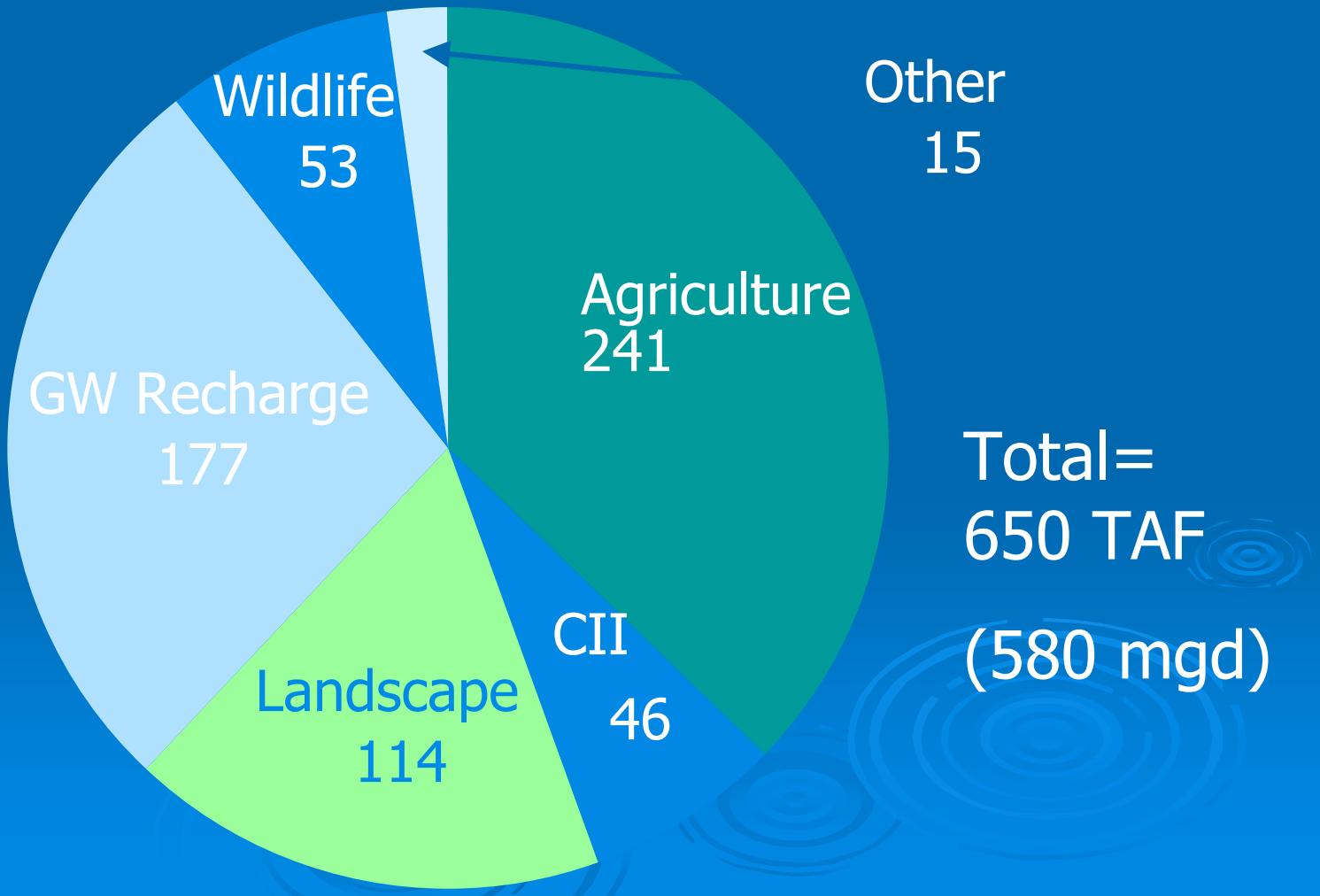
# California's State Water Resources Control Board

---

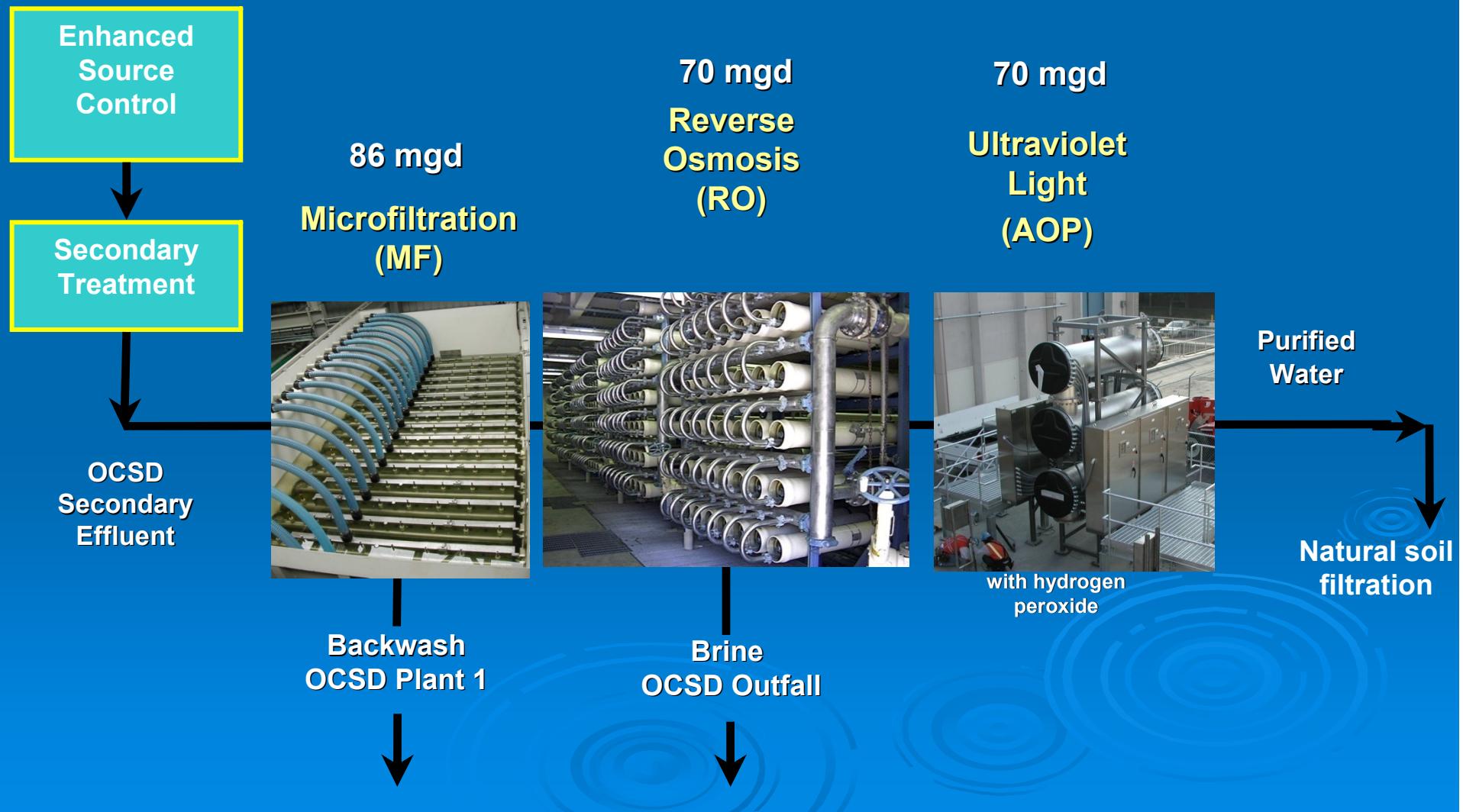
- Primary water rights and water quality regulator under Water Code (focused on environmental protection)
- Recycled Water Policy - 2009
  - Reuse goal
    - Current reuse = 0.65 MAF (580 mgd), ocean discharge = 3.5 MAF
    - Increase of 1 MAF by 2020
    - Increase of 1 MAF again by 2030
  - CEC Panel
  - Salt and Nutrient Management Plans
- General irrigation permit – 2010
- Stormwater Permits – regulate irrigation runoff
- Appeals of Regional Board permits

# Recycling in California (2008 data in TAF)

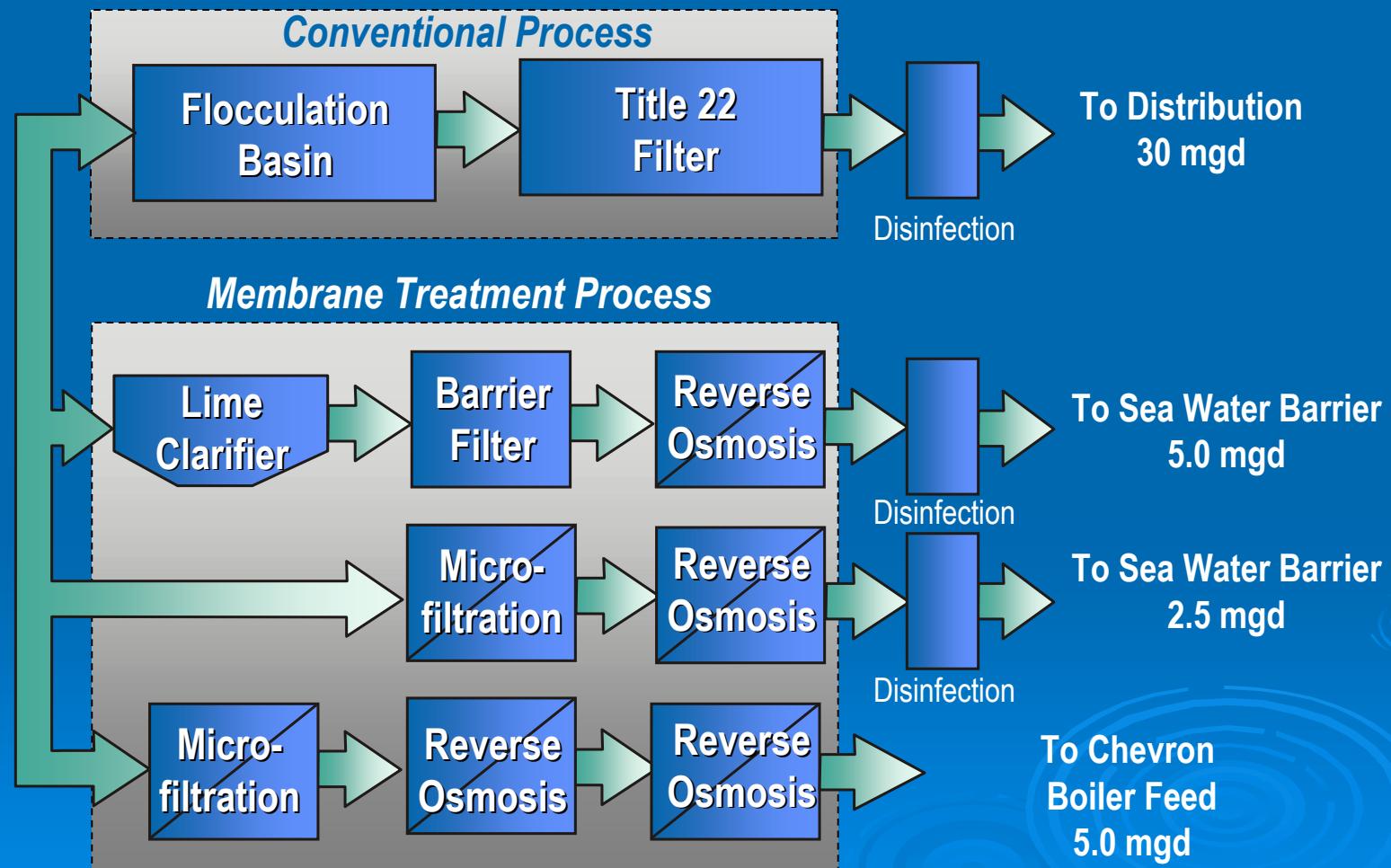
---



# GWR System (OCWD and OCSD) Advanced Water Treatment Flow Diagram



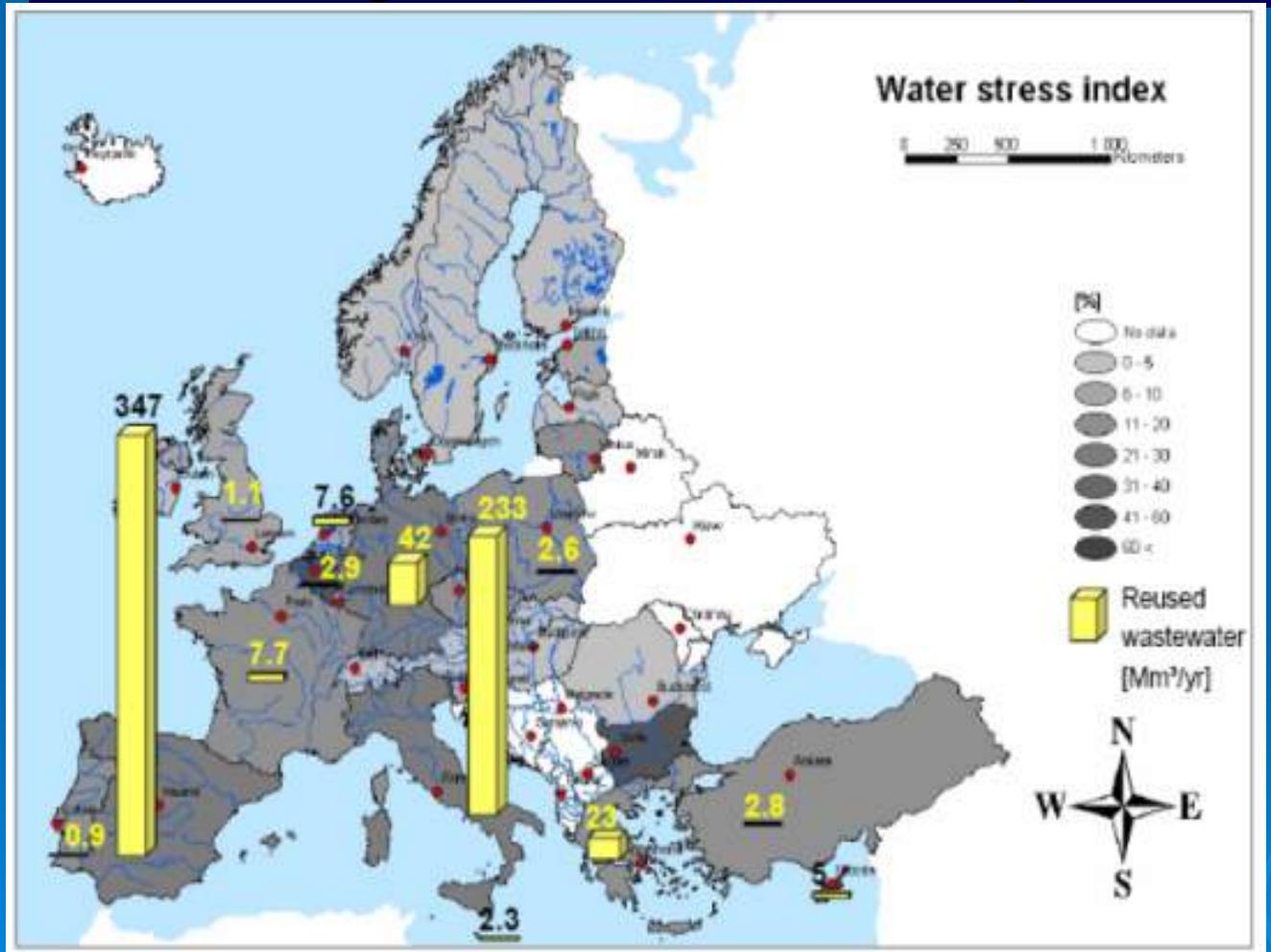
# West Basin Water Recycling Plant



# Water Reuse

## *European Trends*

## ▪ Increasing EU Water Reuse Experience



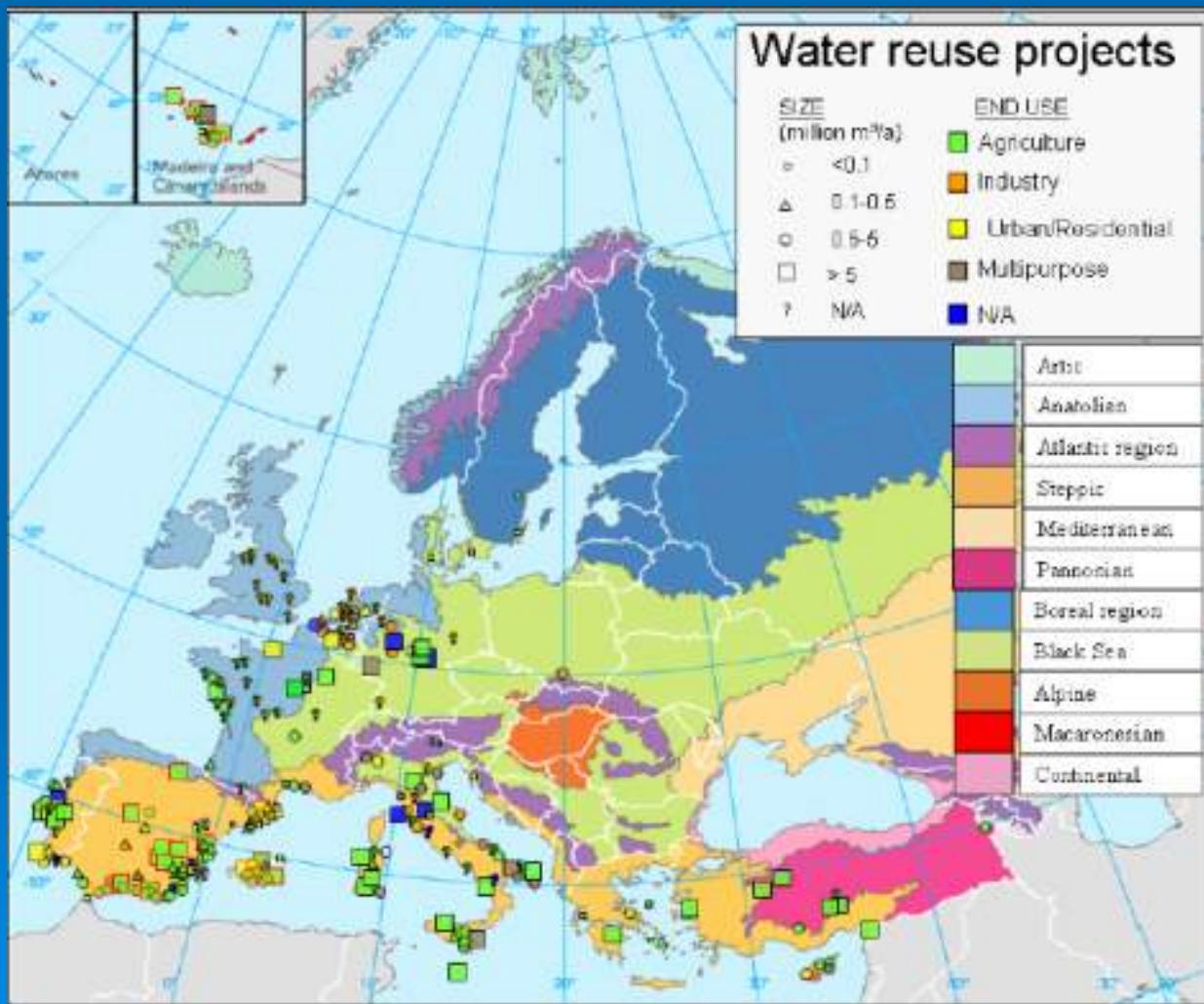
- 964 Million m<sup>3</sup>/yr (2007)
- 2.4% of treated wastewater is reused

Adapted from Aquarec EU Project, 2006

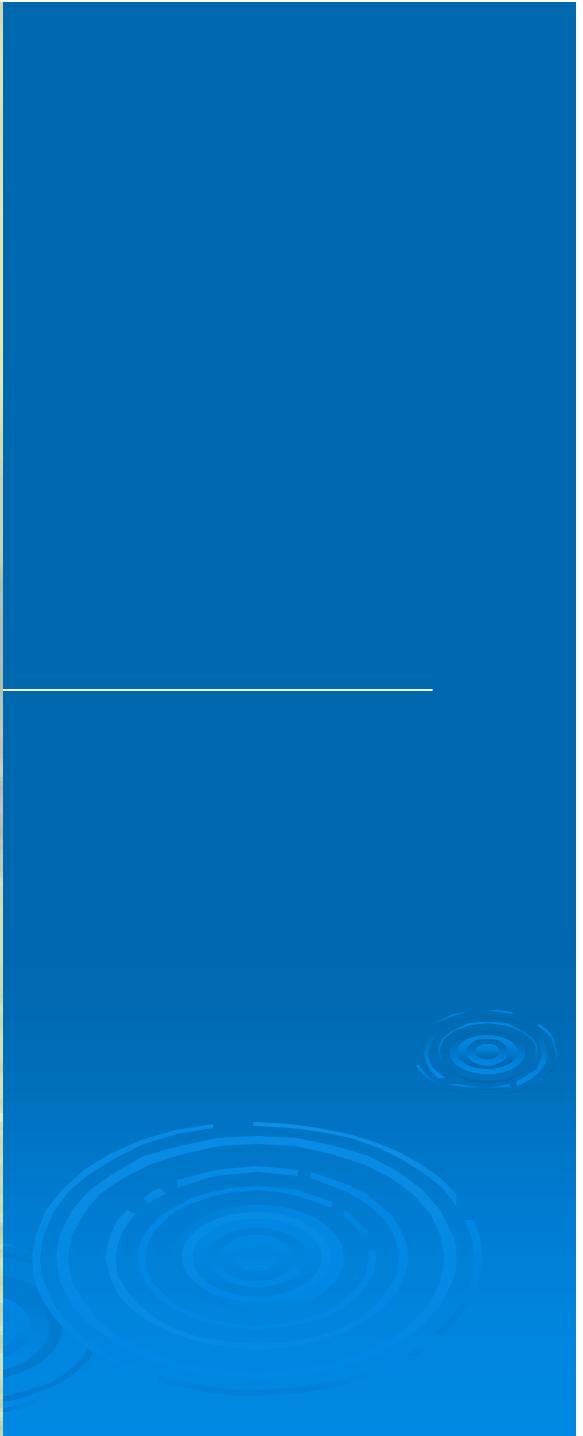
# Water Reuse

## *European Trends*

### ■ Increasing EU Water Reuse Experience



- >3300 projects
- >250 projects with tertiary treatment
- Trend for diversification of water reuse
  - 75% for agricultural irrigation
  - 6% for aquifer recharge
  - 6% for urban uses
  - 6% for environmental enhancement
  - 6% industrial uses





# Context for what is happening in the Australian water industry

---

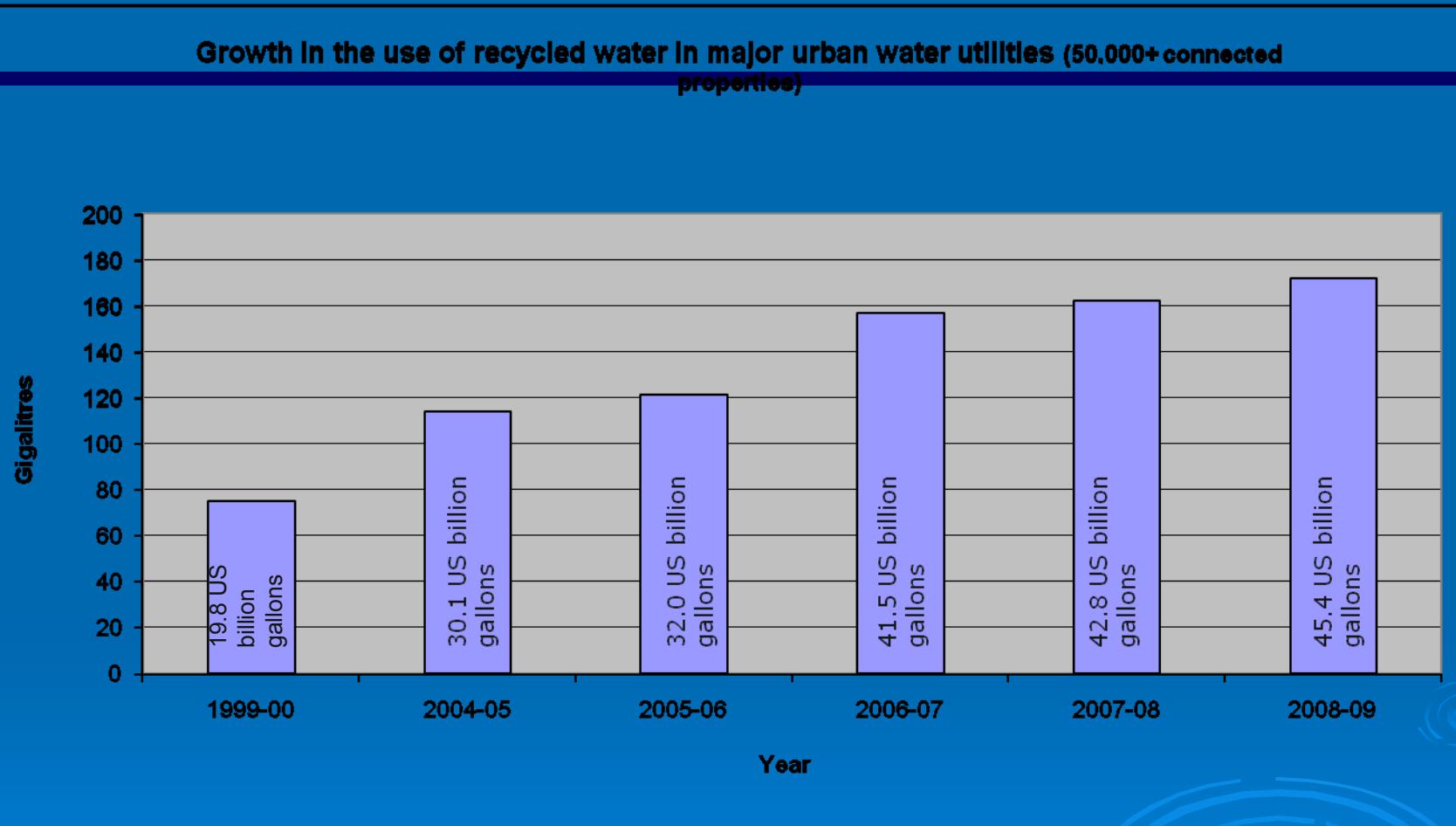
- Climate shift – yields are collapsing dramatically, 30% to 70%
- Rapidly growing populations and changing demographics
- Additional environmental flows for stressed rivers
- Expectations of increased levels of service (i.e., growing affluence)
- Taking a fresh look at the resources available in the urban water cycle in the context of cities of the future
- Moving beyond water restrictions
- Meeting these challenges in a sustainable manner e.g. water/energy inter-relationships and operating in a carbon constrained world

# Responses

## Both on the Demand and Supply side

- Ongoing water conservation programs
- Diversifying sources of water to remove the urban water industry's almost total reliance on surface water run-off (i.e., security through diversity)
- Major projects will include:
  - Desalination plants
  - Building new dams
  - Pipelines to connect water supply systems
  - Large scale water recycling plants
  - Pipe networks to transfer recycled water
  - Third pipe systems in new developments and redevelopments
  - Pipelines connecting rural water to urban areas
  - Water sensitive urban development in new developments
- No water supply option should be ruled out in an era of climatic uncertainty

Since 1999-00 the volume of recycled water produced has increased by 130% in major urban water utilities (>50,000 connected properties)



---

## *New Policy Initiatives*

# Regulations and Criteria

---

- No Federal Regulations
- 28 States Have Water Reuse Regulations
- 2004 U.S. EPA Guidelines for Water Reuse:
  - Recommended treatment processes
  - Water quality limits
  - Monitoring frequencies
  - Setback distances
  - Other controls
- [www.epa.gov/ORD/NRMRL/pubs/625r04108/625r04108.htm](http://www.epa.gov/ORD/NRMRL/pubs/625r04108/625r04108.htm)

# Florida's Ocean Outfall Legislation

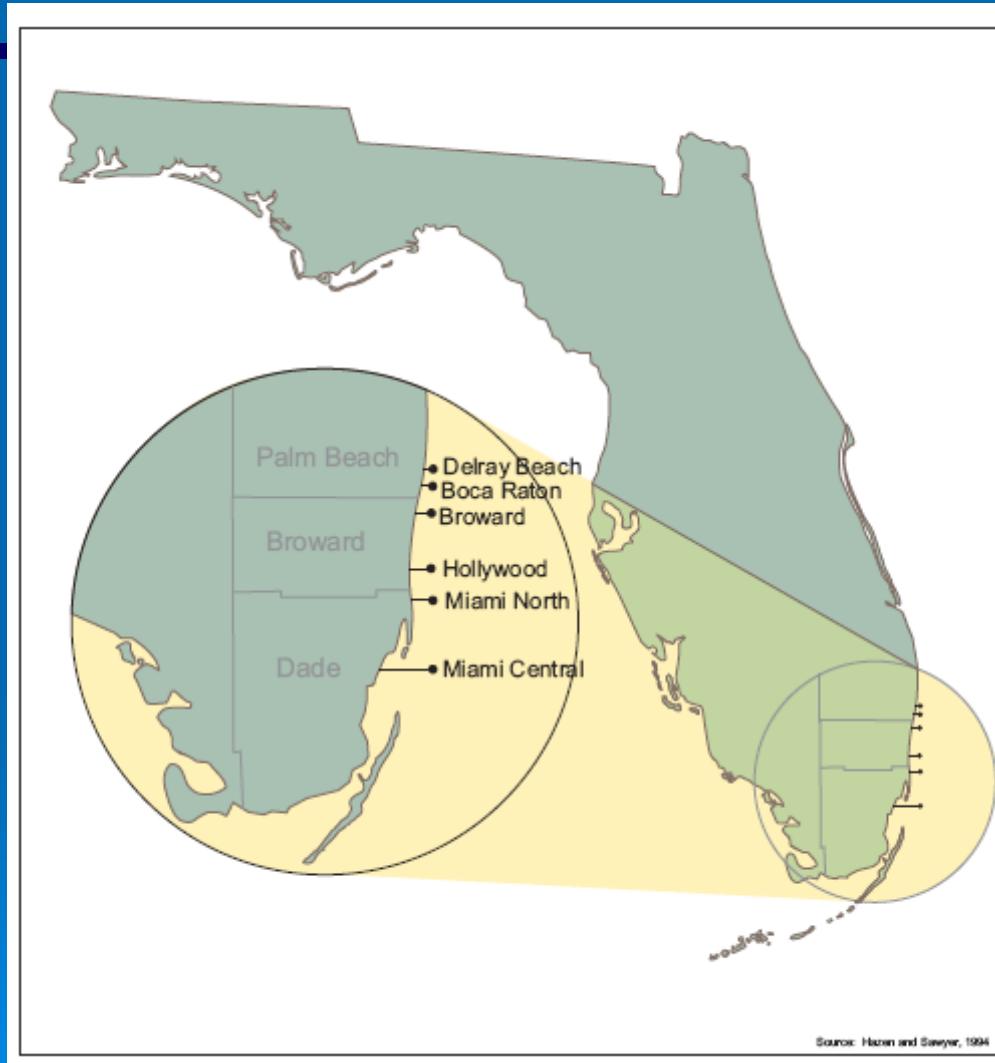
## SB 1302

---

- Prohibits construction of new domestic wastewater ocean outfall pipes or expansion of six existing outfalls on Southeast FL coast
- Law requires
  - significant decrease in nutrients discharged through outfalls by 2018; and
  - elimination of outfalls as primary disposal method for wastewater by 2025.
- 60% of water previously discharged via outfalls would be required to be beneficially reused.
- WateReuse Association will hold its second Potable Reuse Conference in south Florida in November, 2011

# Ocean Outfalls

SB 1302



- Plan by 2013
- Full AWT by 2018, unless 100% reuse
- Reuse system operational by 2025
- 300 MGD

# WateReuse California's Potable Reuse Initiative

---

- WateReuse California formed *ad hoc* committee to explore how it can develop potable reuse in CA; decision based on following:
  - Legislative (California) activity related to potable reuse;
  - Willingness of key environmental organizations and regulators to consider potable reuse;
  - Construction of purple pipe systems is too costly for utilities to implement on large scale;
  - Compliance with IPR regulations is infeasible for many agencies;
  - Drought; and
  - Availability of proven treatment technology.
- NWRI Commissioned “White Paper” on identification of measures and information needed to ensure public health protection if direct potable reuse is to be successfully implemented
- Workshop with state regulators in Sacramento on April 26-27, 2010
- Foundation funded “White Paper” entitled *Direct Potable Reuse – A Path Forward*

# California Senate Bill 918 (SB 918)

---

- Signed into law on September 30, 2010
- Sponsored by WateReuse California
- California Department of Public Health (DPH) to adopt regulations for indirect potable water reuse for groundwater recharge by December 31, 2013
- Requires DPH to adopt regulations for surface water augmentation by December 31, 2016, if an expert panel convened pursuant to the bill finds that the criteria would adequately protect public health
- Requires DPH to investigate feasibility of developing regulations for direct potable reuse and to provide final report on that investigation to the legislature by December 31, 2016

# Australian Water Recycling Centre of Excellence (AWRCE)

- Funded at \$20MM (AUD) over Five Years
- Funding Research on Four Goals:
  - Social/economic/environmental value of water recycling is demonstrated and enhanced;
  - National validation framework for water recycling is established;
  - Reclaimed water is seen as an acceptable ‘alternative water’ for augmenting drinking water supplies;
  - National knowledge, training and education program for water recycling is established.

# Conclusions

---

- Water Reuse and Desalination are “the last rivers to tap”
- Their Ultimate Acceptance is Essential to Achieving Long-Term Sustainability
- U.S., Spain, Israel, Australia, and Singapore are Leading the Way in Reuse
- Direct Potable Reuse may be Viable within a Decade

# Opportunities for Collaboration between Saudi Arabia and WateReuse

---

- Historical Precedents
  - Partnered with AWWA/WEF on WateReuse Annual Symposium since 2005
  - Partnership has Spawning other Opportunities, Including:
    - Collaboration on White Paper on Graywater;
    - Co-Funding of Research Project – Talking About Water;
    - Developed Journal with WEF.
  - Partnered with IWA on Potable Reuse Conference in 2008

# Opportunities

---

- Joint Sponsorship of:
  - Conferences/Workshops/Seminars/Webinars
  - White Papers/Other Publications
  - Research Projects w/WateReuse Research Foundation
- We Could Form Saudi Arabian Division of WateReuse (similar to WateReuse Australia)

# Thank you

---



[www.WateReuse.org](http://www.WateReuse.org)

Wade Miller, Executive Director (703) 548-0880  
ext. 102