101

Dennis Garcia, Assistant General Counsel, Microsoft Corporation

NARUC Winter Committee Meetings, Committee on Water

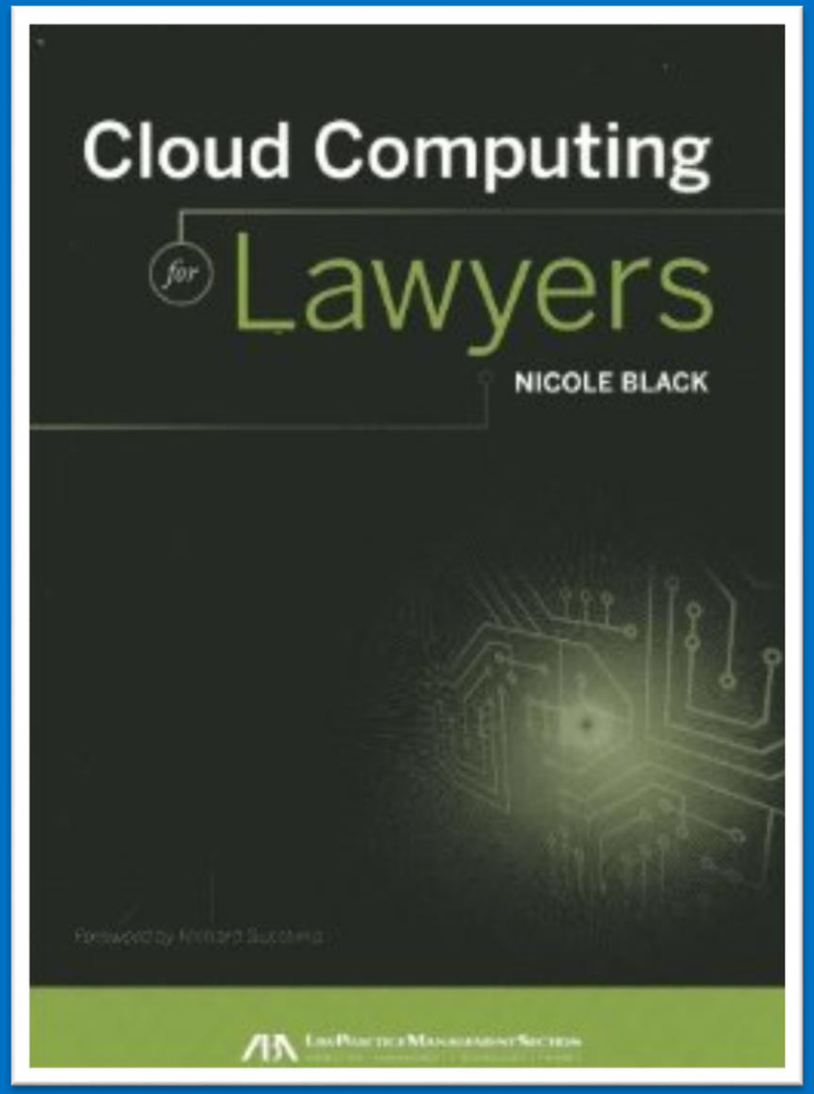
"Smart" Ways to Manage Water: The Benefits of Cloud Computing

February 15, 2016

Washington, D.C.

Microsoft

Cloud Computing for Lawyers



Microsoft

Cloud Computing is Not New - It's Ubiquitous

- Web Hosted Email

- Rise of "Smartphones"

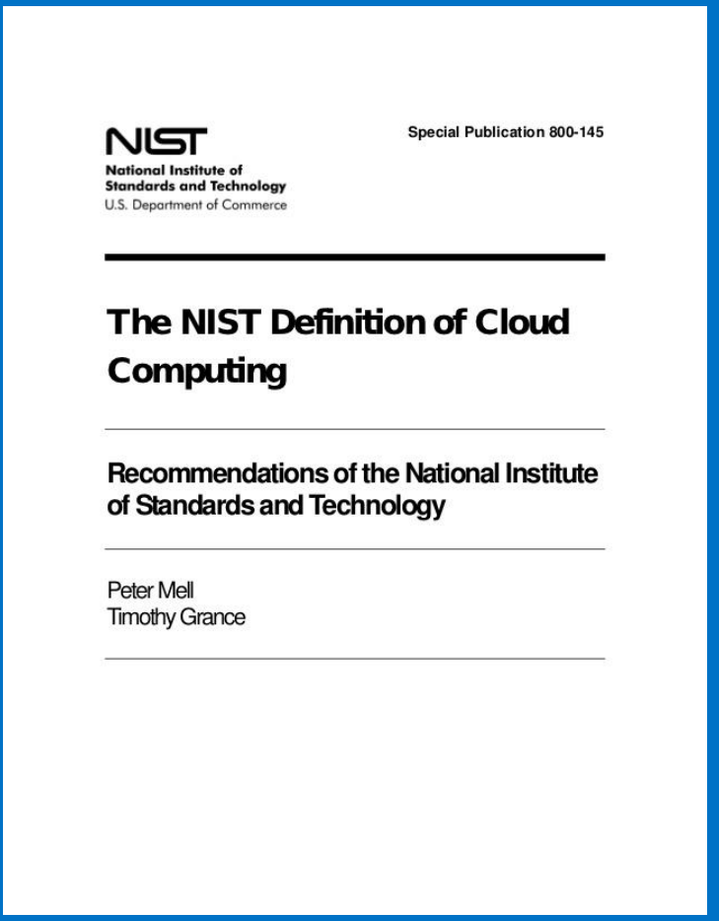
- Social Media Usage

Microsoft

Formal Cloud Computing Definition

NIST
National Institute of Standards and Technology

2011


NIST
National Institute of Standards and Technology
U.S. Department of Commerce

Special Publication 800-145

The NIST Definition of Cloud Computing

Recommendations of the National Institute of Standards and Technology

Peter Mell
Timothy Grance

http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf

Microsoft

Simple Cloud Computing Definition

"a fancy way of saying stuff's not on your computer." *

*Quinn Norton, "Byte Rights," Maximum PC, September 2010, at 12.

Microsoft

Cloud Computing = Off-Premises Computing

Microsoft

Cloud Computing = Data Centers

Microsoft

Data Centers Under the Sea

Microsoft

The “Big 3” of the Cloud

- Software as a Service (“SaaS”)

- Infrastructure as a Service (“IaaS”)

- Platform as a Service (“PaaS”)

Microsoft

Cloud Benefits

- Cost Savings
- Scalability
- Improves Productivity
- Focuses on Your Core Business
- Enhanced Security

Microsoft

Cloud Concerns

- Security
- Bigger Target for Hackers
- Hidden Costs
- Migration of Data
- “Locked In” to Cloud Provider

Microsoft

Crowded Cloud Provider Market

- Traditional IT Providers
- “Born in the Cloud” IT Providers
- Small & Newer IT Providers
- Providers from Other Markets

Microsoft

Goal: Find a Trusted Cloud Provider

Organizations will use technology
only if they can trust it

Microsoft

Trusted Cloud Provider Framework

Protect

Commitment to the protection of your data in cloud services

Comply

Meet your compliance needs when using cloud services

Control

Maintain control of your data in cloud services

Transparency

Understand what happens with your data in cloud services

Third Party Resources

International Association of Privacy Professionals (IAPP)
http://privacyassociation.org

Cloud Security Alliance (CSA)
http://cloudsecurityalliance.org

Privacy Rights Clearinghouse
http://www.privacyrights.org

Electronic Frontier Foundation (EFF)
http://www.eff.org

Microsoft

Dennis Garcia Contact Information

312.920.5413

dennisga@microsoft.com

www.linkedin.com/in/dennisgarciamicrosoft

http://twitter.com/denniscgarcia

Microsoft

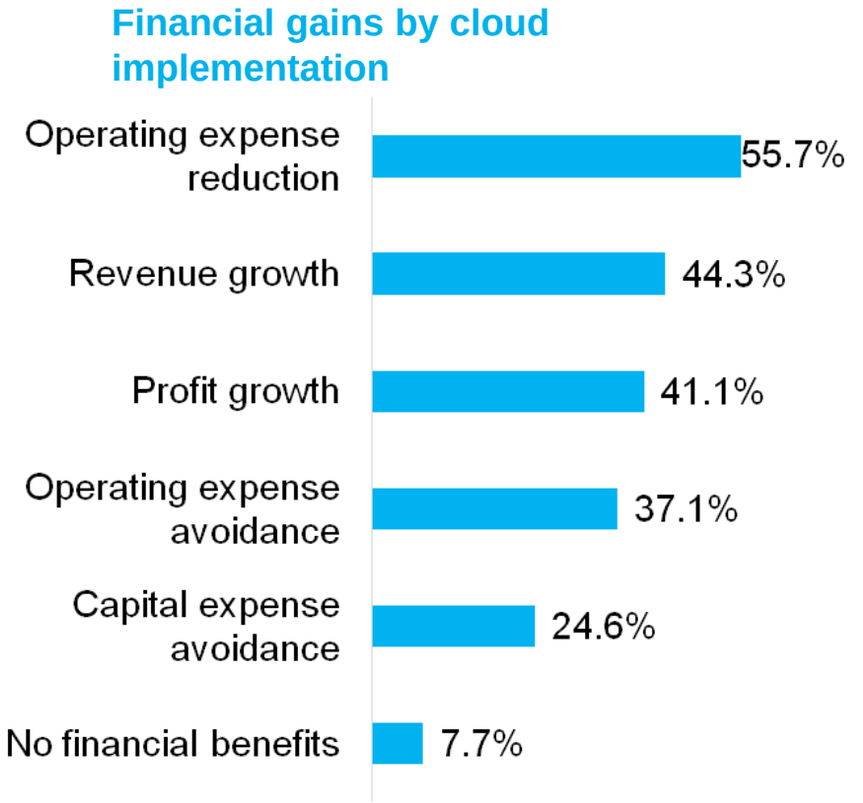
Microsoft

NARUC Cloud Panel

Cloud enabled solutions, collaboration tools, and analytics improve the customer experience and operational efficiency

Cloud has enabled various industries to tackle specific business problems and improve financial performance

- Assisted various industries in meeting their business objectives more effectively thereby reducing the operating expenses
- Enabled various industries to expand the customer interaction channels resulting in revenue growth
- Supported expansion of various industries to newer geographies with minimum capital investment



Source: Economist Intelligence Unit Cloud survey commissioned by IBM, unpublished cross industry data, 2015, Question: 13. Which of the following financial benefits has your organization realized because of cloud technologies during the last two years?, n=784

Security

- IBM is working with a major electric power Distribution Management System vendor, at utility's request, to do a Proof of Concept on DMS in the Cloud
- Some Cloud providers give full security control panels for the utility
  - Providing a level of command close to what IT could do before Cloud
- Standardization of operational processes in Cloud help maintain version and security patch levels

Capital Expenditure Versus Operational Expenditure

- Many utilities are given a fixed rate of return on capital
  - Preferring CapEx over OpEx assumes more capital obtains more revenue
  - This is true if capital is unlimited

- In fact, there is a certain amount of capital that utilities can obtain
  - Therefore, which capital projects are put forth in a rate case are competitive within the utility
  - IT is one of the few departments that can give up capital for operational expense by using Cloud

- Financial Accounting Standards Board
  - “Customer’s Accounting for Fees Paid in a Cloud Computing Arrangement “
  - http://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1176165941746&acceptedDisclaimer=true

Cloud Benefits: Customer

- Faster deployment of new technologies, such as Customer Information Systems
  - Faster Proof of Concept , faster trials, without IT infrastructure
  - Faster, easier connections to other supporting data sources
  - Quicker time to benefit from software improvements
- Integrate with municipal databases to finding all revenue city is due
  - Increasing revenue and fairness for customers who are paying for the water they actually use
- Evolving expectations of customers in a digital age
  - Outage reporting, third party notification, problem reporting app
  - Ask not “is there an app for that, ask why isn’t there an app for that?”

Adapted from “Water World” magazine, volume 29, issue 3

Cloud Benefits: Utility

- A water utility began with Cloud, then created a utility-to-utility managed service and outsourcing program spin-off
  - Built on experience with customer information systems, automated metering infrastructure and asset management
- Cloud-based system is designed to help municipal water utilities meet the evolving needs of their customers, with virtually no risk or up-front costs
- Offers 3,000 standard work orders and documents applicable to most small to midsize utilities
  - Example: All fire hydrants constructed of essentially the same components. In theory can all have the same work order system
  - Geospatial audit of all customers, insuring they are correctly identified and categorized within the information system
- See also IEEE Power and Energy Society panel on “Cloud Computing for Power System Analysis and Operations”, Denver, July 2015 General Meeting

Adapted from “Water World” magazine, volume 29, issue 3

Cloud Benefits

- Access to state of the art computational services
  - Cognitive computing
    - *For realistic in-depth customer interaction, or support of Customer Service Representatives*
    - *For smarter fault detection*
    - *For increased situational awareness security*
  - Fast Access to High Performance Computing on Demand
    - *For rapid scenario analysis during emergencies*
    - *Future casting*
  - Internet of Things platforms
    - *Faster adoption of new sensor technologies such as leak detection and corrosion*

A national electricity grid operator uses cloud, predictive modeling and analytics for condition-based maintenance

Business Challenge

Power grid operators need to rely on costly traditional scheduled asset maintenance to ensure the highest availability and reliability of power transmission because they could not plan maintenance around actual asset conditions.

The Smarter Solution

With a cloud-based big data and analytics solution, this national electricity grid operator has a 360-degree view of its assets from the transformer level to the entire grid. Predictive modeling and advanced analytics provide not only near-real-time asset status, but also long-term projections of maintenance requirements, helping the company plan future preventive maintenance. The company can now plan maintenance for each asset on an as-needed basis, rather than scheduling simultaneous maintenance for all assets of that type, adding to cost reductions.

Business Results

- **23%** reduction in operating expenses with condition-based maintenance
- Provides alerts facilitating proactive rather than reactive responses
- Eliminates costs of implementing or replacing infrastructure by using cloud-based hosting

Source: See speaker notes

US utility analyzes acoustic data to pinpoint and repair small leaks to avoid big water main failures

Based in the US, this company is a not-for-profit water supply agency, which provides water to more than one million people in the district

Business Challenge
Tiny water main leaks can turn into catastrophic ones, the kind that can badly disrupt traffic flow along this US city's major thoroughfare. The city's water utility wanted more of a choice than simply digging up streets to find small leaks or waiting for the big failures that they grow into. It sought a noninvasive means of monitoring mains.

The Smarter Solution
The agency deployed a leading-edge leak-detection system that uses networks of acoustic sensors to monitor the water mains running beneath four miles of its main strip. The solution captures sound signals from pipeline sensors and transmits it to the cloud, where advanced acoustic algorithms separate the normal noises within the pipeline from the acoustic signature of a leak.

Reduction in leaks: Up to 30% reduction in water main leaks and revenue loss is expected for the water utility

Avoiding big failures: Big failures were avoided by enabling the early detection and preventive repair of smaller leaks that lead to larger ones

Improved efficiency: Through the automation of leak detection and work order generation, there was improvement in efficiency of repair operations

Source: Please see speaker notes

American Water Works Association

The Authoritative Resource on Safe Water®

AWWA and Affordability of Water

J. Alan Roberson, P.E.
Director of Federal Relations
AWWA-Washington, DC

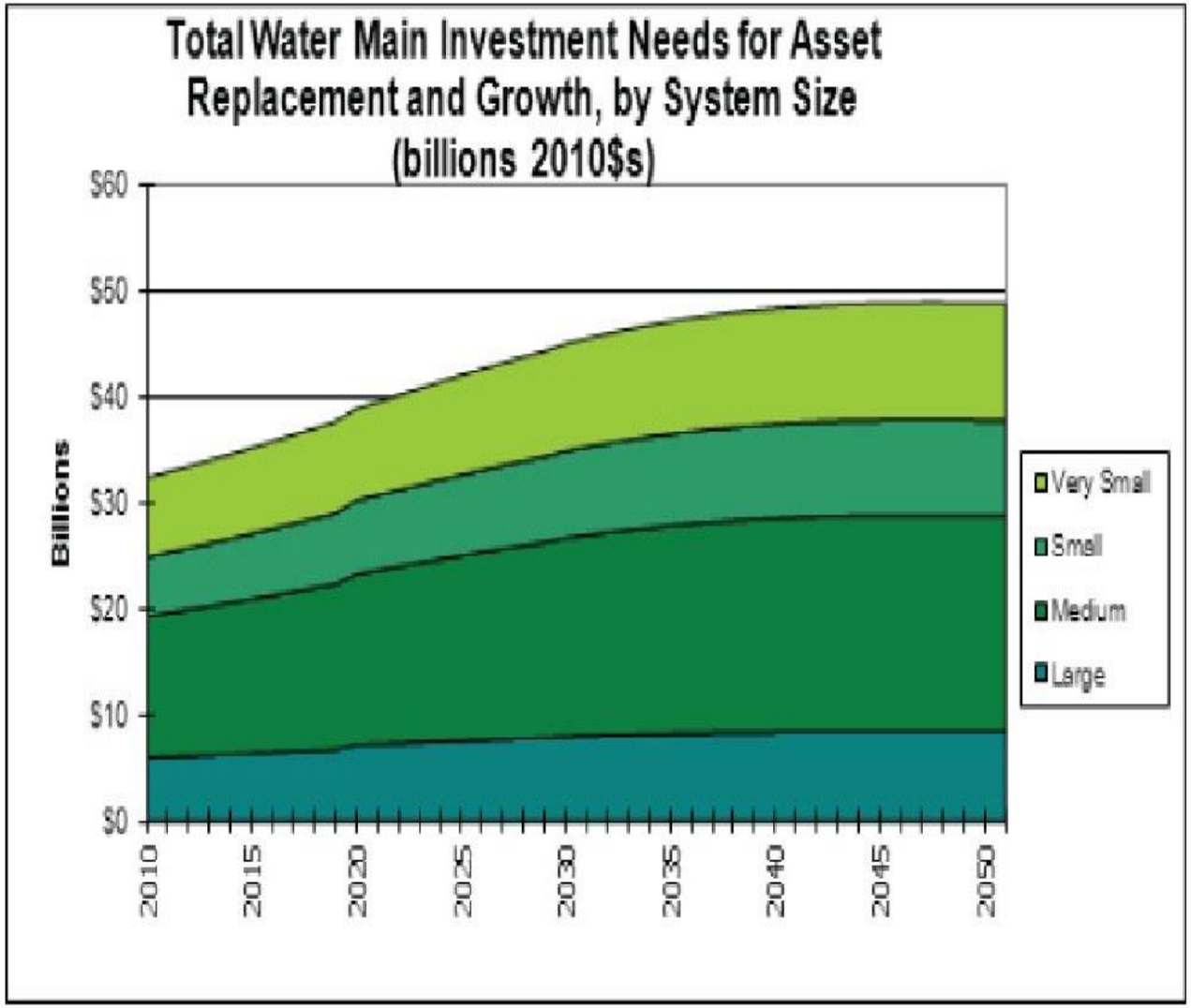
Historical Perspectives on Affordability

- No formal AWWA policy on affordability
  - Policies on discontinuance of water service for nonpayment and metering & accountability
    - Affordability becoming an increasingly important issue for our utility members for a variety of reasons (next slide)
- MHI may not be the best metric
- AWWA always comments on the costs and benefits of proposed regulations

Financial Pressures on Utilities

- Very large infrastructure needs
  - All of the distribution system needs to replaced at least every 100 years
  - *Buried No Longer* - $1 trillion over 30 years
    - Does not include investment for growth
    - Does not include replacement of all of the lead service lines all the way to the building wall
      - Payment by property owner for portion of private property for low-income customers

Total Investment Needs

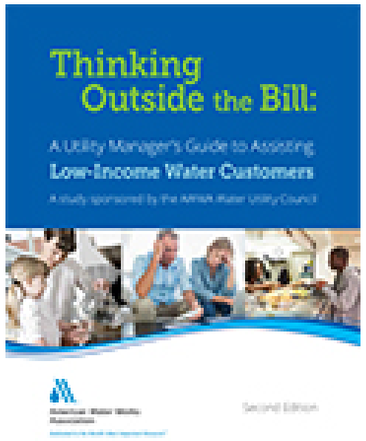


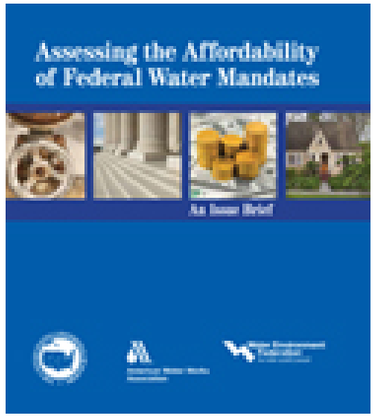
More Financial Pressures

- Most systems' costs are fixed
  - Most revenues from rates comes from sales
- Water sales and revenues can go down
  - Recovery from the recent recession
  - Reduced gallons per capita per day due to more water-efficient fixtures & appliances
    - Potential water quality impacts
    - When will this trend bottom out?
  - Droughts and other extreme weather events

AWWA Tools & Resources

- Affordability resource page
  - *Thinking Outside the Bill*
    - Overview of available tools
  - *Assessing the Affordability of Federal Water Mandates*
    - Joint with WEF and US Conf. of Mayors
    - Several alternatives to MHI
    - Spreadsheet tools provide assistance for evaluation of alternatives





Recent Affordability Efforts

EPA

- New WIFRC
- Compendium of state resources
  - Comments due to EPA on 2/12

Water and wastewater associations

- RFP on legal barriers to progress
  - 2/15/16-Proposals
  - 11/16 – First draft
  - 2/17 – Final report

Water and Wastewater Affordability

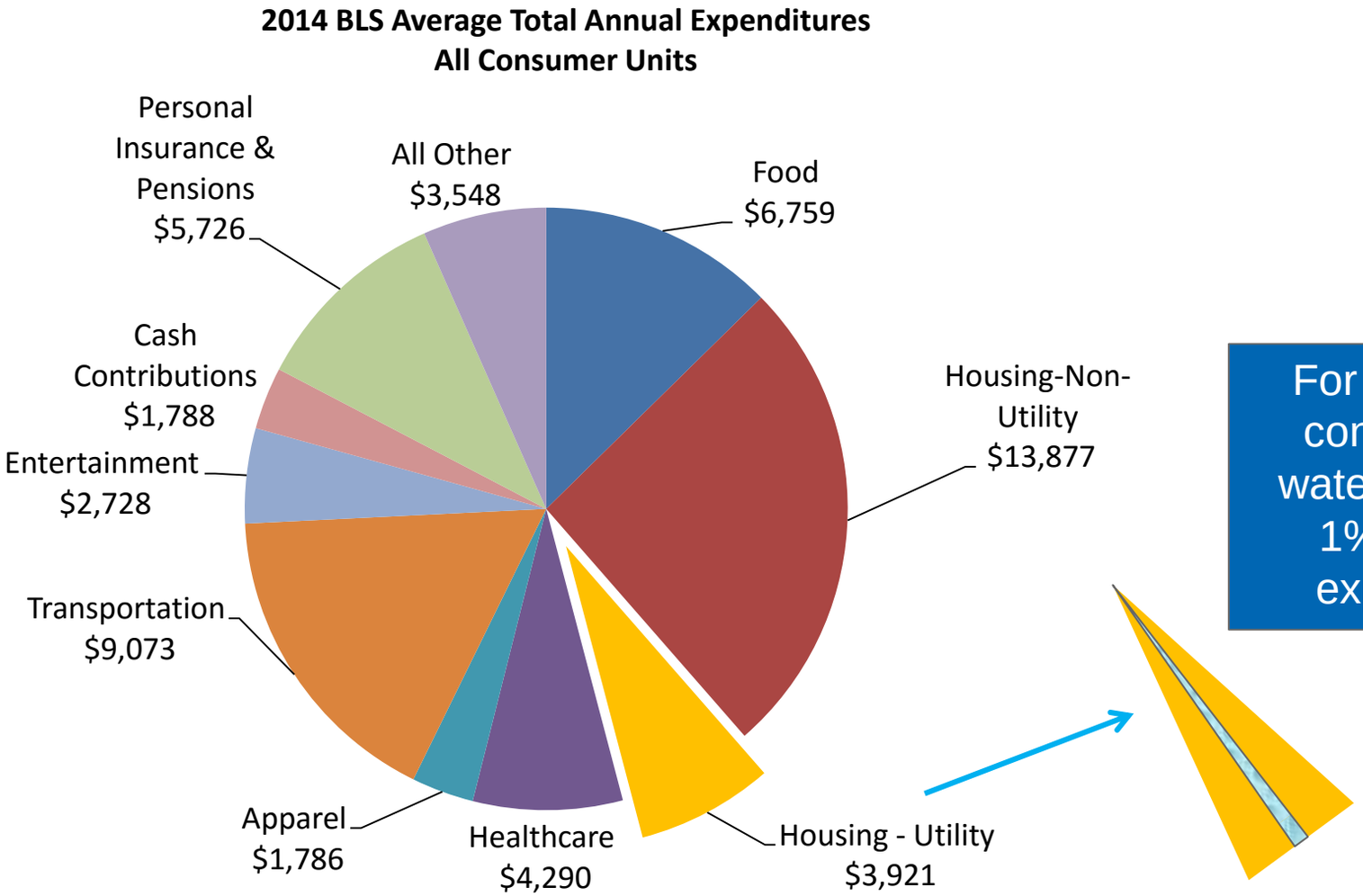
Karla Olson Teasley, Vice President Customer Service

NARUC Winter Meeting

February 15, 2016

Washington, D.C.

How Affordable is Water?



For the average consumer unit, water is less than 1% of annual expenditures.

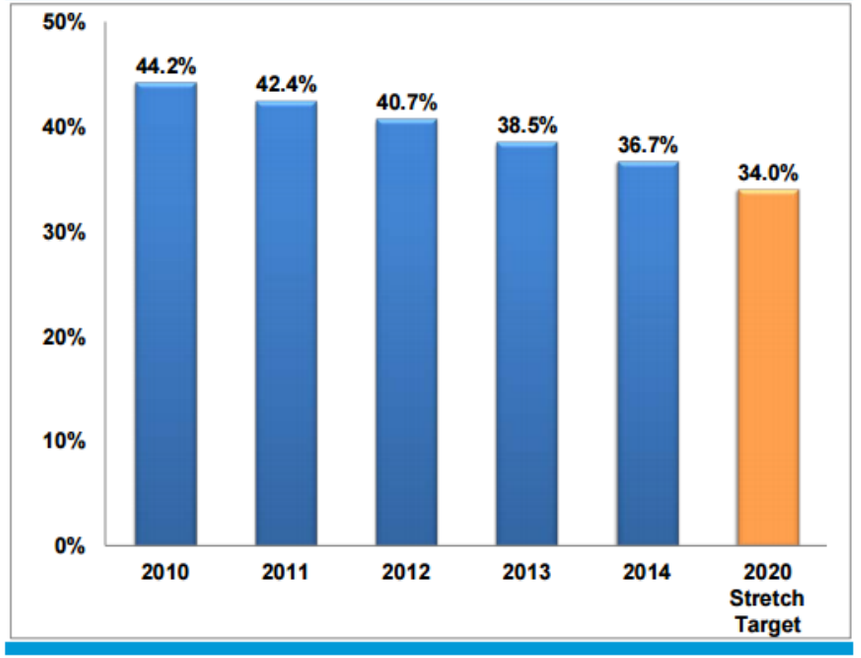
But…Many Americans Live in Poverty

2014	
14.8%	• America's Poverty Rate
21%	• American Children Poverty Rate
47,000,000	• Americans in poverty
$24,000	• Poverty Threshold Family of 4
$2,388	• Low Income Utility Expenditures (vs. $4k avg)

How We Work on Affordability: Cost Control & Operational Efficiency

O&M Efficiency Ratio

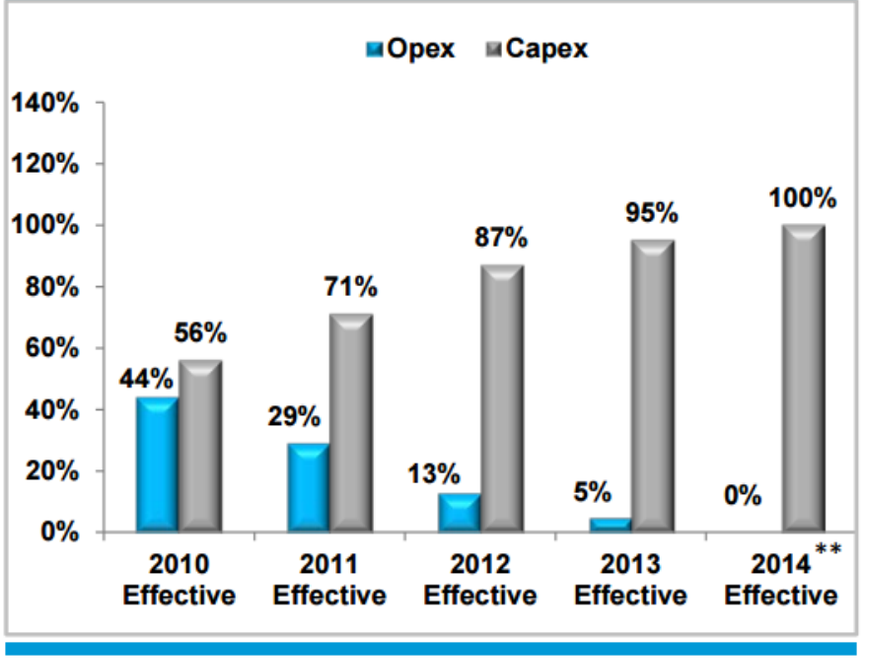
Stretch Target of 34% by 2020



Note:
O&M Efficiency Ratio - Non GAAP measure

Incremental Revenue Requirement*

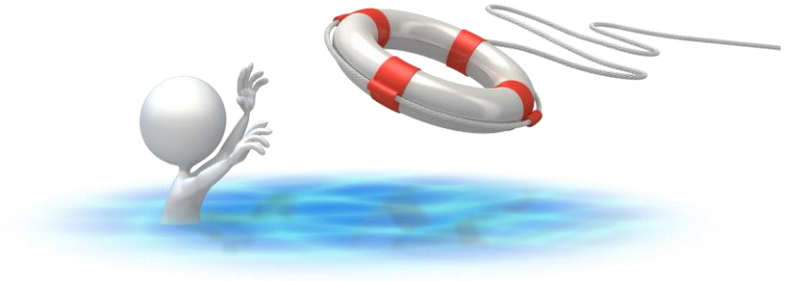
Increases Attributable to Opex vs. Capex



Note:
* Approximation in states where we received black box award
** For general rate cases effective in 2014, the incremental revenue requirement was reduced by 25% due to lower operating expenditures

Pricing Options

- **Single Tariff Prices**
  - Spread costs out
  - Prevent spikes



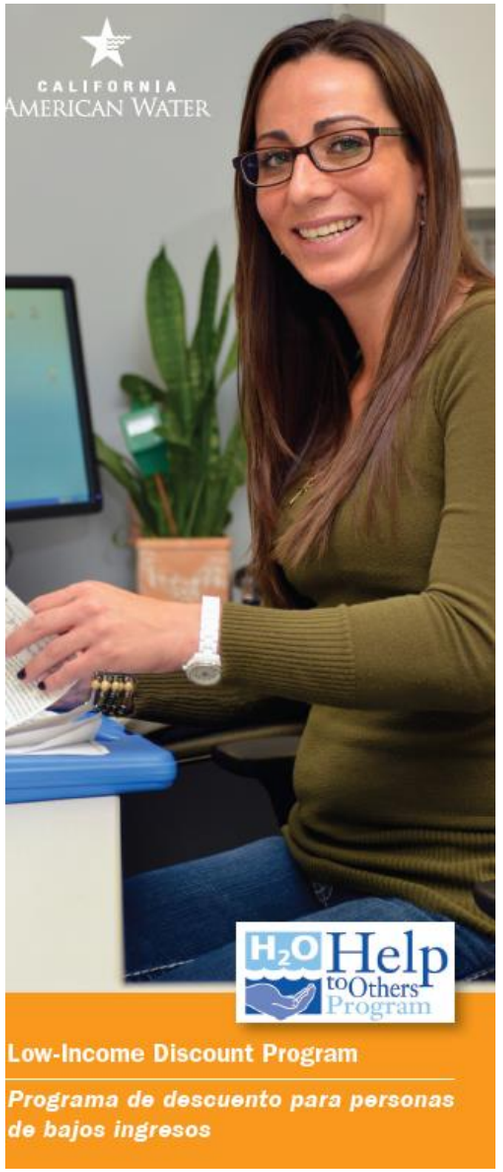
- **Lifeline Amounts of Water**
  - First units of water included in the basic or service charge

Low Income Assistance Programs

- Grants & Assistance (9 states)

- Low Income Tariffs (4 states):
  - Lower Volumetric Rates
  - Discounted fixed charges
  - Discounted DSIC charges

- State Funding
  - West Virginia reimburses water utilities through tax credits



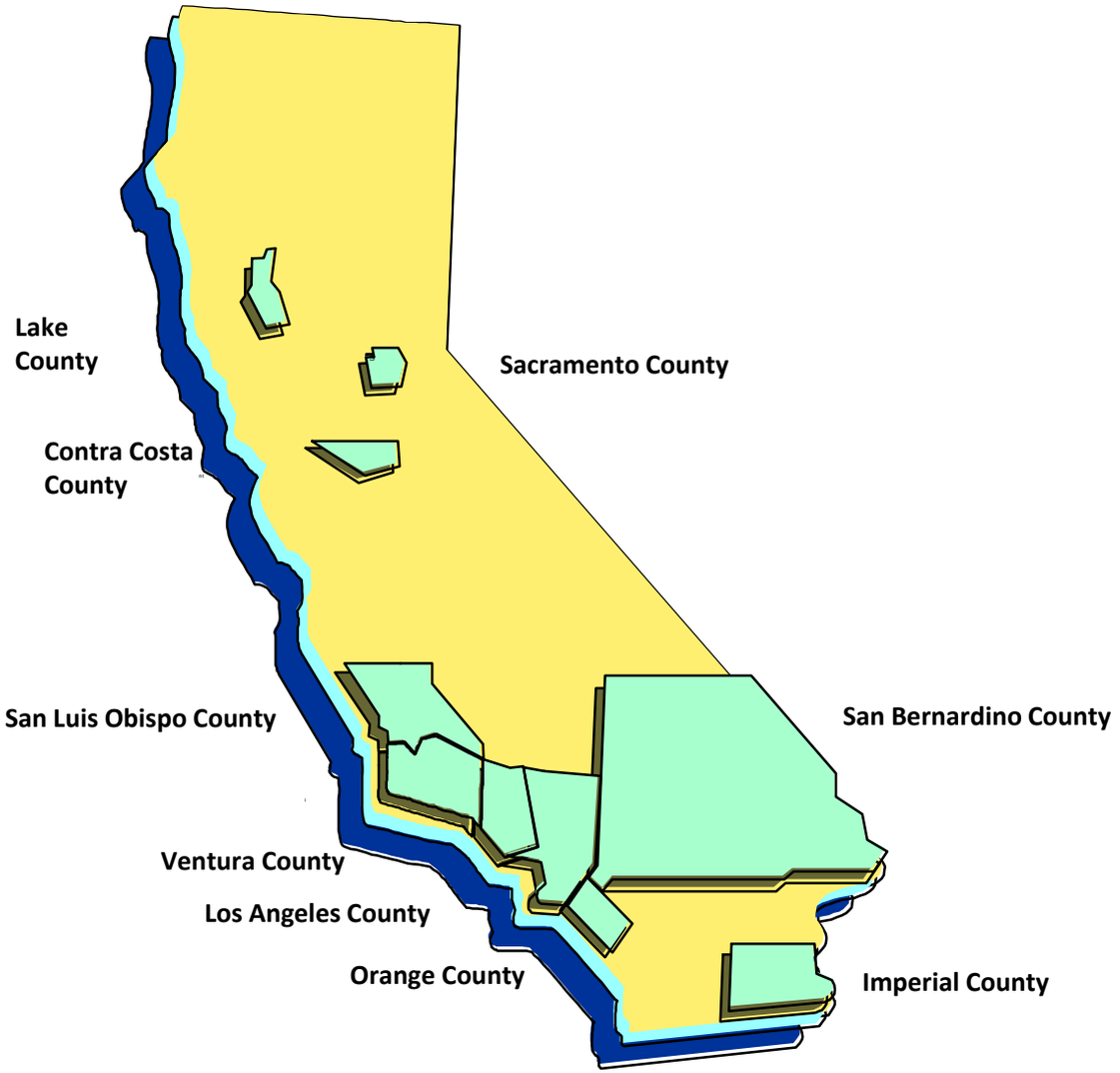
Water Utility Perspective: Waters of the US

Golden State Water Company
A Subsidiary of American States Water Company

Brandyn Hancocks
Golden State Water Company
NAWC Winter Meeting
February 15, 2016

Utility Perspective

Golden State Water Company
A Subsidiary of American States Water Company

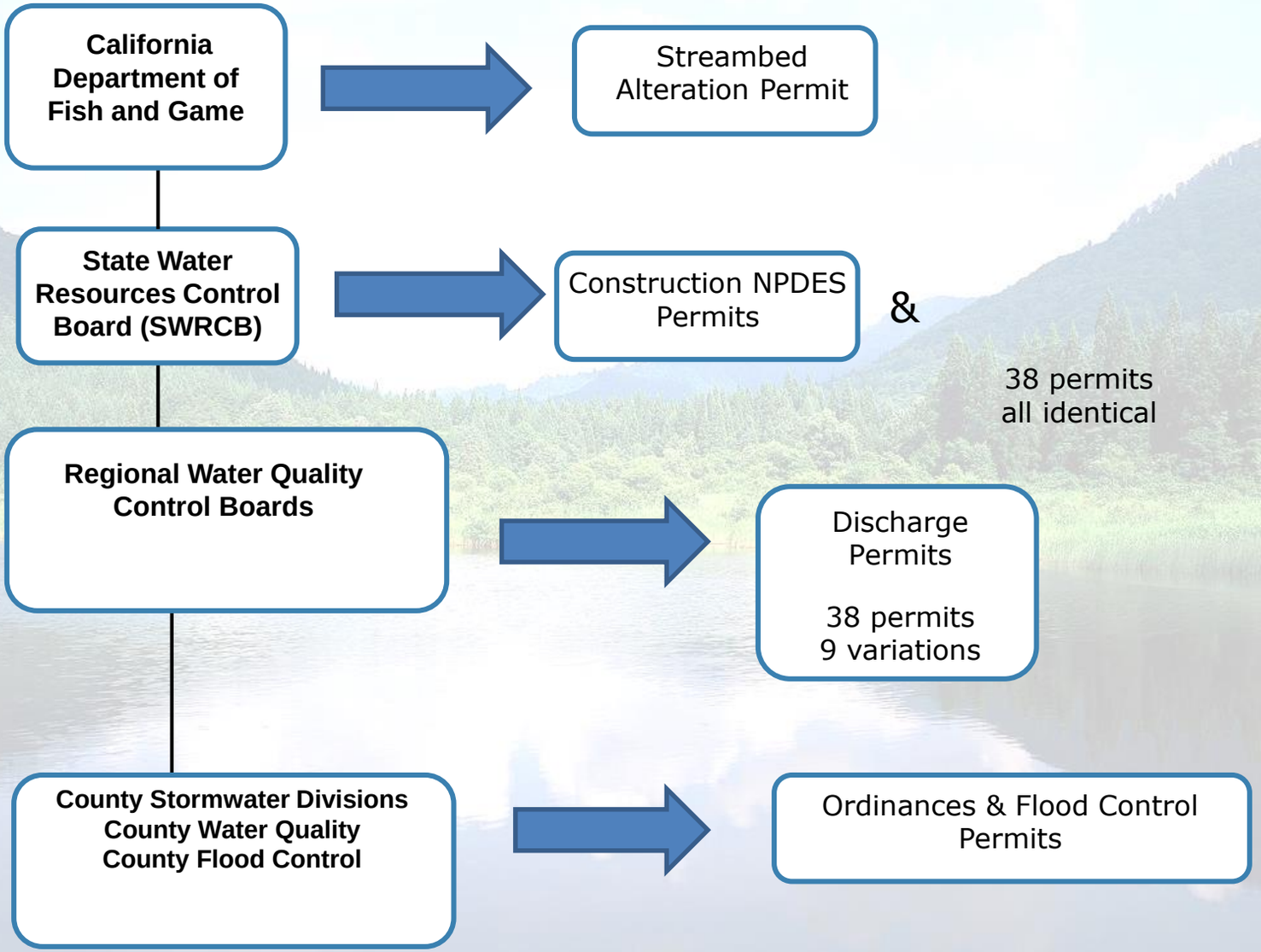


- 75 Communities
- 10 Counties
- 38 Water Systems
- 1 million customers
- 240 ground water wells
- 3 surface water treatment plants

Watershed Management: California Style

- California Porter-Cologne Water Quality Control Act, Chapter 2, Section 13050
  - “Waters of the State” include groundwater.
  - Discharged water is a waste and subject to regulation.
  - Waste Discharge Requirements for Waters of the State and Discharge to Land permits.

Regulatory Roadmap



Discharge Permit Coverage

Golden State Water Company
A Subsidiary of American States Water Company

Permitting Overview
Coverage: Includes planned and unplanned discharges: • Groundwater supply well flushing, development and testing. • Trench dewatering for repairs and emergency failures • Transmission and distribution system installation, testing and maintenance • Water treatment plant • Storage tank releases • Fire hydrant testing • Meter testing • Pressure relief valves • Online analyzers
Effluent Limits
Sampling
Reporting
Fines

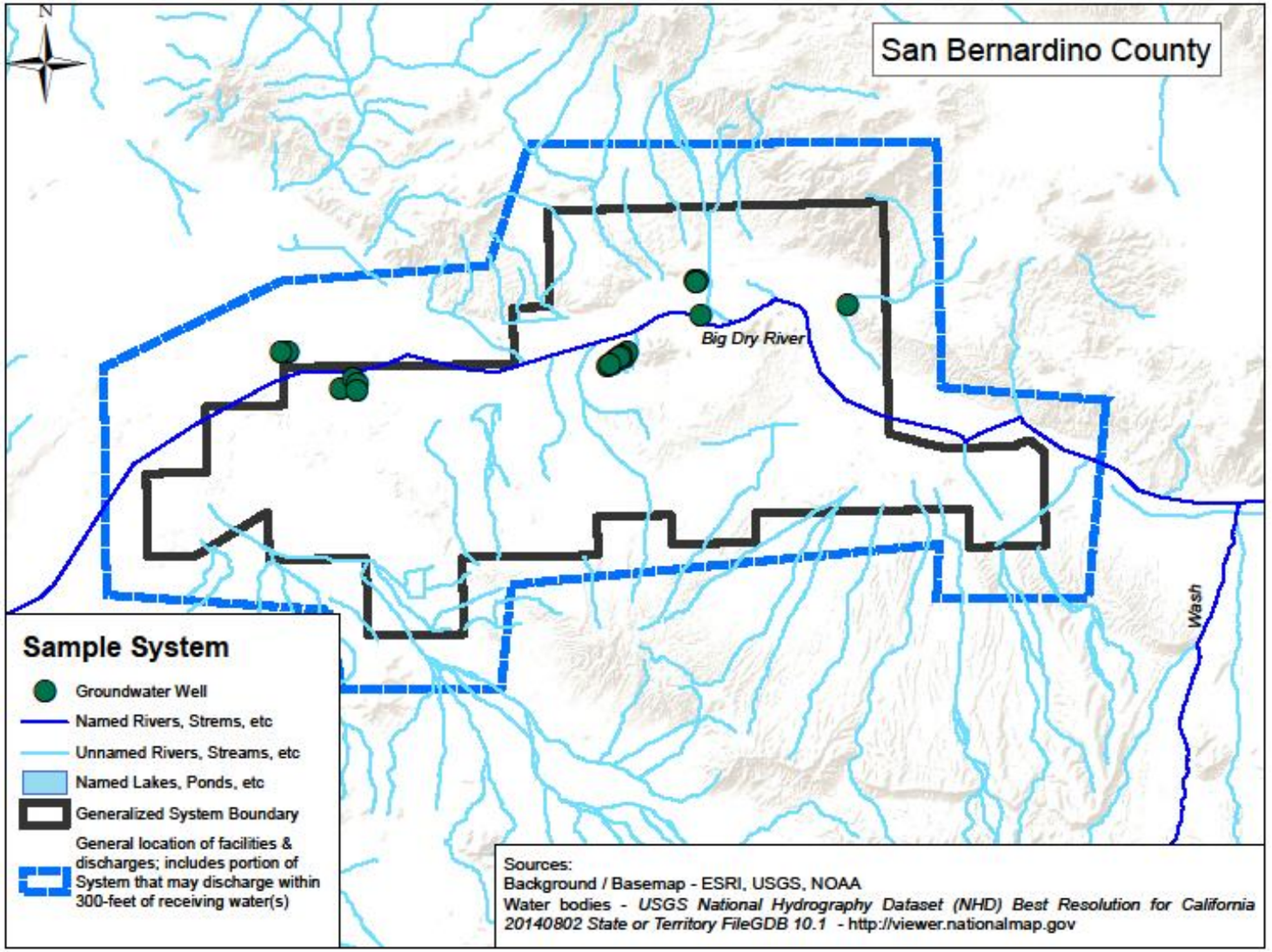
State Discharge Permit

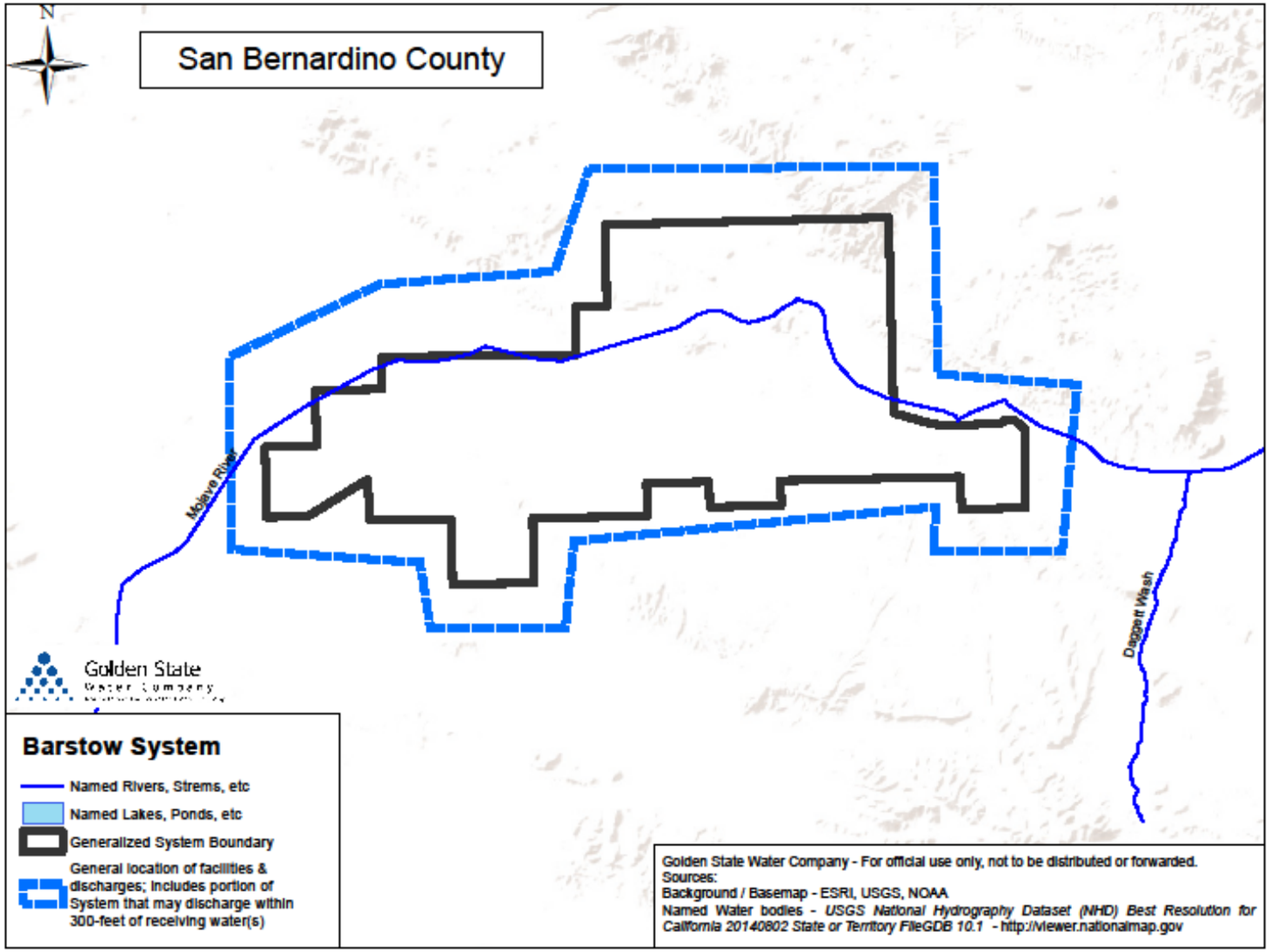
Golden State Water Company
A Subsidiary of American States Water Company

- Site schematic
  - Portions of distribution system within 300 feet of WOTUS
  - Locations of any discharges with potential to reach a WOTUS
  - General location of facilities that discharge to a WOTUS
- WOTUS: Bed, Bank, Significant Nexus to Water of the US
- Checked with the State, Counties, Regional Boards and all Districts of Army Corp: No guidance on WOTUS, Get consultant.


Mojave River
Barstow
Mojave River
Lenwood
Nebo Center
58
15
15


Mojave River
Barstow
Mojave River
Lenwood
Nebo Center
58
15
15


San Bernardino County
Big Dry River
Wash
Sample System
Groundwater Well
Named Rivers, Strems, etc
Unnamed Rivers, Streams, etc
Named Lakes, Ponds, etc
Generalized System Boundary
General location of facilities & discharges; includes portion of System that may discharge within 300-feet of receiving water(s)
Sources:
Background / Basemap - ESRI, USGS, NOAA
Water bodies - USGS National Hydrography Dataset (NHD) Best Resolution for California 20140802 State or Territory FileGDB 10.1 - http://viewer.nationalmap.gov


N
San Bernardino County
Mojave River
Daggett Wash
Golden State
Barstow System
Named Rivers, Strems, etc
Named Lakes, Ponds, etc
Generalized System Boundary
General location of facilities & discharges; Includes portion of System that may discharge within 300-feet of receiving water(s)
Golden State Water Company - For official use only, not to be distributed or forwarded.
Sources:
Background / Basemap - ESRI, USGS, NOAA
Named Water bodies - USGS National Hydrography Dataset (NHD) Best Resolution for California 20140602 State or Territory FileGDB 10.1 - http://viewer.nationalmap.gov

Clean Water Act

Golden State Water Company
A Subsidiary of American States Water Company

- Impaired Water Bodies require the development of total maximum daily loads (TMDLs)
- Several TMDLs in California are below drinking water standard
- NPDES permit requires compliance with TMDL
- TMDLs can be difficult to meet in a groundwater source
- Options: Treat to meet TMDL or abandon source
- TMDLs become de facto drinking water standards

Brandy Hancocks
Golden State Water Company
916.853.3936
bhancocks@gswater.com

Water and Sewer Service Affordability Protecting Health and Safety

Susan L. Satter
Public Utilities Counsel
Illinois Attorney General Lisa Madigan
February 15, 2016

Where we begin

- **Water is an essential service. If water and sewer service are shut off, most homes are uninhabitable and health and safety are at risk.**
- **Water is provided by a single supplier -- privately owned or publicly owned.**
- **Consumers know what others pay.**
- **While median income has stagnated or fallen in many parts of the country, many water prices have risen, often doubling or tripling.**

Sample IOU Water Bills IL – Local Income

Aqua Illinois	Water Charge 5,000 Gallons [1]	Sewer Charge 5,000 Gallons [1]	Water with sewer charge	Median Income [2]	Per Capita Income[2]	Per-cent below Poverty Level[2]
Candlewick Poplar Grove	$41.57	73.04	$114.61	$57,167	$30,019	16.8%
Hawthorn Woods	$56.83	71.65	$128.48	$154,505	$66,662	3.2%
Ivanhoe Mundelein	$54.20	69.56	$123.76	$78,635	$33,296	7.1%
University Park	$34.64	54.30	$84.71	$36,076	$21,176	24.5%
Willowbrook	$57.69	73.04	$130.73	$58,970	$39,875	5.8%
Woodlawn	$29.00	15.19	$44.19	$41,236	$19,027	unknown

Sample IOU Water Bills IL – Percent Gross Income

Aqua Illinois	Water with sewer charge	Percent of Median Income	Percent of Per Capita Income	Percent below Poverty Level
Candlewick Poplar Grove	$114.61	2.4%	4.56%	16.8%
Hawthorn Woods	$128.48	.99%	2.3%	3.2%
Ivanhoe Mundelein	$123.76	1.89%	4.5%	7.1%
University Park	$84.71	2.8%	4.8%	24.5%
Willowbrook	$130.73	2.6%	3.9%	5.8%
Woodlawn	$44.19	1.3%	2.8%	unknown

IAWC Residential Water Purchased Lake Water*	Water Bill for 5,000 gallons[1]	Sewer Collection and/or Treatment[1]	Total	Median Income[2]	Per Capita Income	Percent Below Poverty Level[2]
Alton	$47.14			$36,076	$20,515	24.5%
Cairo	$56.12			$25,495	$14,052	35.6%
Fernway *	$70.07			Oak Lawn $57,567	$28,515	10.1%
Pekin	$38.16			$48,544	$24,931	14%
Santa Fe/SW &W*	$81.54	$65.45	$146.99	Homer Glen $92,547 Romeoville $66,705	Homer Glen $36,016 Romeoville $22,695	3.0% 8.8%

[1]Source: Illinois Commerce Commission, Utilities with more/less than 1,000 connections. http://www.icc.illinois.gov/waterandsewer/ratecomparisons.aspx

[2] Source: http://www.census.gov/quickfacts/

Residential Water Purchased Lake Water*	Water Bill for 5,000 gallons	Sewer Collect-ion and/or Treat-ment	Percent Median Income	Percent Per Capita Income	Percent Below Poverty Level
Alton	$47.14		1.5%	2.7%	24.5%
Cairo	$56.12		2.6%	4.7%	35.6%
Fernway*	$70.07		Oak Lawn 1.46%	2.9%	10.1%
Pekin	$38.16		.94%	1.8%	14%
Santa Fe/SW &W*	$81.54	$65.45	Homer Glen 1.9% Romeoville 2.6%	Homer Glen 4.89% Romeoville 7.77%	3.0% 8.8%

[1]Source: Illinois Commerce Commission, Utilities with more/less than 1,000 connections. http://www.icc.illinois.gov/waterandsewer/ratecomparisons.aspx

[2] Source: http://www.census.gov/quickfacts/

City of Chicago Water Rates and Recent Increases

Recent Water Increases

Effect.Date	% Increase	Water per 1,000 Cu.Ft.	Water per 1,000 Gallons	Bill for 5,000 Gallons
1/1/12	25%	$18.75	$2.51	**$12.55**
1/1/13	15%	$21.56	$2.89	**$14.45**
1/1/14	15 %	$24.80	$3.32	**$16.60**
1/1/15	15%	$28.52	$3.82	**$19.10**
1/1/16	No Change			

Combined Water and Sewer

Effect. Date	% of Water Bill	Bill for 5,000 Gal. Water + Sewer
1/1/12	89%	**$23.72**
1/1/13	92%	**$27.74**
1/1/14	96%	**$32.54**
1/1/15	100%	**$38.20**

Median income: $47,831
Per capita income: $28,623
Rate as % of median: .96%
Rate as % of per capita: 1.6%

http://www.cityofchicago.org/city/en/depts/water/provdrs/cust_serv/svcs/know_my_water_sewerrates.html

Springfield, IL City Water, Light and Power 5,000 Gallon Sample Bills

5 “units” plus monthly charge

	Water	Sewer	Total
In town:	$14.80	21.27	36.07
Out of town:	$19.23	30.63	49.86
Out of town S:	$19.73	30.63	50.36

Springfield median income: $48,848

Springfield per capita income: $29,621

Percent of Springfield median income: 0.89%

Percent of Springfield per capita income: 1.5%

http://www.cwlp.com/customer/rates/water.html (Feb. 6, 2016)
http://www.cwlp.com/customer/rates/sewer.html (Feb. 6, 2016)

Ratemaking and Riders

- Ratemaking recognizes need for continuing investment by providing consumer funds in rates, i.e. depreciation expense and ADIT
  - To avoid unreasonable increases, Riders must be carefully tailored:
    - Investment riders must incorporate ratemaking protections and existing investment incentives and avoid allowing utilities to charge consumers for investment they have already funded in rates.
    - Decoupling riders must be symmetrical and limited to reconciling actual usage and expected usage: not total revenue
    - Unusual riders should be avoided.

Affordability - Impact on Consumers and Communities

Bill Impact

- Collection practices – what happens when people can't pay?
- Infrastructure and decoupling riders result in constantly changing prices and consumer confusion
- Rate design – large fixed charges versus variable charges limit consumers' ability to affect their bills and leads to frustration

Community Impact

- Affordability - median income of service area increasing or decreasing?
- Percentage of residents living in poverty?
- Effect on property values
- How do rates compare to surrounding areas?
- Single tariff pricing reasonable?
- Is water quality affecting consumers' view of fairness of rate?

Water Company ROE Compared to Other Utilities

Type of Utility	Average Return on Book Value
Water	10.3%
Natural Gas	10.4%
Electric	9.3%
Combination Gas and Electric	9.%

Source: AUS Utility Consultants, January, 2016

Conclusion

- While water and sewer industries face investment needs, regulation already provides consumer funds for investment
- Regulators need to be highly sensitive to rising water and sewer rates due to declining incomes and closely review shareholder claims that rates need to increase
- Regulators need to closely review requests for special regulatory treatment or riders to assure that decoupling or other adjustments are symmetrical and do not unnecessarily or unfairly increase rates due to the failure to recognize the effect of depreciation and ADIT in consumer rates, other cost savings, or reduced risk.

Thank you for the opportunity to participate in today's meeting.