EPA
United States
Environmental Protection
Agency

INFORMATION FOR STATE DRINKING WATER PROGRAMS AND PUBLIC WATER SYSTEMS

Need Technical Assistance?

Call GoToWebinar Support:

U.S. and Canada: **1-800-263-6317**

10/22/2009

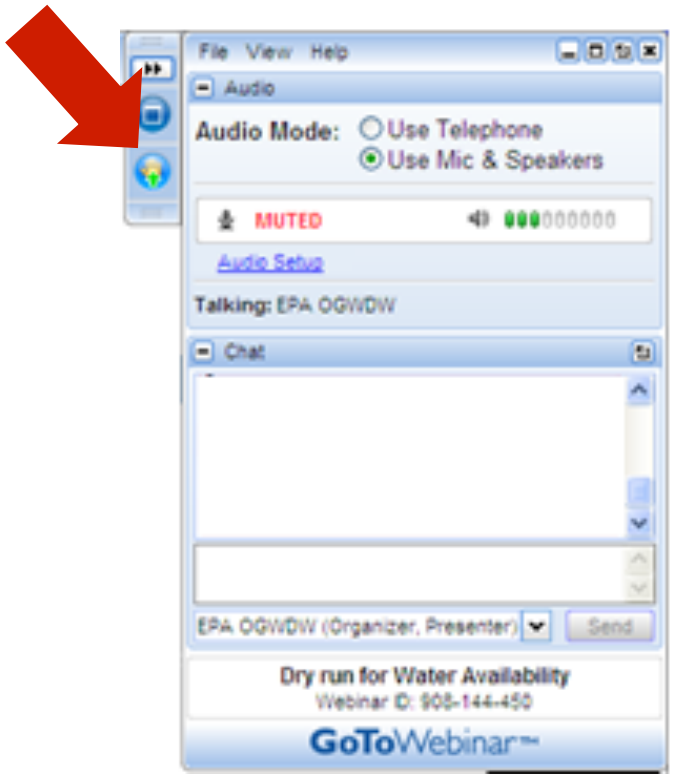
Water Availability and Water Efficiency

Connecting to the Audio

- Dial-in using your telephone
  - Number: 773-945-1011
  - Conference Code: 485-513-331

If You Need Help

- Raise your hand
  - Someone will contact you via chat to help
- Ask a question at the bottom of your GoToWebinar window



Maximizing Your Screen

- For a full screen view hit F5 or full screen icon in bottom right
- To return to the regular view, hit F5 again or regular screen icon
  - You need to be in "regular" view to submit text questions
- Hitting Control+H will also give you a larger view

Questions and Answers

- You can submit questions/comments anytime during the presentation
- Just use the question and answer pane that is located on your screen
- EPA will address as many questions as possible at the end of the presentations
- EPA will compile the questions submitted during the Web cast and will send a complete list of questions and answers to the emails of each registrant

Polls

- Polls will be launched during breaks throughout the presentation
- Please be sure to respond to the polls
- You will not be able to view the presenter's screen until the poll is closed by a webinar organizer

Today's Experts

SPEAKERS

Vanessa Leiby
Principal, The Cadmus Group, Inc.

Rudd Coffey
Senior Associate, The Cadmus Group, Inc.

Michael Finn
Environmental Engineer, U.S. EPA OGWDW, Protection Branch

ASK THE EXPERTS

Mike Means
Water Quality Manager, Washington Department of Health Office of Drinking Water

Edward G. Means
Vice President, Malcolm Pirnie, Inc.

Richard Harris
Manager of Water Conservation, EBMUD

Speakers

Michael Finn

Michael Finn is an Environmental Engineer with the Environmental Protection Agency's Office of Groundwater and Drinking Water, Drinking Water Protection Branch.

Prior to coming to EPA he was with the California drinking water program as a field engineer in the San Francisco Bay area for more than 10 years.

Vanessa Leiby

Vanessa Leiby, a Cadmus Principal, has provided extensive support to OGWDW on a wide range of projects with a particular focus on water and energy efficiency, source water protection, regulation development and implementation, and water system security.

Prior to joining Cadmus, Ms. Leiby was, for 10 years, the Executive Director of the Association of State Drinking Water Administrators (ASDWA).

Rudd Coffey

Rudd Coffey, a Cadmus Senior Associate, has 10 years of experience supporting EPA's drinking water program, and in particular, the Capacity Development, State Revolving Fund, and drinking water rule implementation efforts.

Currently, Mr. Coffey is helping to lead Cadmus' support of EPA's efforts to implement the Green Project Reserve requirements of the American Recovery and Reinvestment Act.

Ask The Experts
Mike Means

Mike Means has 15 years of experience as a hydrogeologist working in both the public and private sectors, and is a licensed hydrogeologist in Washington State. He has worked for the past 3 years as the Water Quality Manager for the Washington Department of Health Office of Drinking Water (ODW). As part of his duties, Mike is also the program manager for the State source water protection program. Mike comes to ODW from the Kitsap County Health District.

His local experience includes 6 years as the county's drinking water program manager and 3 years in its Solid and Hazardous Waste Program as a hydrogeologist. His State and local background provides a unique combination of expertise in both the technical and regulatory implementation challenges involved in protecting water resources.

Prior to his work in Washington, Mike received his B.S. degree in geology at the University of California at Santa Barbara, worked in private consulting with Tetra Tech, Inc., for more than 5 years at landfill and cleanup sites at Vandenberg Air Force Base and at many leaking underground fuel tank cleanup sites throughout Southern California.

Ask The Experts
Edward G. Means

Mr. Edward Means is Vice President with Malcolm Pirnie, Inc. Mr. Means has over 30 years of experience, including 18 years in the public sector with the Metropolitan Water District of Southern California, in roles including Water Quality Laboratory Manager, Director of Water Quality, Director of Resources, Chief of Operations, Chief Operating Officer, and acting General Manager.

Mr. Means is knowledgeable in water quality and water resources development and over 100 articles in industry journals and two books on water resource has worked for many of the large water agencies in the U.S. He has published s, management, and quality issues.

Ask The Experts
Richard Harris

As Manager of Water Conservation, Richard Harris oversees the development and implementation of the District's Water Conservation Master Plan in support of long-term water supply and demand management goals. Richard has been at EBMUD for nearly 20 years, and prior to EBMUD's Water Conservation Division, he managed the District's Water Recycling Program.

Richard has more than 23 years experience in water and energy resource management, civil engineering and environmental systems planning. Richard serves as a Board member of the California Urban Water Conservation Council and the Alliance for Water Efficiency; he is an active member in the American Water Works Association and sits on a number of project advisory committees comprised of California urban water agencies. Mr. Harris also serves as the EBMUD Energy Conservation Coordinator to the California Flex Your Power Campaign.

Richard holds a Masters in Civil Engineering from the University of California at Los Angeles and Bachelors degrees in Business Economics and Environmental Studies from the University of California at Santa Barbara.

Disclaimer

- The examples included in this presentation are intended for discussion purposes only. Throughout this presentation, the terms "State" or "States" are used to refer to all types of primacy agencies including U.S. territories, Indian tribes, and EPA Regions. The statutory provisions and EPA regulations described in this document contain legally binding requirements. This presentation is not a regulation itself, nor does it change or substitute for those provisions and regulations. Thus, it does not impose legally binding requirements on EPA, States, or public water systems. This guidance does not confer legal rights or impose legal obligations upon any member of the public. While EPA has made every effort to ensure the accuracy of the discussion in this presentation, the obligations of the regulated community are determined by statutes, regulations, or other legally binding requirements. In the event of a conflict between the discussion in this presentation and any statute or regulation, this presentation would not be controlling.

13

Water Availability and Water Efficiency

Information for State Drinking Water Programs and Public Water Systems

10/22/2009

Overview

- Introduction
  - Mike Finn, U.S. EPA Headquarters
- Water Availability
  - Vanessa Leiby, The Cadmus Group, Inc.
- Water Efficiency
  - Rudd Coffey, The Cadmus Group, Inc.
- Success Stories, Funding Opportunities
  - Vanessa Leiby
- Questions and Answers
  - Facilitator, Vanessa Leiby

15

Introduction

Mike Finn, U.S. EPA Headquarters

Goals of the Webinar

- Understand water availability issues and resources available to systems
- Understand water efficiency measures and resources
- Inform State programs and PWS on what water systems can do with their own O&M to improve water efficiency and deal with water scarcity
- Offer tools and resources to help system owners and operators adopt best industry practices and prepare for the future

Water Scarcity

- Water supplies and demand are impacted by:
  - Population growth
  - Economic trends
  - Legal decisions
  - Short-term climate change (periodic droughts)
  - Long-term climate change
  - Emerging contaminants
  - Infrastructure and technology (dams, transmission, etc.)
- Constraints on water use exist and are likely to increase over time

Options for Dealing With Water Scarcity

- Options are limited:
  - Many existing resources are currently stressed
  - Competition for new water resources
    - New water rights may be limited or difficult to obtain (e.g., State or local regulations and policies may limit withdrawals to protect endangered species.)
  - Competition over existing, multi-use water sources
    - Hydropower, recreation, drinking water, ecological, etc.
  - Quantity/quality issues with new sources
    - Alternate sources are likely to be lower quality, farther away, or both
      - Increased expense and energy consumption to move and treat

Short Term Challenges of Dealing With Water Scarcity

- Utility
  - Rising costs to water systems (wholesalers, higher pumping costs, etc.)
  - Potential loss of revenue from drought restrictions or voluntary consumer conservation
- Rate payers
  - Requires behavioral changes (from both consumers and utilities)
  - Balance between affordability and "value" of water, true cost of water, and water supply services

Long Term Challenges of Dealing With Water Scarcity

- Difficulty finding new source(s) of adequate quality
- Public concerns regarding water reuse/recycling
- Educating public on concept of Total Water Management
- Current lack of national forecasting for water supply and demand
- Sustained change in consumer behavior and lifestyle
- Regulatory requirement for water reuse/recycling

Opportunities Created by Addressing Water Scarcity

- Implementing best management practices (BMPs) for water availability and implementing water efficiency programs have many benefits
  - Reduce long-term operation and maintenance costs by reducing need for quick short-term fixes for supply shortages
  - Meet regulatory requirements
  - Meet public service responsibility
  - Improved capacity to adapt to climate change, drought-reduced quantity, and degraded quality
  - Smaller energy and per capita water footprint
  - Revenue from sale of carbon credits under potential cap-and-trade regime

Monitoring Water Availability and Variability

- According the 2008 AWWA State of the Industry Report, source water is the highest priority
- Critical to improve monitoring of source availability and variability at the utility level
- Systems can improve information by:
  - Partnering with neighboring systems in watershed
  - Identifying existing data sources:
    - USGS
    - States
  - Establishing a source water monitoring program

Need For Efficiency

- Water scarcity and limited alternatives focus attention on:
  - Availability of existing and potential source water (i.e., quantity)
  - Efficiency of water use
  - Quality of existing and potential sources
- Numerous strategies exist and all involve more efficient use of existing sources
  - Utilities face many challenges
  - Improving efficiency creates opportunities

24

Water Availability

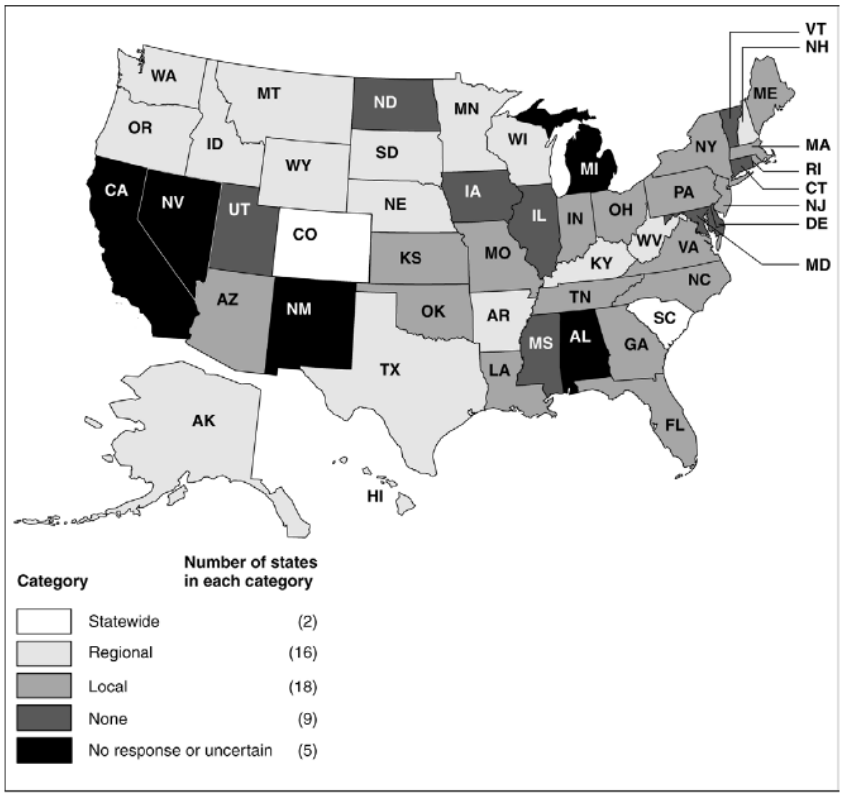
Vanessa Leiby, The Cadmus Group, Inc.

Recent Statistics

- Between 1995 and 2000
  - Withdrawals and the population served increased 8% (USGS)
- In 2006, the withdrawals by community water systems (CWSs) were:
  - 75 billion gallons per day
  - 70% from surface sources
- Although CWSs account for only 13% of total freshwater withdrawals, future demand will compete with energy and agriculture (biggest users)

Is Water Scarcity Really a Problem?

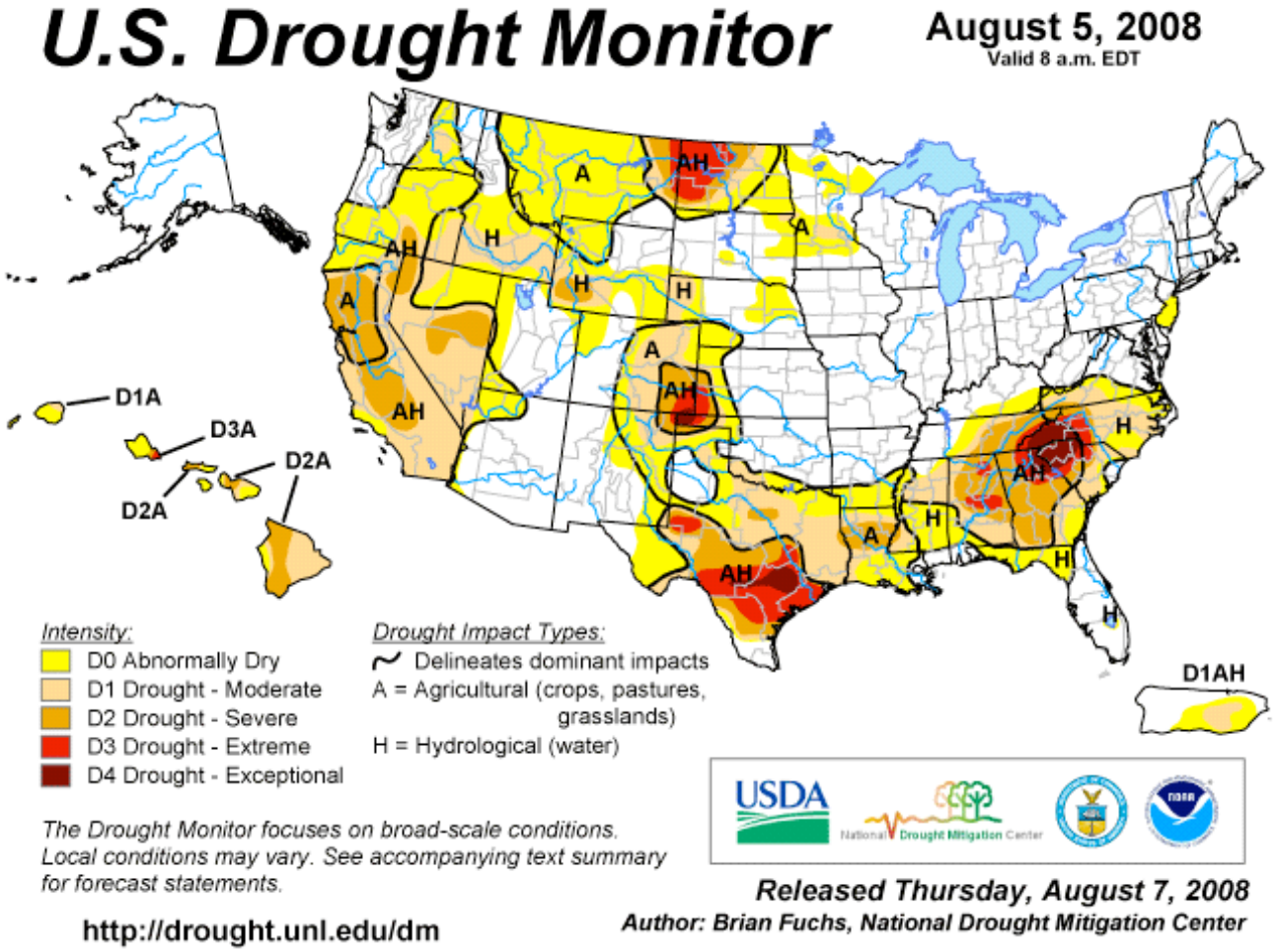
Figure 22: Extent of State Shortages Likely over the Next Decade under Average Water Conditions



Source: GAO analysis of state water managers' responses to GAO survey.

- 2003 GAO study found that demands on the nation's supplies are growing
- Under normal conditions, water managers in 36 States anticipate shortages in the next 10 years
  - Drought conditions will exacerbate shortage impacts
- Planning info needed at a scale useful to decision makers
- USGS leads new National Water Availability and Use Assessment Program
- Until then work with what you know and what you are currently doing [bottom-up approach]

Short-Term Drought Conditions Are Well Monitored



Local Knowledge Is Needed

- Water availability knowledge depends on:
  - Local needs
    - Current demand (population trends)
    - Forecast of future demand (population growth)
  - Existing sources
    - How does your source water quality/quantity currently change? Seasonally? During precipitation events? Drought events?
    - If those changes were exacerbated, could you manage? How would you manage?
  - Potential options:
    - Supply-side (e.g., new sources, storage)
    - Demand-side (e.g., increased efficiency by system and customers)

Improving System Knowledge

- 1998 EPA Water Conservation Plan Guidelines provide a useful framework (http://www.epa.gov/watersense/pubs/guide/htm)
  - Step 2 "Develop a water system profile"
- Control and Mitigation of Drinking Water Losses in Distribution Systems
  - Near completion
- Accurate profile depends on effective monitoring of demand (metering)
  - Residential water usage, industrial, agricultural, landscapes, etc.
- AWWA Free Water Audit Software
  - www.awwa.org/Resources/WaterLossControl.cfm?ItemNumber=48511&navItemNumber=48158
    - Based on "water balance" approach

Improving System Knowledge

Information Needs:

- Estimated service population
- Estimated service area (square miles)
- Total annual water supply
- Types and number of service connections
- Total system demand
  - Metered sales
  - Unmetered sales
  - Unaccounted water (apparent and real losses)
- Average-day demand
- Maximum-day demand
- Rate structure

Defining Local Needs: Demand Forecast

- The 1998 U.S. EPA Water Conservation Plan Guidelines provide a simple water demand forecasting methodology based on population
  - Good for systems with little variation in service population type
- Monitoring/tracking new demands and system growth
- Regional differences—where is growth occurring?
  - Systems in fast growing areas may have different options than systems in developed areas

Demand Forecast Resources

- U.S. Census
  - http://www.census.gov/
- State, County, and City
- Community Development Agencies or Groups

Demand-Side Management

- Establishing a baseline for measuring progress:
  - Existing total use
  - Per capita use
  - Use in various sectors (residential, industrial, etc.)
- Breaking down use by sectors (if possible) can identify where measures can achieve the most savings

Examining Existing Data Sources

- Periodic supply assessments
  - Source water assessment
  - State capacity or other reports
  - Review historical records if available
  - Tool: sanitary survey
- Ongoing monitoring and tracking supply quantity
  - Stream flows, surface water levels, and well measurements
- Ongoing monitoring and tracking source quality
  - Impacts from climate change or drought
  - Seasonal variations, precipitation events, etc.

Evaluating the Source

- Characterizing the source
  - Does supply vary by season?
    - During which period is water most abundant?
    - Does the intensity of precipitation vary?
  - Is supply affected by drought?
    - How frequent are drought events?
    - What is the average duration of drought events?
  - Do changes in water quantity drive changes in quality?
- Is the system vulnerable to changes at the source?

Examining the System

- Examine
  - Water loss and demand
  - Operations and infrastructure

- Water
  - Monitor water loss in distribution system and elsewhere
  - Monitor demand:
    - Water metering
    - Water accounting

Examining the System

- Operations and infrastructure
  - System capacity (treatment and storage)
    - Tool: sanitary survey
  - Treatment ability to deal with new or degraded sources

Projecting the future:
How can the system adapt to changes in demand, source, or system capacity?

Closer Look at Water Control

- EPA is preparing a guidance on water loss control (Control and Mitigation of Drinking Water Losses in Distribution Systems)
  - Metering
  - Water loss prevention elements:
    - Water audit
    - Intervention
    - Evaluation

Planning

1. **Review key planning questions**
   - Is the system in a designated critical water supply area?
     - Critical water supply areas are areas that have experienced or are expected to experience water supply problems within the next 20 years
   - Does the system experience frequent shortages or supply emergencies?
   - Does the system have substantial unaccounted-for and lost water?
   - Is the system experiencing a high rate of population and/or demand growth?
   - Is the system planning substantial improvements or additions?

2. **Review existing planning**
   - Capital, facility, or supply plan
   - Drought or emergency plan
   - Water conservation plan

4. **Are the existing plans sufficient? If not, what are the options?**

Identifying Options: Supply-side

- Protecting existing sources to safeguard existing supply
  - Source water protection
  - Watershed protection
  - Watershed partnerships
- Matching storage to complement anticipated supply
  - Large storage required for multi-year supply variation
  - Small storage sufficient for supply variation within one year

Identifying Options: Supply-side

- Developing new sources to add supply (or recover lost supplies)
  - Partnerships with other systems
    - Interconnection for emergency use
  - Diversify sources (bulk water purchases)
  - Switch to more sustainable source
  - Water reuse/recycling for non-potable use
    - Many projects have been implemented, particularly in the U.S. southwest
    - Local and State regulatory constraints and guidance vary
  - Desalinization
    - Regulatory constraints may exist
    - Environmental impacts may be substantial
    - Costly and energy intensive, but can play a niche role

Identifying Options: Demand-side

- System programs
  - Metering
  - Water accounting
  - Leak detection and repair/replacement
  - Pressure management, etc.

- Conservation and water efficiency as a new source of water
  - Reduces need to find new sources
  - Extends the life of existing sources

Identifying Options: Demand-side

- Can focus on:
  - Customer behavior (demand side management)
  - Water system operations (e.g., minimizing water losses)
  - Water efficient devices (see WaterSense)
- Vickers 2001 Water Use and Conservation book and 1998 EPA Water Conservation Plan Guidelines provide useful frameworks
  - The following presentation on water efficiency focuses on water system operations

Identifying Options: Demand-side

- Start simple:
  - Conservation pricing
  - Public education
  - Water audits
  - Retrofits
- Advantages of demand-side measures
  - Generally more energy efficient and cost-effective than supply-side measures

45

Water Efficiency

Rudd Coffey, The Cadmus Group, Inc.

Challenges

- Water utilities face many challenges:
  - Need for investment to replace or upgrade aging infrastructure
  - Increasing competition for raw water sources
  - Threats to existing watersheds and surface waters
  - Unresolved issues with over-drafted aquifers
  - Emergence of new threats
  - Changing compliance and public-health standards

More Challenges…

- Water utilities face many challenges:
  - Dependency on complex power-supply networks and markets
  - Natural disaster and security threats
  - Higher customer expectations for communication and service
  - Pressure from all stakeholders for more public involvement
  - “Rising cost" industry

Water efficiency is just one of many competing priorities

Water Efficiency and Conservation

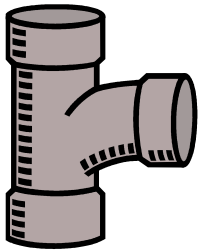
- Water conservation = minimizing water losses
- Water efficiency = maximizing existing resources
- Focusing on water efficiency can conserve water and reduce stress at the source
- Systems need to identify and evaluate efficiency measures

Water Efficiency Pays Off

- Applying water efficiency measures can save water, energy, and money
  - Controlling leaks is one key water efficiency measure
    - The U.S. will need to spend between $325-335 billion dollars on water systems over the next 20 years to upgrade distribution (AWWA, 2001, EPA 2007 DWINSA)
    - Of this $325 billion, 29% ($94 billion) is estimated to be spent on water loss control (Thornton, 2002)
    - Average water loss in systems is 16%; up to 75% of that is recoverable (Thornton, 2002)
    - In most cases, water loss management is extremely cost effective, with paybacks measured in days, weeks, and months; not years (Thornton, 2002)

Areas of Water Efficiency

Source → Treatment → Distribution → Tap

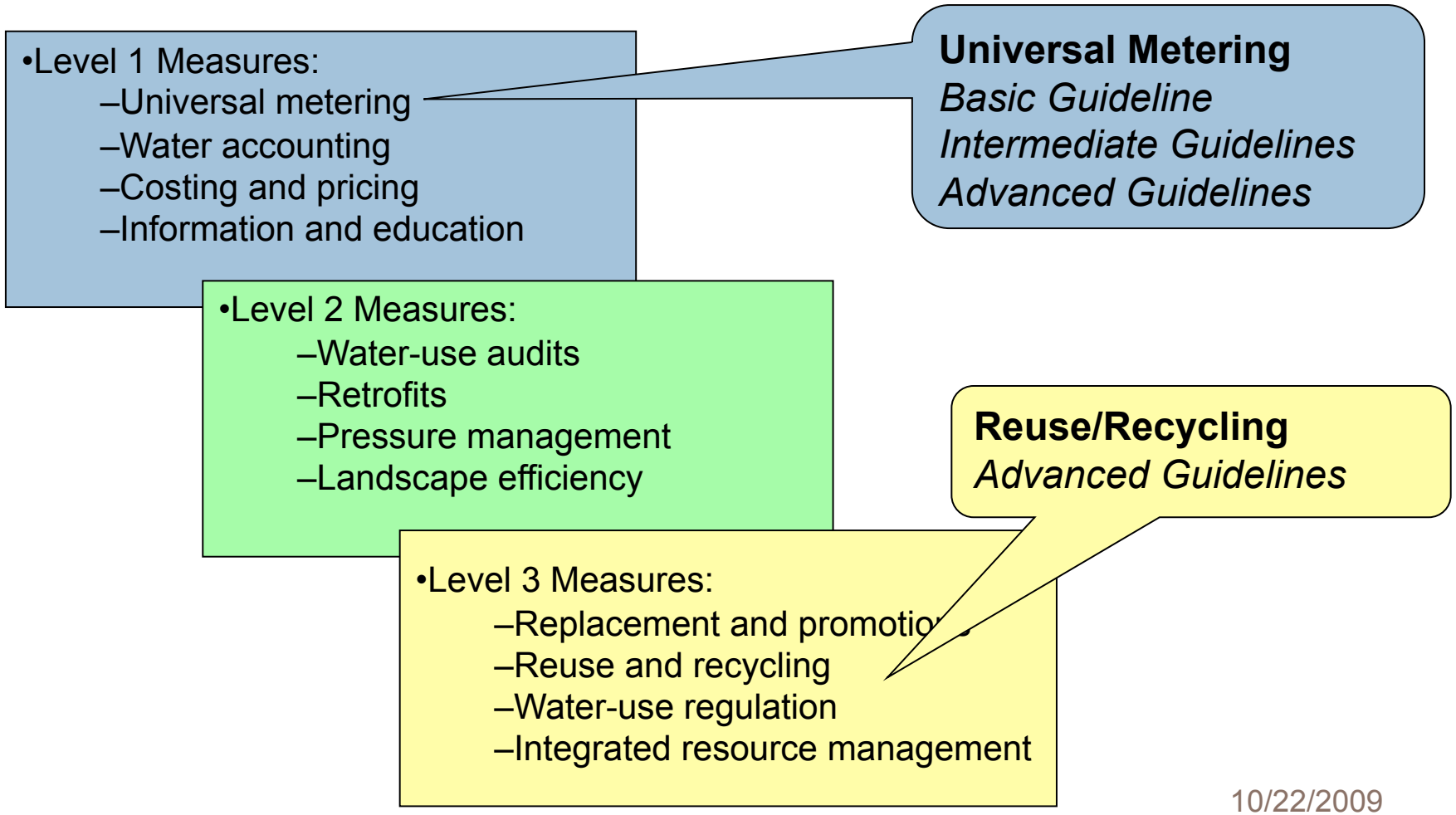


Approaches for Identifying Efficiency Measures

- Tiered approach to review measures for a conservation program
  - Many efficiency options exist
  - Tiered approach defines a starting point
- Add water efficiency to existing BMPs
  - Asset Management
  - Environmental Management System
- Find someone at system to be the water efficiency coordinator

Tiered Approach:
A framework for reviewing measures

3 levels (tiers) of Water Conservation Measures for Utilities *(EPA, 1998)*



Applying the Tiered Approach

- Systems are unique; therefore is no linear "path"
  - Any measure can be considered by any system
- Focus should be on the potential benefit of each efficiency measure
  - Measures may or may not be practiced by all systems
- Basic Level 1 measures should be applied by all systems
- All measures should be considered by all systems

Level 1 Measures

- Universal metering
- Water accounting
- Costing and pricing
- Information and education

Level 1: Universal Metering

- Source-water metering
- Service connection metering
- Public-use water metering
- Fixed-interval meter reading
- Meter accuracy
- Meter testing, calibration, repair, and replacement

Level 1: Water Accounting and Loss Control

- Account for water
- System audit
- Leak detection and repair strategy
- Automated sensors/ telemetry
- Loss-prevention program
- Repair known leaks
- Analysis of "unaccounted for water" or "non-revenue water"
  - Pipe and storage leakage
  - Inaccurate or malfunctioning meters
  - Unauthorized use
  - Hydrant use
  - Unavoidable leakage

Level 1: Costing and Pricing

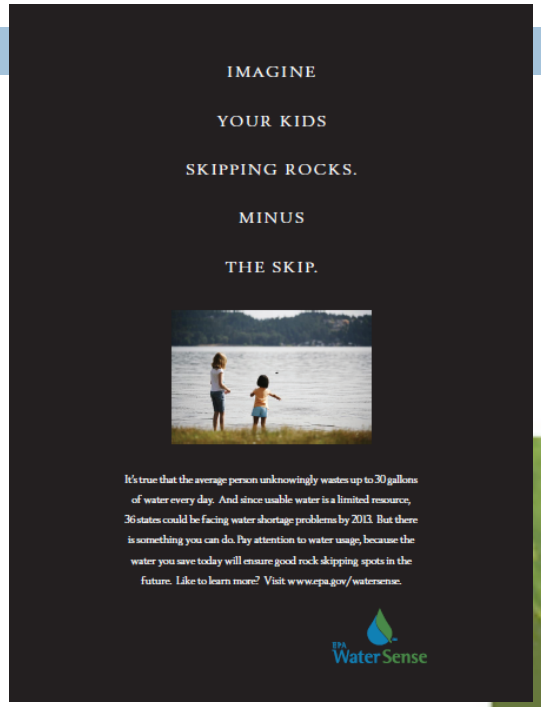
- Cost-of-service accounting
- User charges
- Metered rates
- Cost analysis
- Nonpromotional rates
- Advanced pricing methods

Conservation pricing

Unit cost per 1,000 gallons	
0- 2,000 Gallons	$1.00
2,001 - 9,000 Gallons	$2.42
9,001 - 15,000 Gallons	$6.31
15,001 - 25,000 Gallons	$9.00
25,001 - over Gallons	$9.81

Level 1: Information and Education

- Understandable water bill
- Information available
- Informative water bill
- Timely water bill
- Water bill inserts
- CCR
- School program
- Public education program
- Workshops
- Advisory committee



www.epa.gov/watersense/partners/resources/r_promote.htm

Level 2 Measures

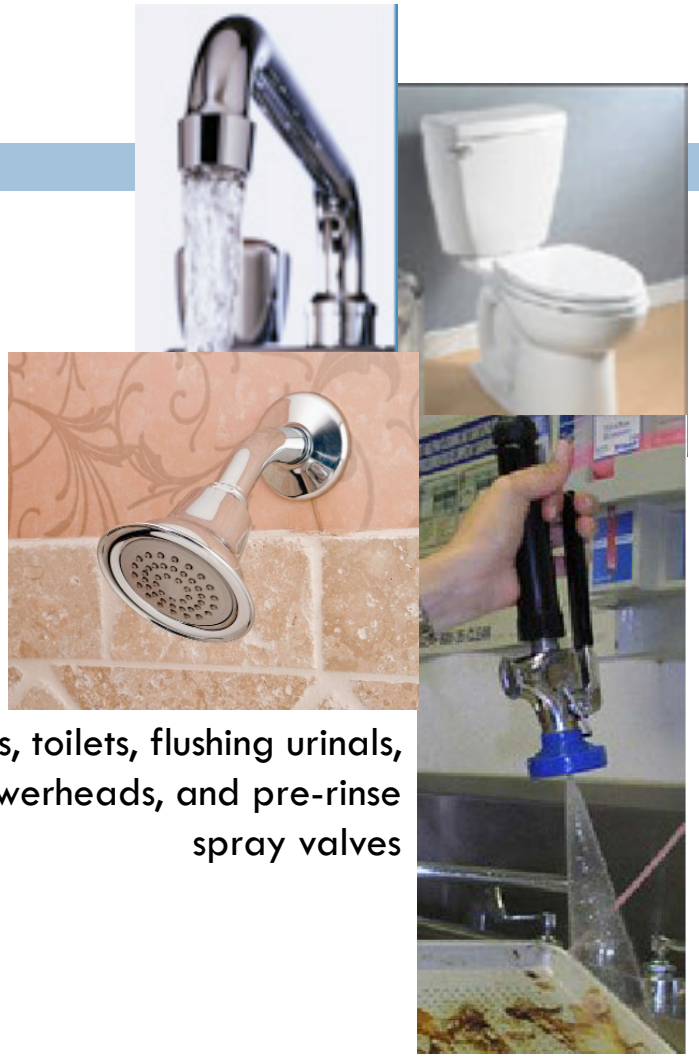
- Water-use audits
- Retrofits
- Pressure management
- Landscape efficiency

Level 2: Water Use Audits

- Audits of large-volume users
  - In-home
  - Commercial and industrial
- Large-landscape audits
- Selective end-use audits

Level 2: Retrofits

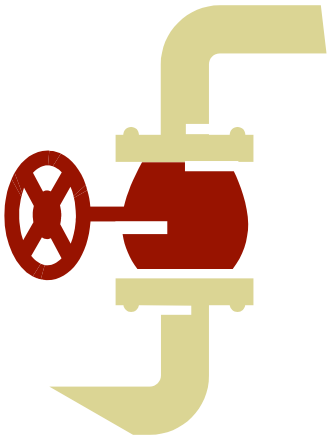
- Make retrofit kits available
- Distribution of retrofit kits
- Targeted programs



Faucets, toilets, flushing urinals, showerheads, and pre-rinse spray valves

Level 2: Pressure Management

- System-wide pressure management
  - Practice to manage system pressure to an optimum level of service ensuring sufficient and efficient supply while reducing pressure variations, faulty level control, and reducing excess pressure
- Pressure-reducing valves

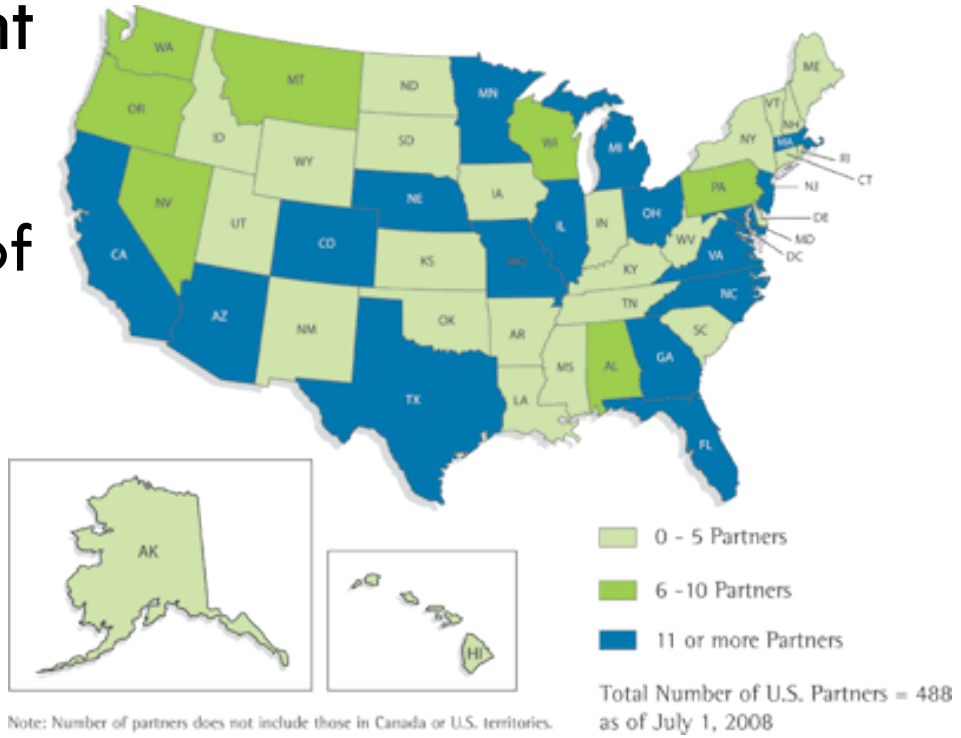


Level 2: Landscape Efficiency

- Selective irrigation submetering
- Landscape planning and renovation
- Irrigation management

Level 2: Landscape Efficiency

- Irrigation Management
  - EPA's WaterSense program has a listing of irrigation professionals and partners



Distribution of WaterSense Irrigation Partners by State.

EPA WaterSense PARTNER

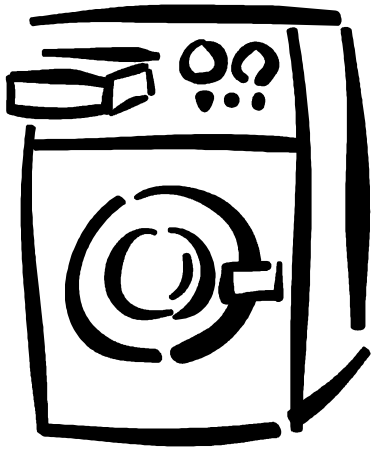
Weather-based landscape controller

Level 3 Measures

- Replacement and promotions
- Reuse and recycling
- Water-use regulation
- Integrated resource management

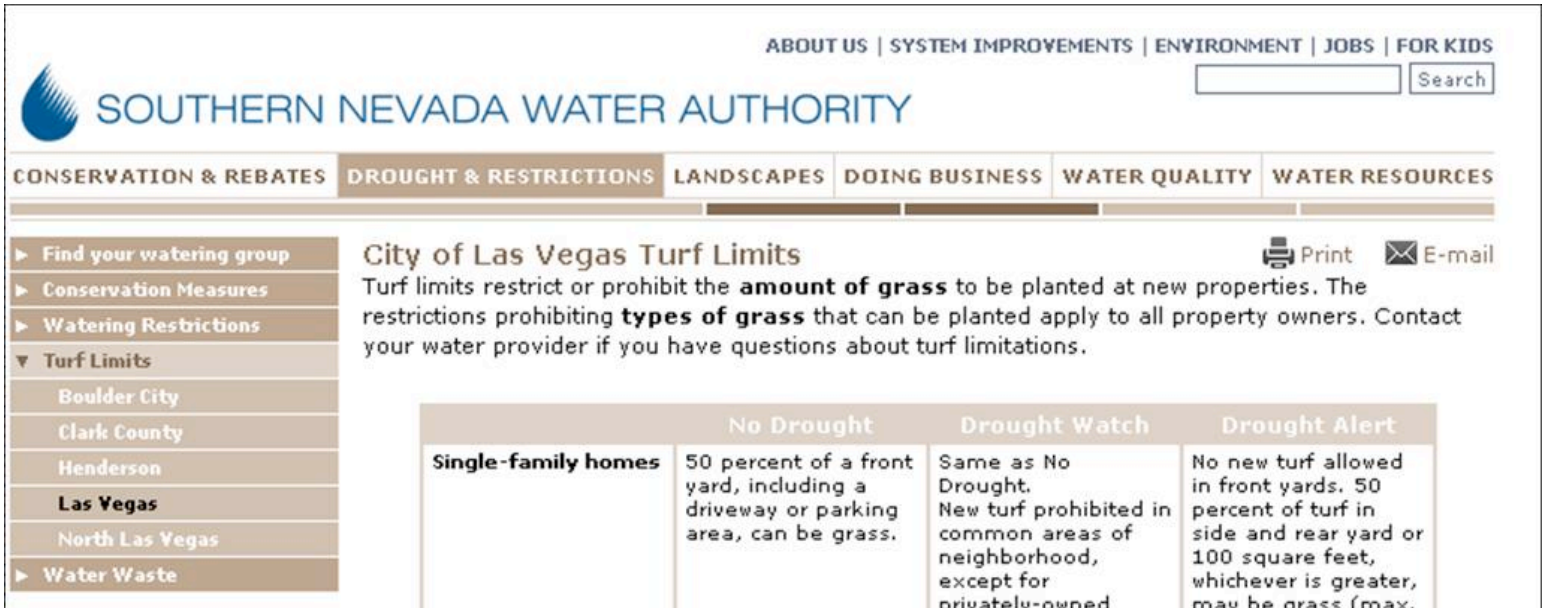
Level 3: Replacements and Promotions

- Federal and State incentives
- Rebates and incentives
  - EPA WaterSense – Rebate Finder
  - www.epa.gov/watersense/pp/find_rebate.htm
- Promotion of new technologies
- Upfront incentive programs for water efficient devices
  - Process changes
  - Rain water harvesting
  - Metering



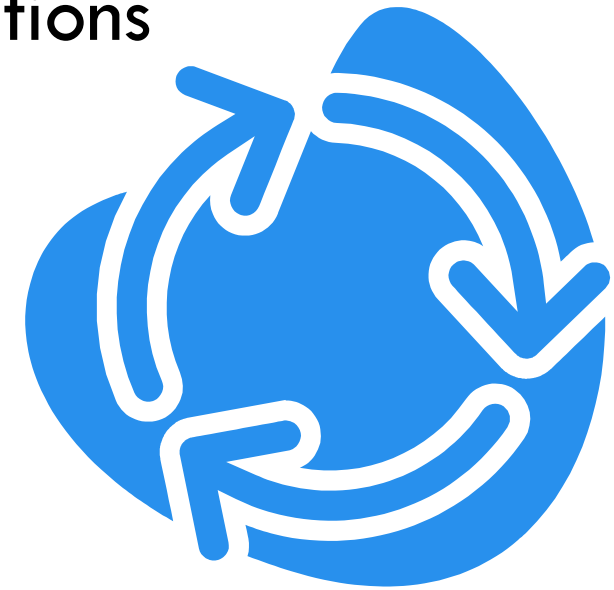
Level 3: Water-Use and Regulation

- Water-use standards and regulations
- Requirements for new developments



Level 3: Reuse and Recycling

- Industrial applications
- Large-volume irrigation applications
- Selective residential applications



Level 3: Integrated Resource Management

- Supply-side
- Demand-side

Other BMPs

- Build water efficiency into existing BMPs
  - Asset management
    - Rehab vs. replacement: managing infrastructure to find the lowest long-term cost options
  - Environmental management system
    - Materials and design standards
  - Strong link with energy efficiency

EPA's DWSRF Program

- Fund billions in drinking water infrastructure, projects, and assistance each year
- Water conservation and efficiency may be eligible for both loan assistance and set-aside assistance
- States can use DWSRF tools and resources to incentivize water conservation and efficiency
- For more information: www.epa.gov/safewater/dwsrf

- Examples of eligible projects:
  - Infrastructure Loans:
    - Installing water meters
    - Water-efficient devices
    - Funding incentive programs
  - Set-asides:
    - Water efficiency plans
    - Technical assistance (e.g., water audits, leak detection, and rate structure consultation)
    - Drought monitoring
    - Public education
- Green Project Reserve (GPR) has created new resources targeting projects that improve water conservation and efficiency

Green Project Reserve

- 20% of ARRA stimulus funds must be used on "green projects"
- Most common green projects are water efficiency and energy efficiency
- Congress may incorporate GPR into base program going forward
- Some projects may require a business case to be eligible
- Many States are providing additional incentives for GPR projects

- Examples of projects that may be eligible under the GPR:
  - Water audit
  - Leak detection survey or equipment
  - Installing water saving devices
  - Water meters
  - Replacing leaking pipes
  - Reclamation, recycling, & reuse

EPA's WaterSense

- EPA sponsored partnership program
- WaterSense label allows consumers to identify quality, water-efficient products
- www.epa.gov/watersense/
- Products currently certified include:
  - High-Efficiency Toilets
    Bathroom Sink Faucets
  - Flushing Urinals
  - Landscape Irrigation Services
  - New Homes (draft)
  - Showerheads (draft)
  - Pre-Rinse Spray Valves (in development)
  - Irrigation Control Technologies (in development)

Success Stories, Funding Opportunities

Vanessa Leiby, The Cadmus Group, Inc.

Case Studies

- Anderson, Indiana
- Metropolitan North Georgia Water Planning District
- Irvine Ranch Water District
- Gallitzin, PA

Anderson, Indiana

- Water meters are proven to increase water conservation, but the correct size and type of meter must be installed to realize the full benefit
- Anderson used performance contracting to survey and test existing large meters for accuracy
  - Found that 41 out of 142 large meters were improper size and/or type
  - Justified replacement cost for 31 of these

Anderson, Indiana (cont.)

- Results of meter sizing and typing project:
  - Reduced apparent water loss
  - Increased water system revenue
    - On average, water use for apartment complexes, commercial, and public facilities increased by over 40%
  - Reduced O&M costs
  - Improved accuracy of meter readings increases incentive for customers to use water efficiently

Metropolitan North Georgia Water Planning District (MNGWPD)

- District background
  - Responsible for water resource planning for 16 counties in metropolitan north Georgia
  - Area of rapid growth
  - Suffered severe drought in '07-'08
- Progressive approach to regional water supply planning focuses heavily on water efficiency, by consumers and water suppliers

MNGWPD (cont.)

- Developed Water Supply and Water Conservation Management Plan
  - Adopted in '03, amended in '07
  - 30-year projections of water supply and demand
  - Framework and strategies for water supply resource management
  - Management strategies call for intensive demand management, aggressive water conservation
  - Outlines public education plan

MNGWPD (cont.)

- In pursuit of water conservation goals, MNGWPD has comprehensive program to reduce average annual demand by 20%
- Actions include:
  - Demand-side management (fixture retrofits, education, legislation to mandate irrigation rain sensors, etc.)
  - Residential and commercial water audits
  - Establish conservation pricing
  - Require sub-meters in multi-family buildings
  - Assess and reduce system leakage
    - All water systems must conduct distribution system water audit. MNGWPD conducts workshops for water system staff on audit methodology and use of AWWA audit software.

Irvine Ranch Water District: Background

- Quick Facts
  - Population served: 150,000
  - 59,646 connections
  - 77,950 acre service area
- Scenario
  - 75% population growth in previous decade
  - Facing 20% population growth per decade
  - Drought conditions
  - Increasing wholesale water charges

Irvine Ranch Water District: Approach

- Developed 5-tiered rate structure
  - Created individualized water budget for each customer
    - (based on landscape square footage, number of residents, daily evapotranspiration, elevation, and medical needs)
  - Water rate based on percentage use of allocated water budget (lower percentage use = lower rate)
- All customers billed fixed service fee based on meter size
  - Average total bill was $20/month

Irvine Ranch Water District: Results

- Spent $5 million on conservation programs in the 6 years following implementation
- Avoided $33.2 million in water purchases over the same period
  - Averaged 12% annual residential water savings in the 6 years following implementation
  - Held water rates stable for 5 years
  - Achieved 85-95% customer approval of rate structure
- Improved water awareness on an individual level

Gallitzin, PA: Background

- Quick Facts
  - Population Served: 2,000
  - 1,000 connections
- Scenario
  - Water losses exceeded 70%
  - Averaged 309,929 gallons per day
  - Faced recurring leaks, high operating costs, low pressure and unstable water entering system

Gallitzin, PA: Approach

- Identified Leaks
  - Created production and distribution records
  - Mapped system to locate leaks (found 95%)
- Initiated a leak repair and corrosion control program
  - Received assistance from the Pennsylvania Department of Environmental Protection Small Water Systems Outreach Program
    - Helped train in how to repair system leaks, replace meters and improve customer billing

Gallitzin, PA: Results

- More efficient use of water (four years after implementation)
  - 59% decrease in water production
  - 87% decrease in unaccounted for water
- Significant cost savings
  - 61% decrease in energy costs
  - 47% decrease in chemical costs
  - Lower need to purchase water during droughts
- Extended life expectancy of equipment

Key Resources

- Drinking Water State Revolving Fund
  - EPA memo "Use of Drinking Water State Revolving Fund (DWSRF) Program Funds for Water Efficiency Measures" summarizes many water efficient projects
    - www.epa.gov/safewater/dwsrf/pdfs/memo_dwsrf_policy_2003-07-25.pdf
- American Recovery and Reinvestment Act
  - Green Project Reserve Categorical Projects
    - Water saving fixtures
    - Metering previously unmetered connections
    - Leak detection equipment
    - Water audits

Additional Resources

- AWWA WaterWiser (www.awwa.org/Resources/Waterwiser.cfm?navItemNumber=1516)
- EPA's WaterSense programs (www.epa.gov/watersense)
- Alliance for Water Efficiency (www.allianceforwaterefficiency.org)
- California Urban Water Conservation Council (www.cuwcc.org)
- National Regulatory Research Institute (www.nrri.org)
- Funding Water Efficiency Through the State Revolving Fund Programs (www.epa.gov/safewater/dwsrf/pdfs/fact_dwsrf_water_efficiency03-09-02.pdf)
- AWWA Water Audit Software (www.seo.state.nm.us/water-info/conservation/AWWA-Spreadsheet-Gallup.pdf)

Additional Resources

- National Drinking Water Clearinghouse (www.nesc.wvu.edu/ndwc/ndwc_tb_available.htm)
- Municipal Research and Services Center of Washington (www.mrsc.org/Subjects/Environment/water/wc-conservgen.aspx; and www.mrsc.org/Subjects/Environment/water/wc-measures.aspx)
- Waste Reductions Resource Center (wrrc.p2pays.org/indsectinfo.asp?INDSECT=27)
- USGBC and LEED program (www.usgbc.org; and www.usgbc.org/DisplayPage.aspx?CategoryID=19)
- NYSERDA (www.nyserda.org)
- National Rural Water Association (www.nrwa.org)
- Rural Community Assistance (www.rcap.org)

Questions and Answers

Facilitator, Vanessa Leiby, The Cadmus Group, Inc.

THANKS FOR PARTICIPATING!

IF YOU HAVE FOLLOW-UP QUESTIONS, PLEASE CONTACT MIKE FINN:

Finn.Michael@epa.gov

or check EPA's Web site:

www.epa.gov/ogwdw