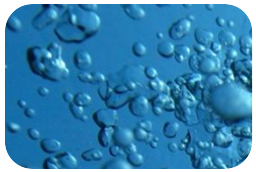
Water Supply Planning For a Growing Community in an Arid Climate

2011 AWWA PNWS Conference
Boise, Idaho

Presented By: Kyle Radek – City of Meridian
David Stangel - MSA

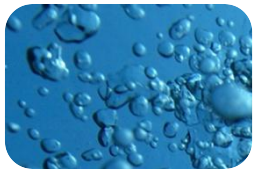
MSA

Outline



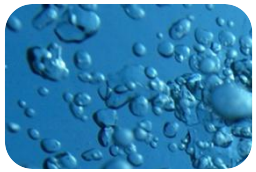
- Drivers For Project
- What's Unique About Meridian
- Existing and Future Demand
- Areas with Separate Irrigation Water
- Conservation Planning
- Future Water Supply Needs
- City’s Next Steps
- Summary

Project Drivers



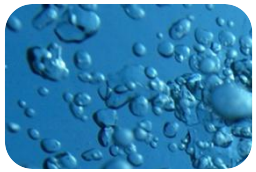
- City Undertaking Water Master Plan Update
- City is Proactive and Progressive
  - Wanted to look at Water Supply beyond strict DEQ Requirements
  - Leading other Idaho Municipalities in the use of Reclaimed Water
- Had Experienced Water Quality Issues at Some Wells
- Concerned that an East Snake Plain Conjunctive Management scenario could occur in the Treasure Valley

Current Supply



- 19 Wells
- 45 MGD of “Total” Supply Pumping Capacity
- 40 MGD of “Firm” Pumping Capacity
- 4 Pressure Zones – Soon to Be 5
- City has Built Extensive Redundancy Into System with 2 way Automated Valving at Zone Boundaries
  - Allows Water to be Served to a Higher Zone During Emergency

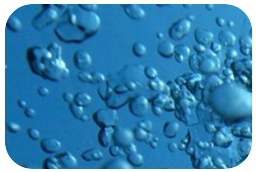
Current Demands



- 2007 – 2009 Production Data
- Average Day Demand (ADD) 8.3 - 9.5 mgd
- Maximum Day Demand (MDD) 15 – 19 mgd
- Peak Hour Demand (PHD) 24 – 30 mgd

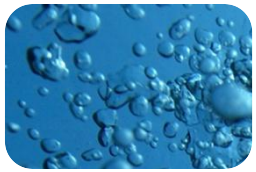
- Historical Ratios:
  - MDD/ADD Ratio: 2.0
  - PHD/ADD Ratio: 3.0

Current Summary



- Current Surplus of Supply of Approximately 10 mgd Under Firm Capacity Pumping Comparisons
  - Dependent on Location of Demand Relative to Sources
- Major Question: Does City Continue to Serve Peak Hour Demand or Max Day Plus Fire from Wells?

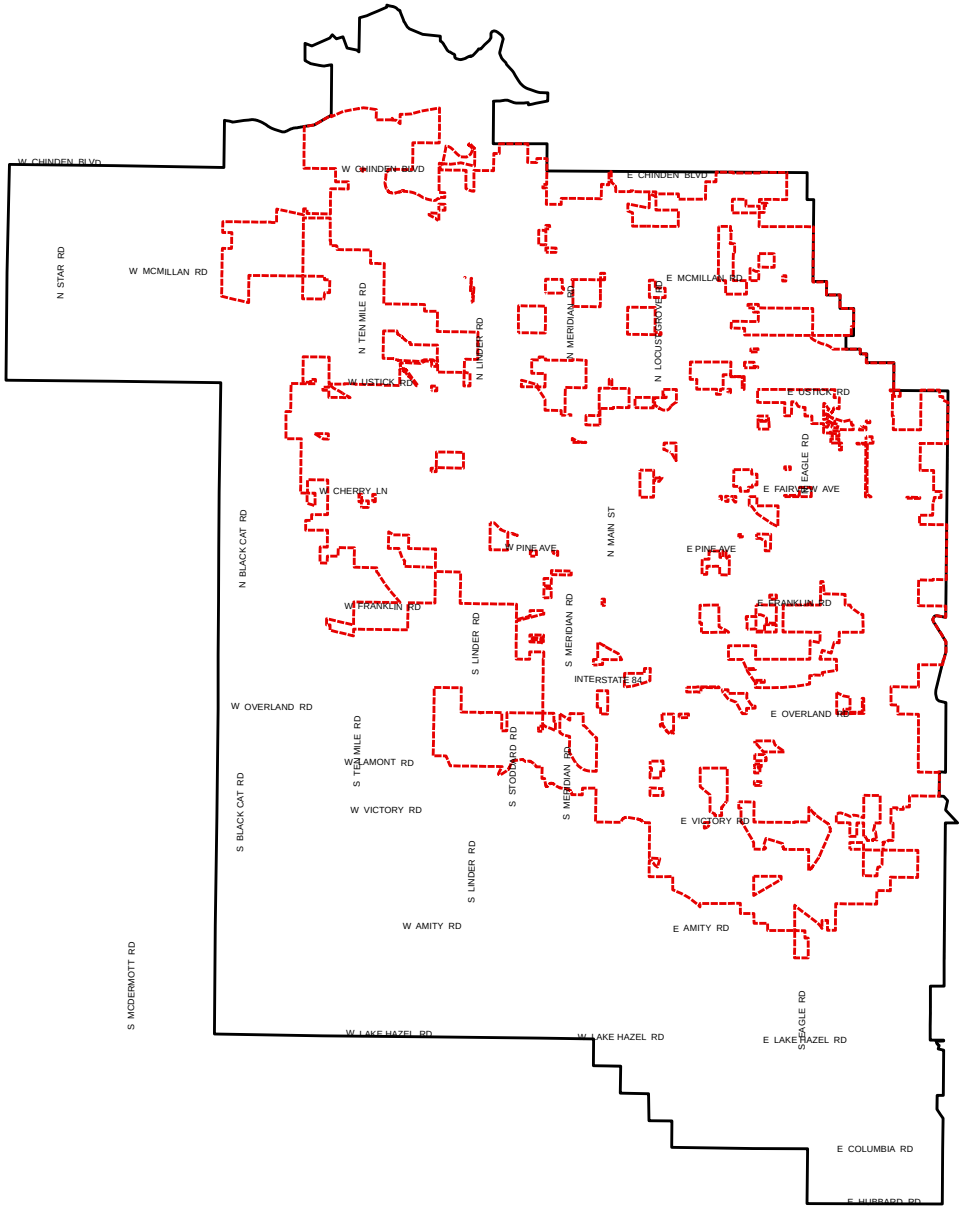
Population Projections



- COMPASS Provided:
  - Planning Information through Build-out by Traffic Analysis Zone (TAZ)
- For 0 – 20 Years, Projections Will be Made by Pressure Zone
- Beyond 20 Years, Projections Are Focused on Overall System

Note: DEQ Only Requires a 20 year Projection in Master Plans

Service Area Projections



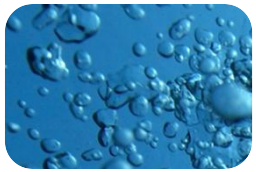
Legend

- **Meridian City Limits**
- **Meridian Impact Area**

Service Area Boundary

- 2010
- 2020
- 2030
- 2060 to Build Out

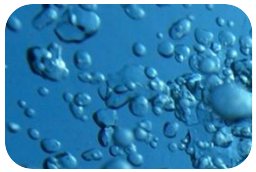
Population Projections

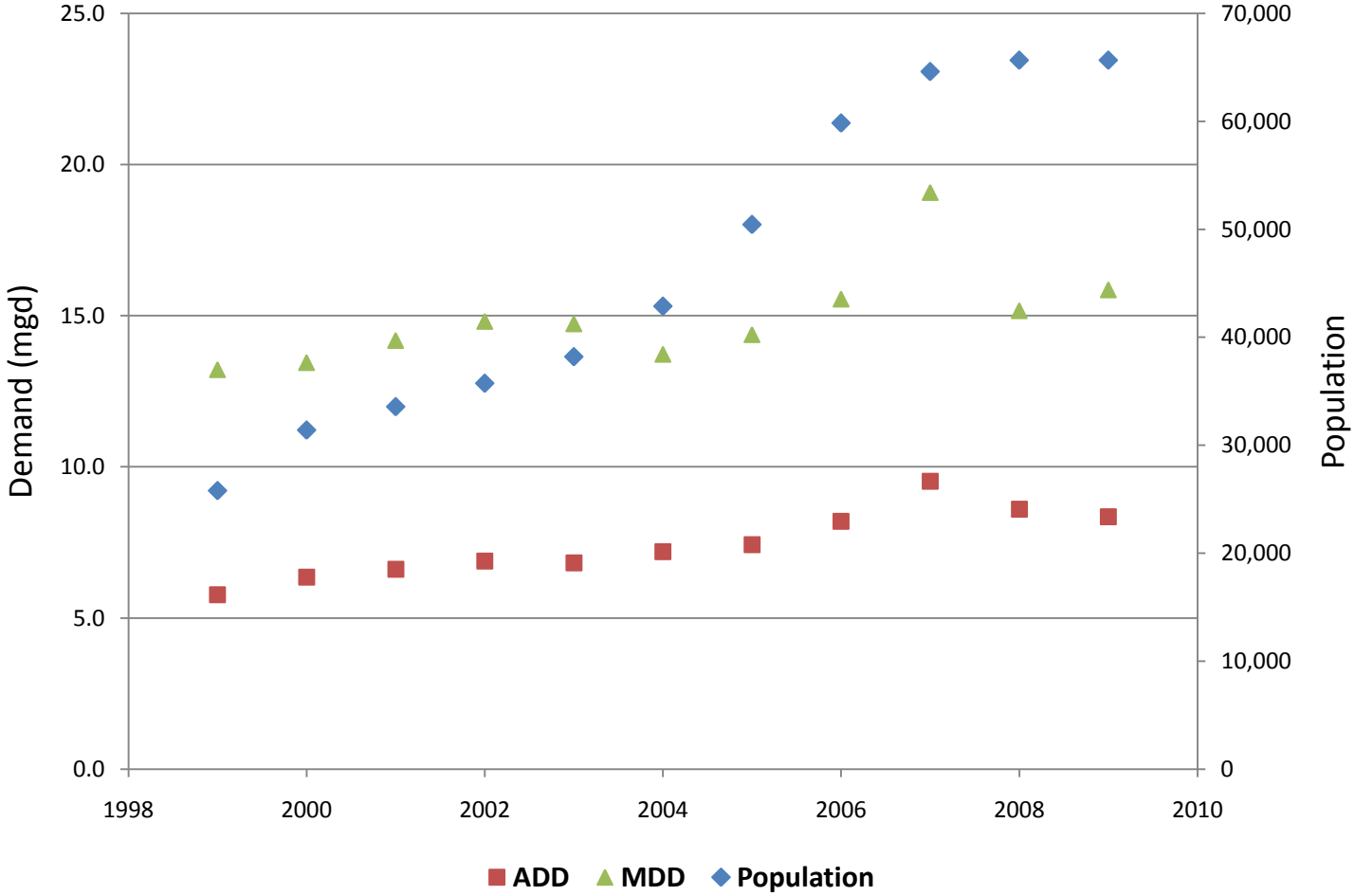


Year	Population*
2010	65,000-70,000
2020	104,000
2030	140,000
2060	252,000
Build Out	345,000

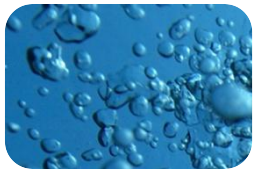
*Service Area Population

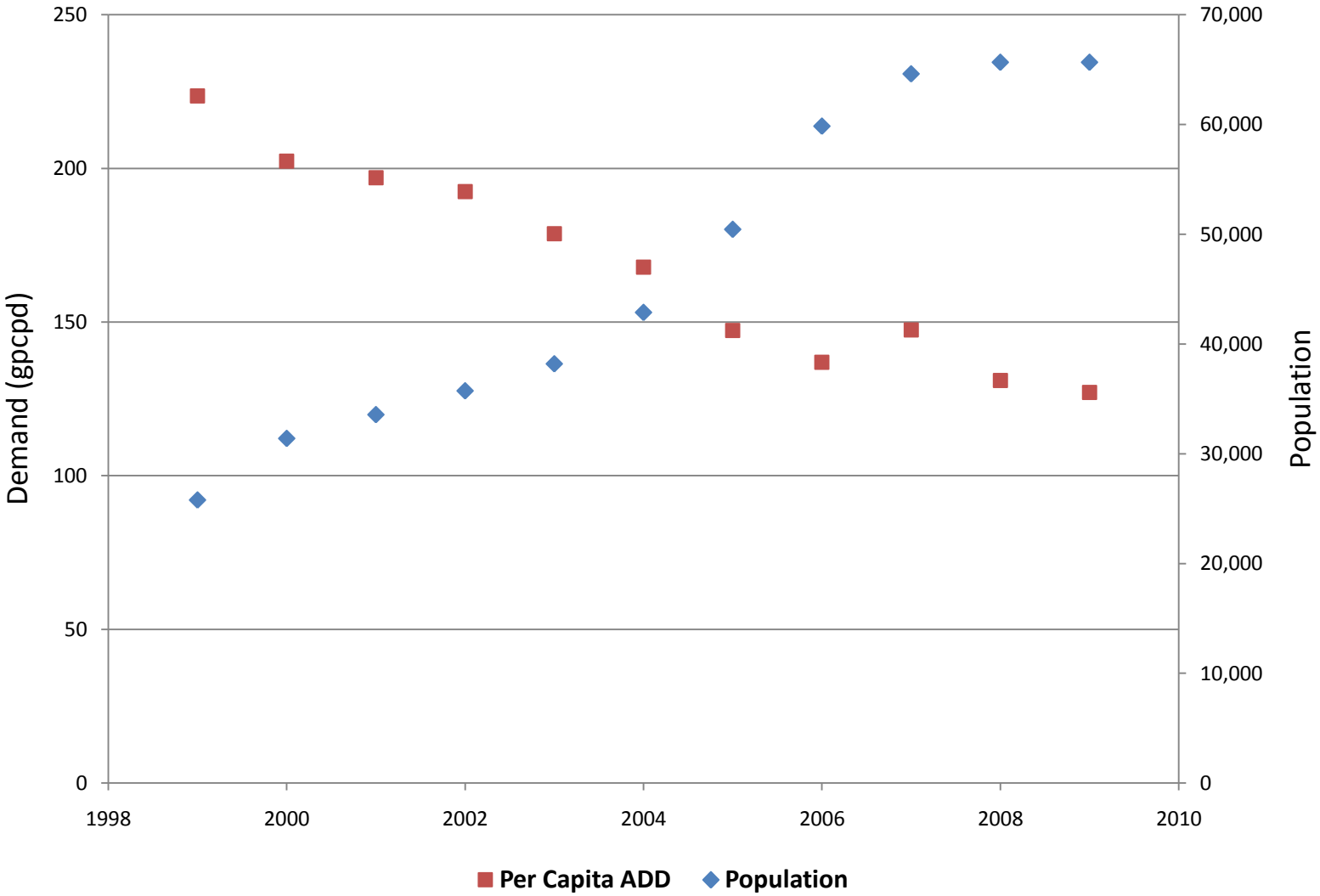
Historic Water Use



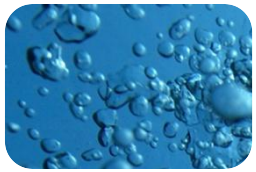


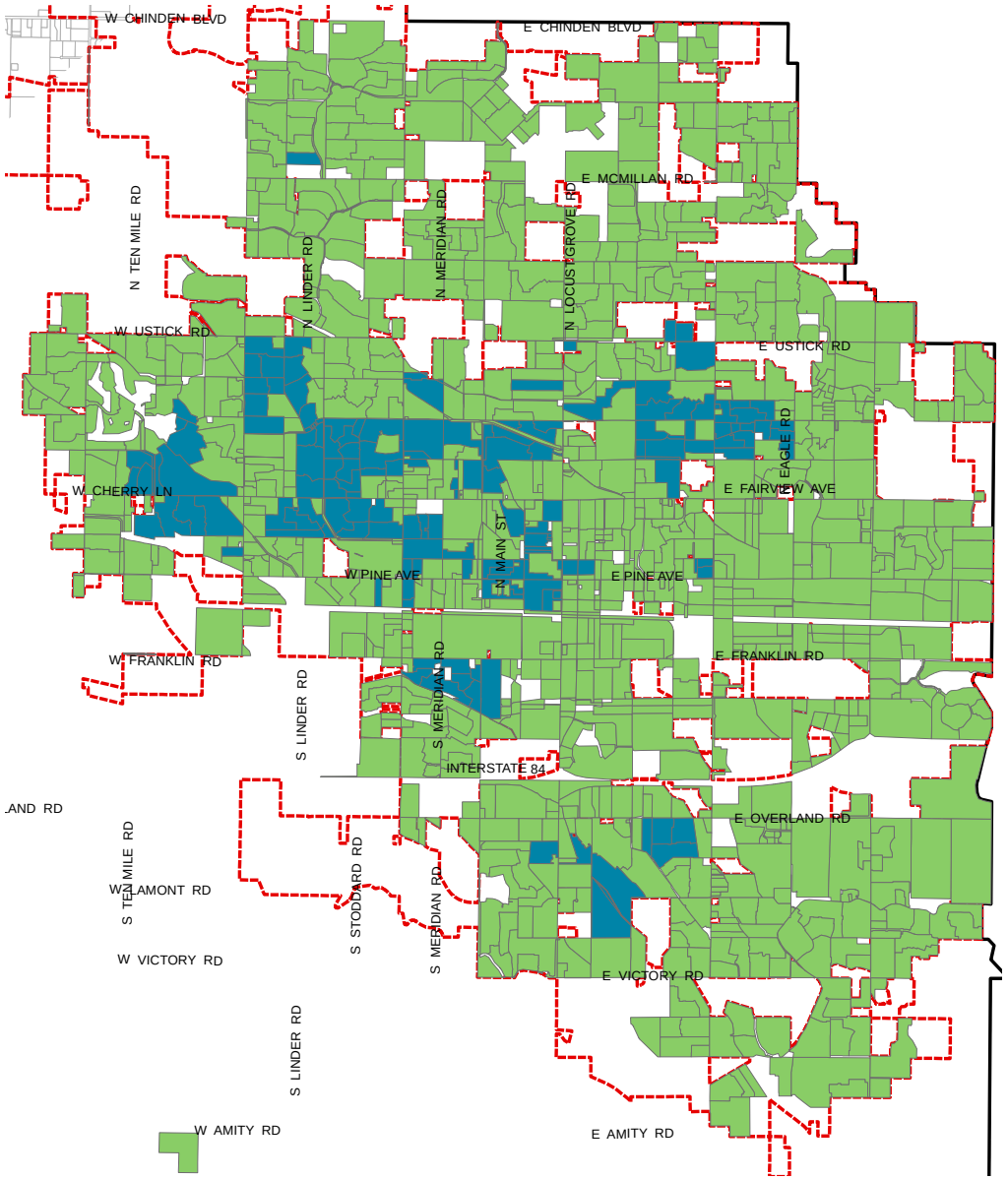
Historic Per Capita Water Use





Potable/Non-Potable Irrigation

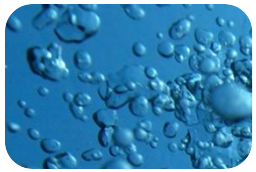




Legend

- Meridian City Limits
- Non-potable Irrigation
- Potable Irrigation

Potable Water Usage Factors



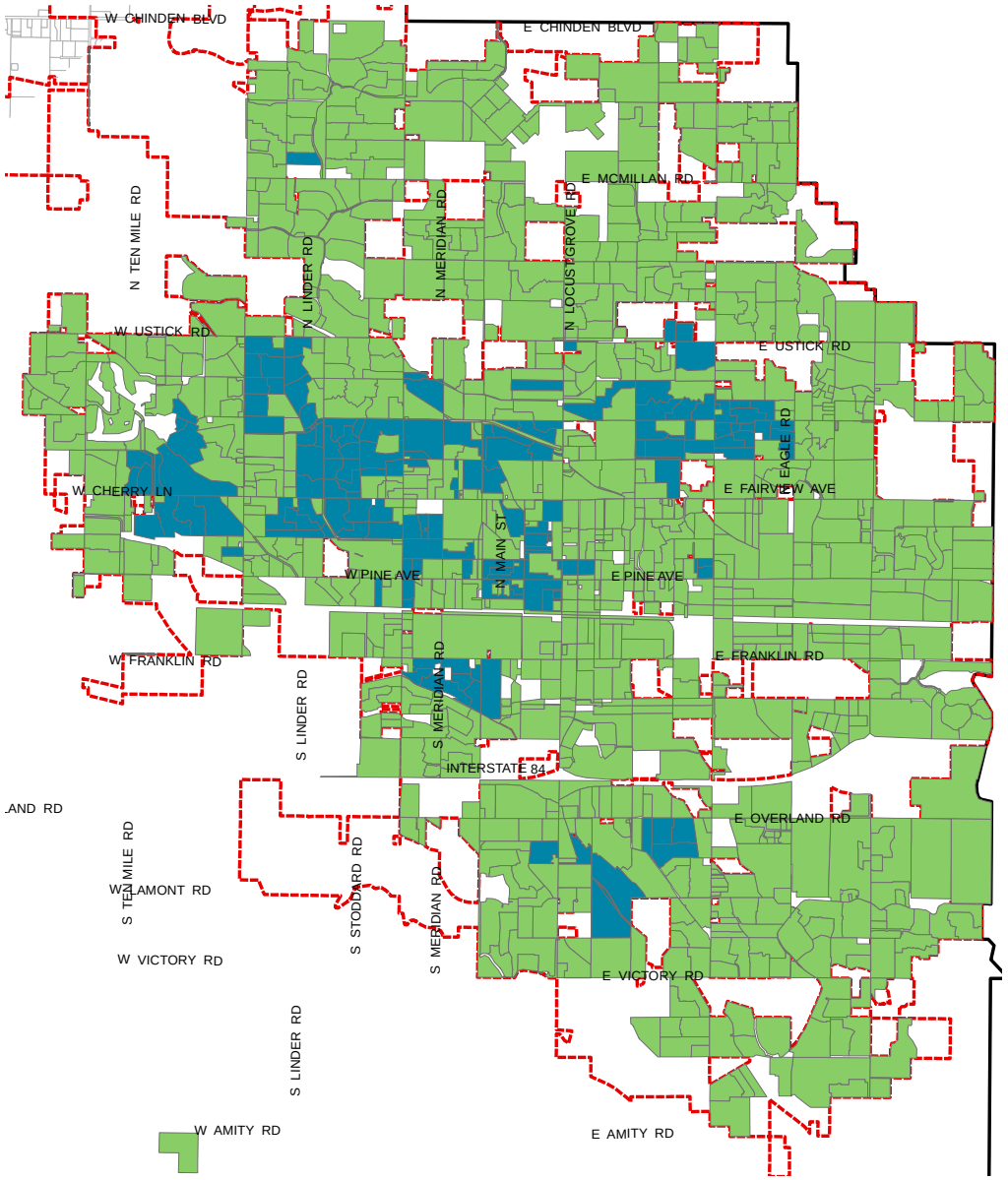
- System-wide Average of 130 gpcpd
- Areas Using Potable Irrigation Average 215 gpcpd
- Areas With Non-Potable Irrigation Average 110 gpcpd

- City Assumes All New Development will Include Non-Potable Irrigation

- Question: What Water Use Factor Should be Used for Future Projections?

Potable/Non-Potable Irrigation

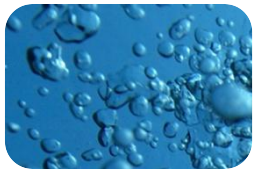
Potential Potable Water Savings	
Population	13,000
ADD	1.4 mgd
MDD	2.8 mgd
PHD	4.2 mgd

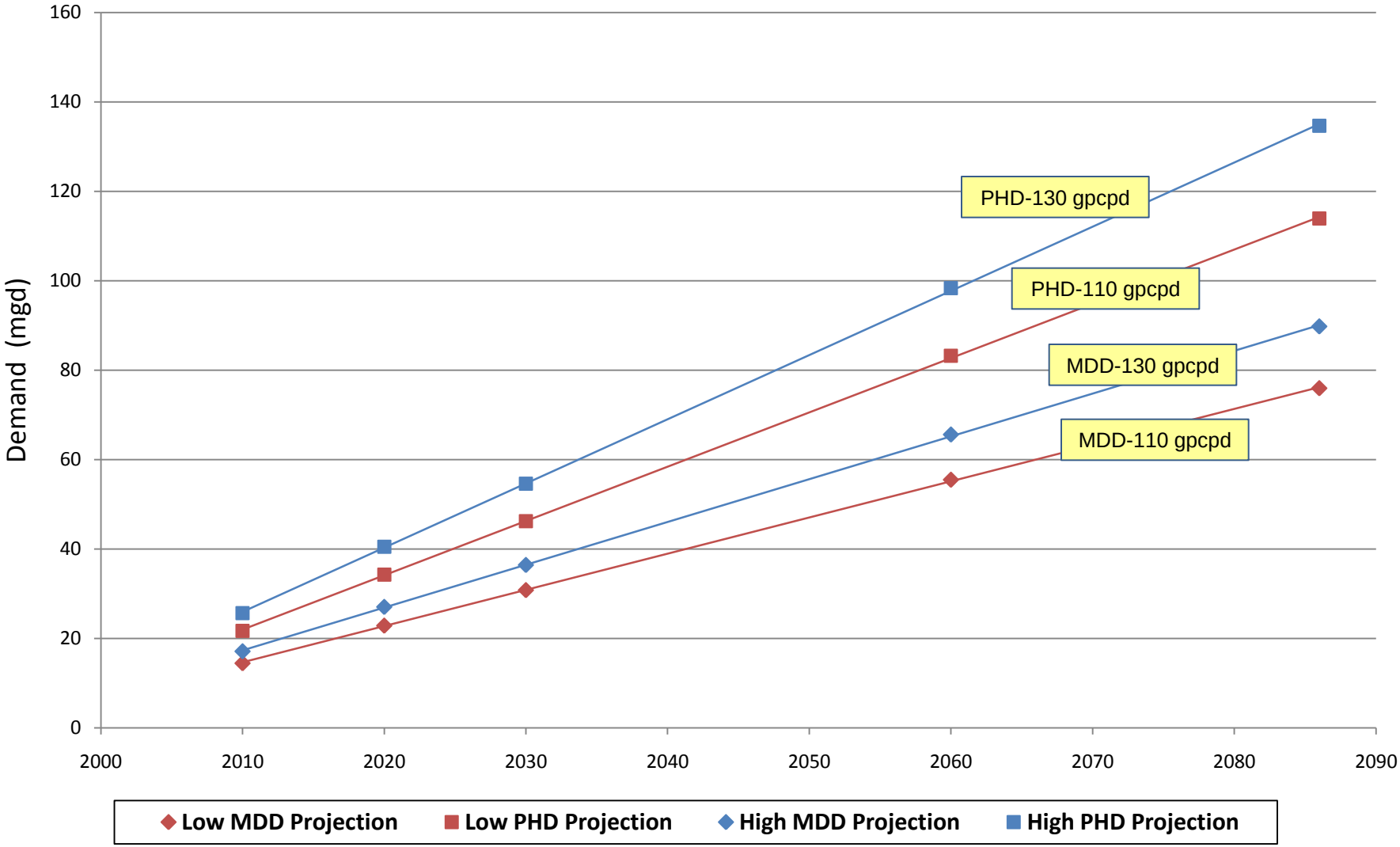


Legend

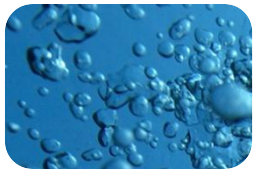
- Meridian City Limits
- Non-potable Irrigation
- Potable Irrigation

Water Use Projections





20 Year Water Use Projections

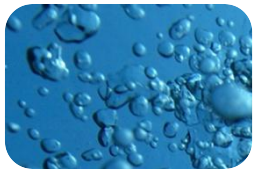


- Assuming 130 gpcpd the City Will Need:
  - 36 mgd to serve MDD (no new wells required)
  - 55 mgd to serve PHD (+ 15 mgd, 23 cfs) (5 wells)

- Assuming 110 gpcpd the City Will Need:
  - 31 mgd to serve MDD (no new wells required)
  - 46 mgd to serve PHD (+6 mgd, 9 cfs) (2 wells)

*Assumes Each Well Produces 3 mgd

50 Year Water Use Projections

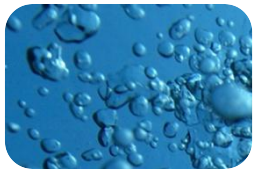


- Assuming 130 gpcpd the City Will Need:
  - 66 mgd to serve MDD (+ 26 mgd, 39 cfs) (9 wells)
  - 98 mgd to serve PHD (+ 58 mgd, 87 cfs) (20 wells)

- Assuming 110 gpcpd the City Will Need:
  - 56 mgd to serve MDD (+16 mgd, 24 cfs) (6 wells)
  - 83 mgd to serve PHD (+43 mgd, 65 cfs) (15 wells)

*Assumes Each Well Produces 3 mgd

Build Out Water Use Projections

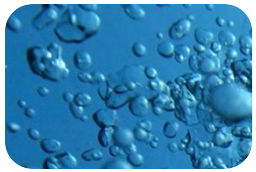


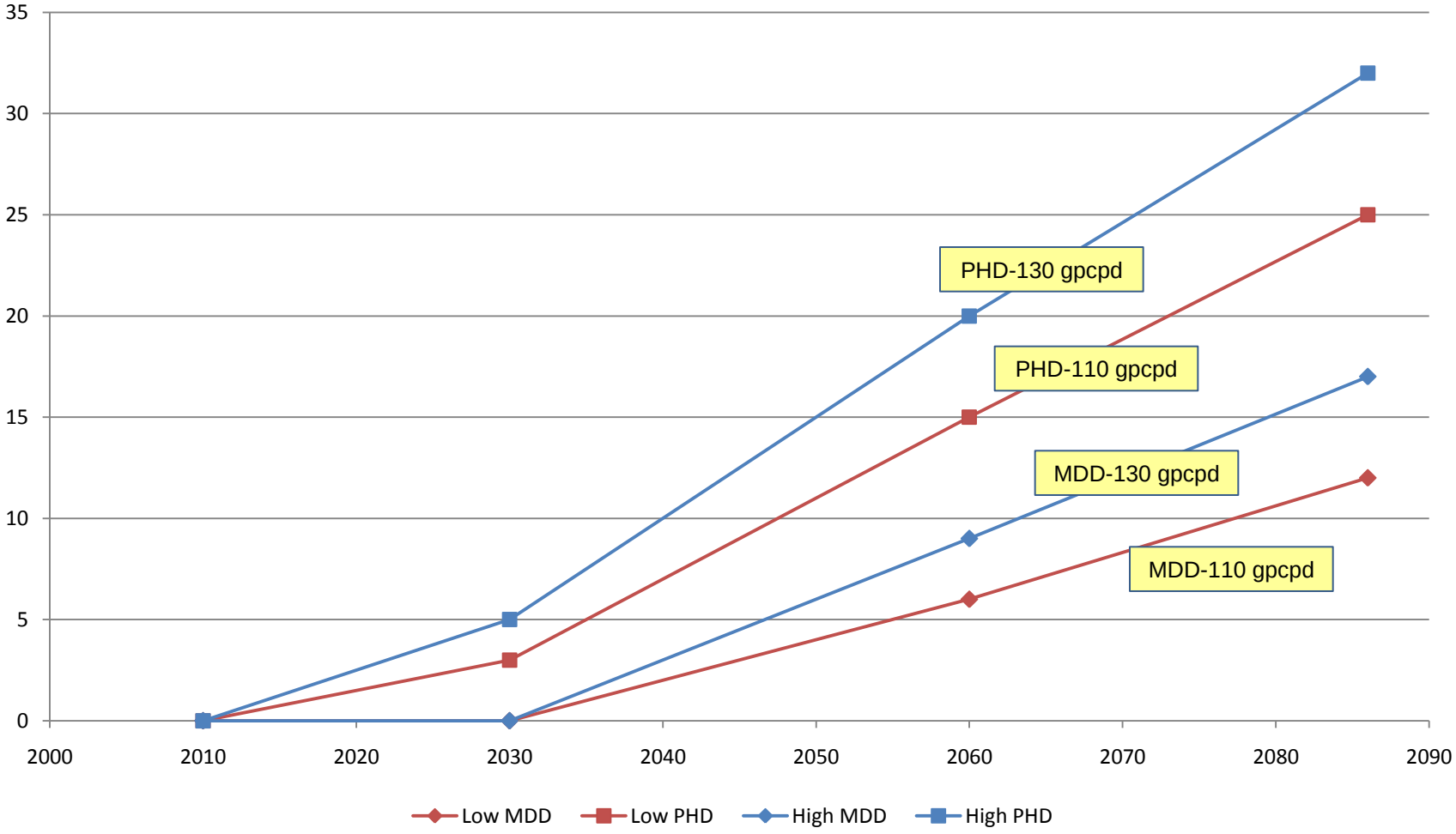
- Assuming 130 gpcpd the City Will Need:
  - 90 mgd to serve MDD (+ 50 mgd, 77 cfs) (+17 wells)
  - 135 mgd to serve PHD (+ 95 mgd, 147 cfs) (32 wells)

- Assuming 110 gpcpd the City Will Need:
  - 76 mgd to serve MDD (+ 36 mgd, 56 cfs) (12 wells)
  - 114 mgd to serve PHD (+74 mgd, 176 cfs) (25 wells)

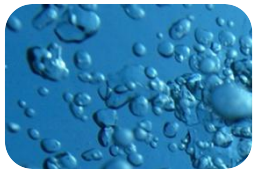
*Assumes Each Well Produces 3 mgd

Required New Wells



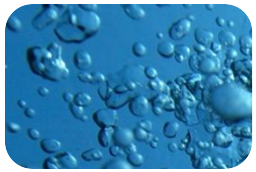


What Should the City do Now?



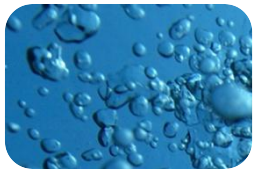
- Continue to Be Proactive
  - Reasonable Anticipated Future Needs (RAFN) Request
- Maintain More than 1 Well Redundancy in Each Zone
  - Hedge against Water Quality Issues or Mechanical Failure
  - Construct Additional Ground Storage to Eliminate Wells Needing to Meet Peak Hour Pumping Requirements
- Conservation
- Update Planning Documents every 5 +/- Years
- Evaluate Long Term Alternative Water Supplies

Conservation Plan



- City staff recognized that conservation is a key element for long term planning
- Reductions in per capita demands equate to millions of gallons per day in the future
- Benefits:
  - Decrease reliance on developing new sources
  - Delay or reduce capital investments for water and wastewater
  - Reduce operation and maintenance costs for water and wastewater
  - Improve supply reliability
  - Encourage the most beneficial use of available water for residents of Meridian and the surrounding area

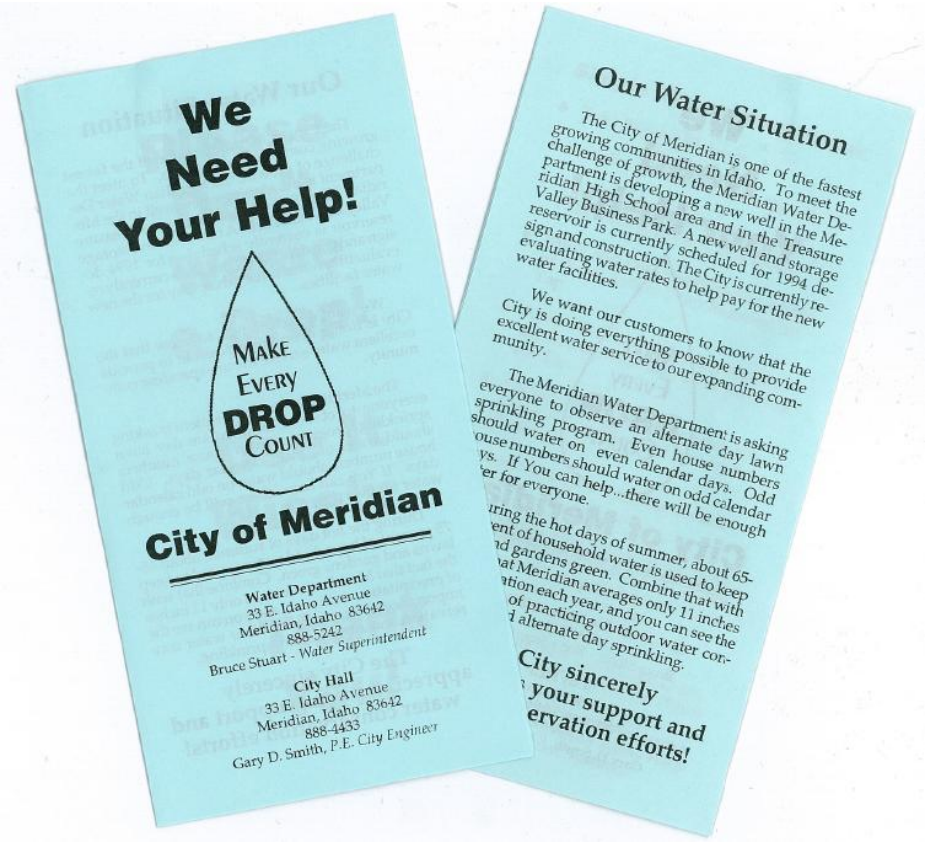
Conservation Plan



- Master Plan update facilitated interest in Conservation Plan
- Water Supply Workshop helped frame the conservation discussion
- Questions:
  - Is use of surface water vs potable water really conservation?
  - What water should we be worried about conserving?
  - Could conservation of surface water have undesirable consequences?

Conservation Plan

- Past efforts focused on immediate needs / potential shortages due to demand growth outpacing system growth



We Need Your Help!

Make Every DROP Count

City of Meridian

Water Department
33 E. Idaho Avenue
Meridian, Idaho 83642
888-5242
Bruce Stuart - Water Superintendent

City Hall
33 E. Idaho Avenue
Meridian, Idaho 83642
888-4433
Gary D. Smith, P.E. City Engineer

Our Water Situation

The City of Meridian is one of the fastest growing communities in Idaho. To meet the challenge of growth, the Meridian Water Department is developing a new well in the Meridian High School area and in the Treasure Valley Business Park. A new well and storage reservoir is currently scheduled for 1994 design and construction. The City is currently reevaluating water rates to help pay for the new water facilities.

We want our customers to know that the City is doing everything possible to provide excellent water service to our expanding community.

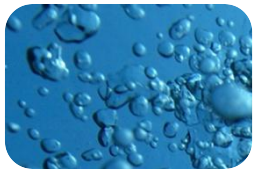
The Meridian Water Department is asking everyone to observe an alternate day lawn sprinkling program. Even house numbers should water on even calendar days. Odd house numbers should water on odd calendar ys. If You can help...there will be enough er for everyone.

ring the hot days of summer, about 65- ent of household water is used to keep nd gardens green. Combine that with at Meridian averages only 11 inches ation each year, and you can see the of practicing outdoor water con- d alternate day sprinkling.

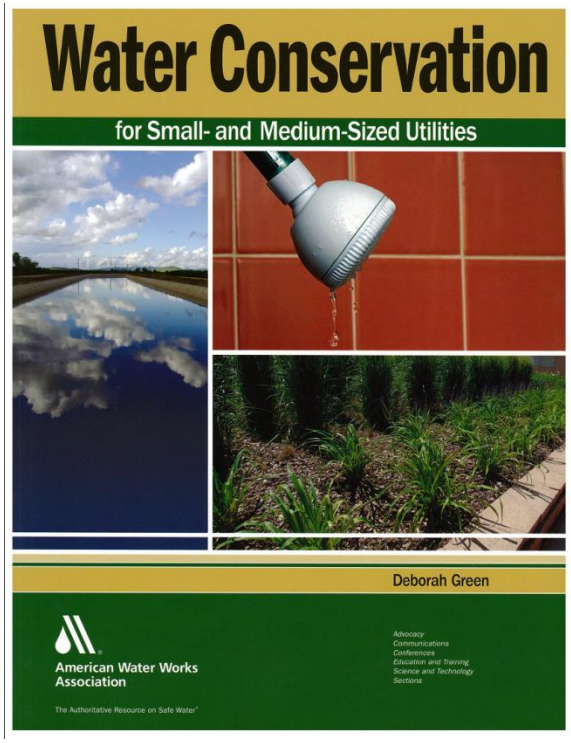
City sincerely
your support and
ervation efforts!

1993 Flyer

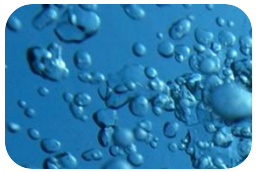
Conservation Plan



- Plan development process
  - Working Group of Stakeholders
    - Major commercial users
    - Interested residential users
    - Regional stakeholders
- Determine goals and objectives for plan
- Recommend conservation measures to implement
- Propose a Plan for City Council Approval



Conservation Plan

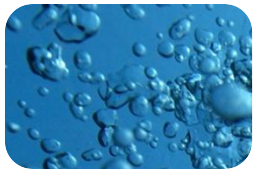


Different Perspectives

- Develop stakeholder groups and lobby state offices and political bodies
- Change rate structure

- Control the "*controllables*"
- Keep water affordable

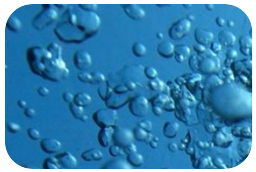
Conservation Plan



- Common Ground:
  - Shared resource requires shared efforts to conserve
  - Need to collect and analyze data to understand sustainable yield of water supply

  - Public Education is a key to success
  - Development of Reclaimed water program is a key to success

Conservation Plan



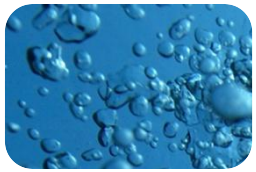
- Current working group efforts:
  - Weigh costs and benefits of different conservation measures

- Interesting and unconventional ideas

Future Water Supply

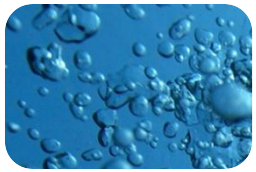
- Evaluate Risks to Supply
  - Water Quality
    - Regulated Contaminants Above the MCL
  - Water Quantity
    - Poor Well Production
    - Water Rights are not Available
  - Conjunctive Management of WR in the Treasure Valley
    - Senior Surface Water Rights Holders Make a "Call" on Groundwater Users
  - Climate Change
  - Regulatory Changes

Future Water Supply



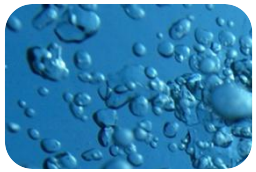
- Mitigation of Water Supply Risks
  - Reduce Demand (per capita, average and peak)
    - Conservation
    - Reclaimed Water Use for Irrigation, Industrial, Other?
  - Above Ground Storage
    - Supply Peak Hour and Fire Demands from Tanks
    - Use Tanks for “Blending” of Water Supplies
  - Maintain Additional Well Buffer Beyond DEQ Requirements
  - Diversify Supply
    - Form Alliances with Surface Water Right Holders
    - Purchase Senior Groundwater or Surface Water Rights

Summary



- Significant Incentive to Maintain or Reduce Per Capita Usage Rates
  - Supports Current City Conservation and Reuse Efforts
- Important Decision on Whether to Serve MDD or PHD from Wells
- Regardless of Per Capita Usage Rates or Rates of Growth, City will Need Additional Supply

Take Away

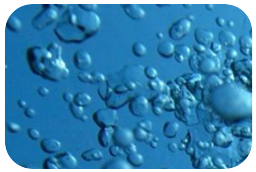


We are Lucky with the Great Surface and Groundwater Supplies in the Treasure Valley….

however we do live in a desert and water will only become a more precious (and costly) resource in the future

Start Planning For It!!

Thank You



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- David Stangel – ds@msa-ep.com

Questions