

# CENTRAL VALLEY WATER RECLAMATION FACILITY

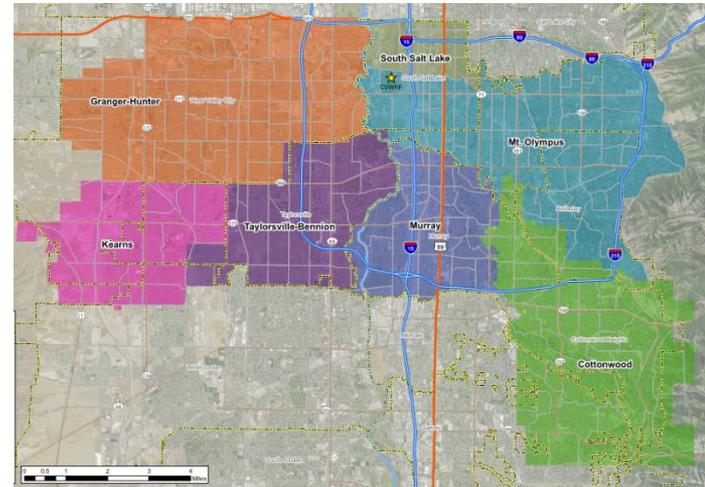
## Nutrients, Permit and Asset Management

July 13, 2016



# Service Area and Facilities

- 5 special service districts and two cities in Salt Lake County
- 7 miles of interceptor 33 to 84 inch
- 2 siphon structures
- 75 mgd Treatment Plant



# Facility Data

- Treatment Plant and Interceptor Sewers were constructed in the 1980's
- Population Served: ~500,000
- Area Served: 115 sq. miles
- Rated Flow Capacity: 75 MGD
- Current Flow: 50 - 55 MGD
- Discharge Point: Mill Creek 2,300 ft. upstream of Jordan River

# Plant Background/History

- Federal Clean Water Act 1972
- CVWRF formed as Interlocal Agreement Agency in 1978
- Permitted under UPDES Permit UT0024392
  - Permit Parameters – BOD, TSS, Ammonia, Total Coliform, (Secondary Treatment Standards)
  - Five-year Permit Cycle
- Trickling Filter/Solids Contact Process

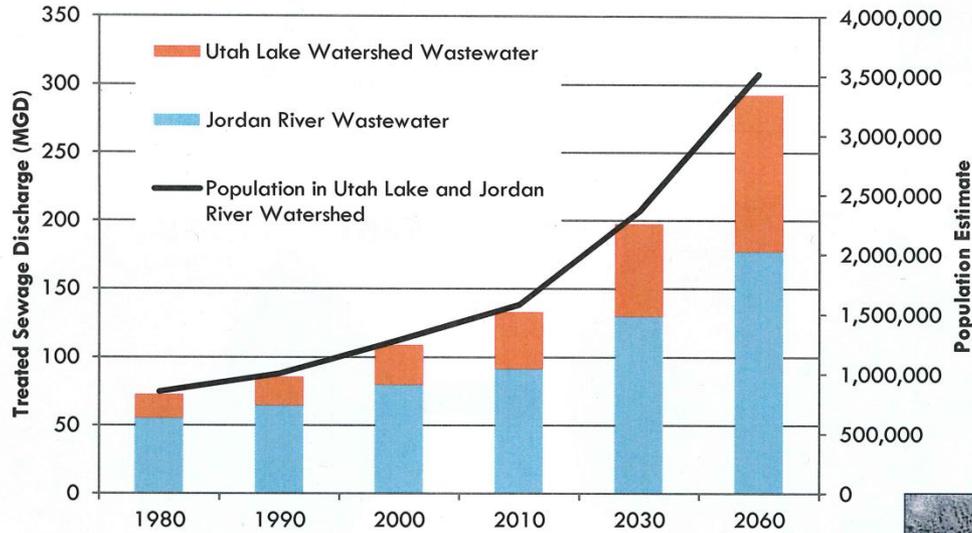
# Nutrient Removal History

- Nutrients— Nitrogen and Phosphorus
  - Great Lakes Region 1970's
  - East Coast and Chesapeake Bay 1980's and 1990's
  - Mississippi Basin and Western States 2000's
- CVWRF joins Jordan River/Farmington Bay Water Quality Council 2008
  - Jordan River TMDL
  - Impounded Wetlands Studies/ GSL

# Nutrient Removal History

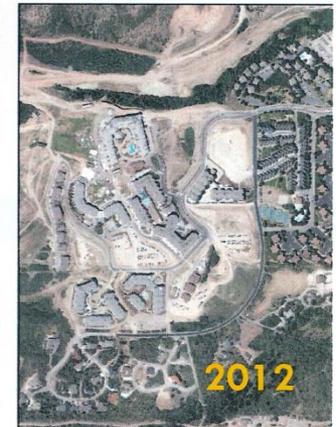
- Utah Nutrient Strategy
  - Adaptive Management
  - Plan, Implement, Monitor, Assess...
- Technology Based Effluent Limits (TBEL)
  - 1.0 mg/L P (Total Phosphorus)
  - 10.0 mg/L TIN (Total Inorganic Nitrogen), Future
- Phosphorus Rule
  - Approved December, 2014
  - Five-year Compliance Schedule (January 1, 2020)
  - Modified in 2015 to allow application for compliance variance until January 1, 2015 if demonstrating sufficient progress

# Population Growth

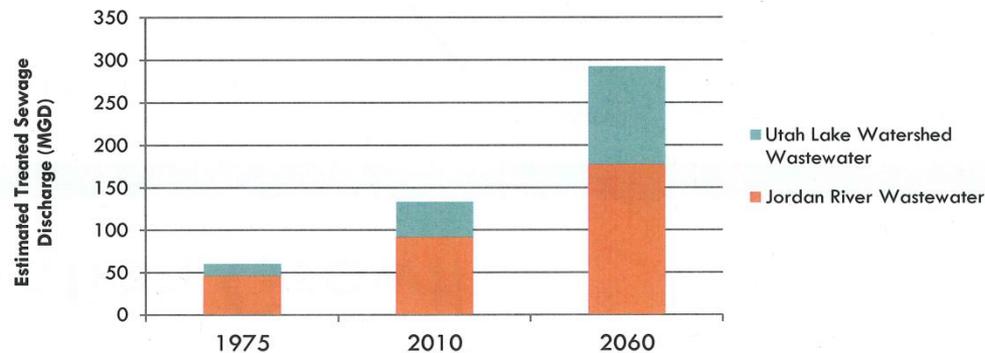
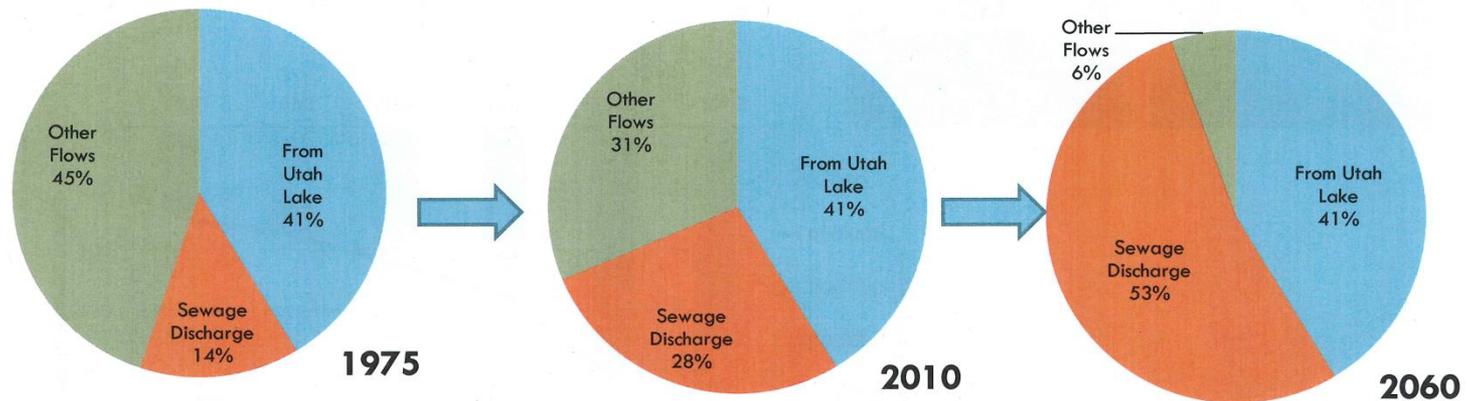


## Projected Growth from 2010 to 2060

- State of Utah: 115%
- Jordan River Basin: 94%
- Utah Lake Basin: 176%



# Proportion of Jordan River that is Treated Sewage



# Discharge Permit Renewal

- Permit Expired February 2015
- Application was made 180 days prior to permit expiration
- Draft Waste Load Analysis (WLA) Received
  - Jordan River vs. Mill Creek Discharge
    - Lower Dilution for Whole Effluent Toxicity Testing
    - Lower Ammonia Limits
    - Lower Metals Limits (copper)

# CVWRF Actions

- Plant Optimization Study (P & N) - 2013
- Jordan River/Mill Creek Hydraulics and UAA Studies – 2013 - 2014
- WET History and Variance Request - 2014
- Engineering Evaluations – 2015-2016 (cost of \$550K)
- JRFBWQC
  - Snail and Mussel Study - 2015
    - Ammonia Letter

# CVWRF Actions (cont.)

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- JRFBWQC (cont.)
  - Phosphorus Variance Letter
- POTW Coalition/ Legislative Action
  - Water Quality Amendment 19-5-105.3 – Peer Review

# Recommendations to CVWRF Board

- Approve construction of a 2300 ft Pipeline to Jordan River (~\$10M, 2017-2018)
  - Preserves dilution factor for ammonia, metals and WET testing
  - Reduces cost for biological nutrient removal project
  - Reduces risk of costly studies and additional treatment to remove toxicants

# Recommendations to CVWRF Board

- Approve Construction of a Biological Nutrient Removal Process to meet TP limit of 1.0 mg/L and reduce TIN to near 10 mg/L (~\$90M, 2017-2024)
  - Attempts to further combat the TBPEL could be costly and are unlikely to succeed due to national momentum for nutrient regulation
  - Will reduce TIN to near proposed future limits of 10 mg/L
  - May yield additional benefits of reducing other organic compounds which may be regulated in the future
  - Submit request for TP compliance variance until 2025
  - Negotiate additional 10 years grace period for TIN
  - Continue phosphorus studies to support justifying or challenging future lower TP limits

# Asset Management

- Main plant and interceptors constructed in early to mid 1980s. Original equipment and facilities are 30 years old
  - Design life for tanks and buildings is 50 years
  - Design life for equipment is 20-25 years
- Maintenance, repair and replacement activities are increasing
- Major siphon failure and collapse in October 2014
- Identify and mitigate risk of failing equipment/infrastructure
- AM program to help guide and prioritize future maintenance and capital expenditures over next 25 years



# 30-inch Granger-Hunter Siphon Pipe Failure



# Worn-out/Damaged Equipment and Piping



Worn Pump Impeller and Volute



Corroded Pipe

# High Consequence of Failure



UV Units



Main Heat Loop Pump

# Obsolete Equipment



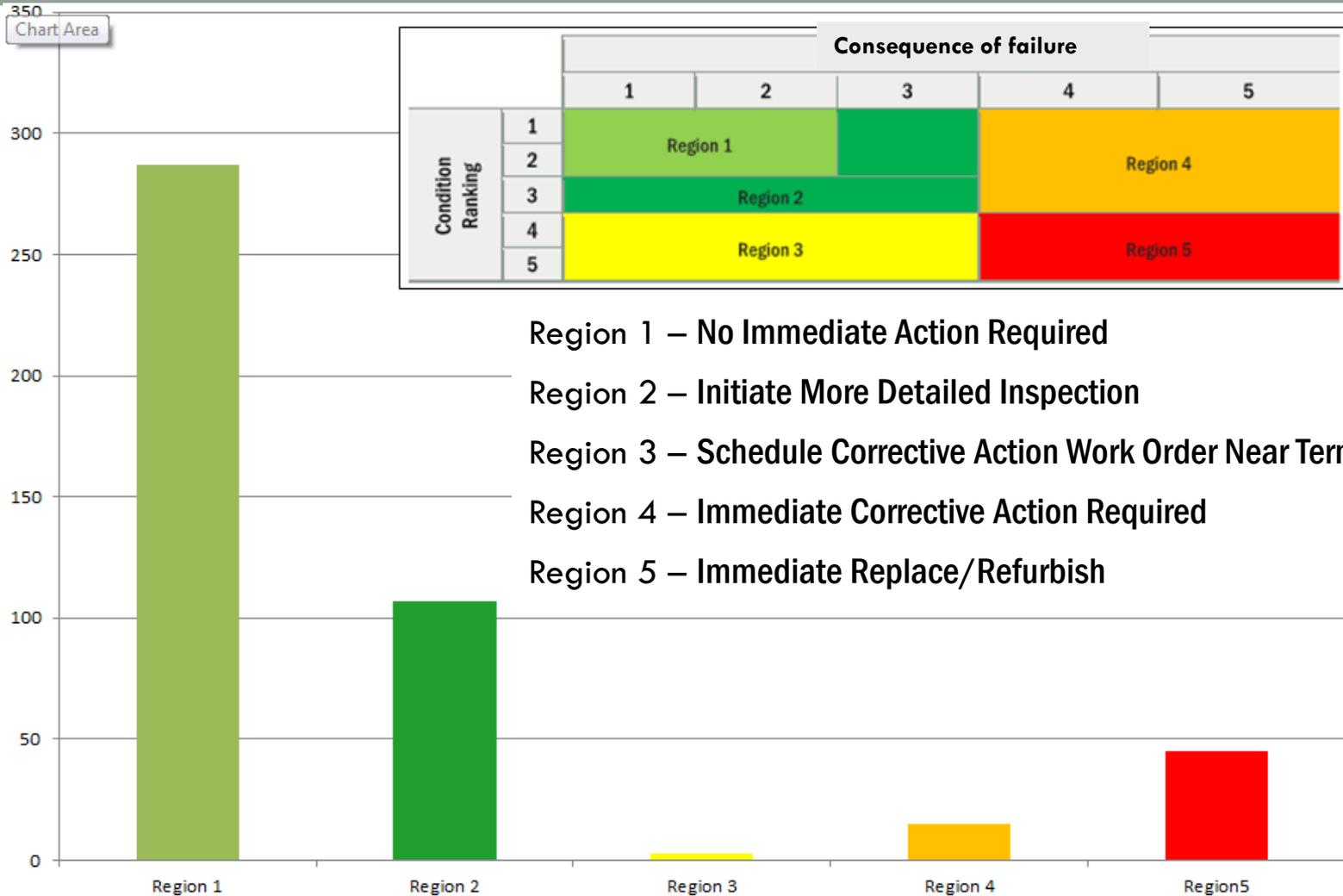
30-year old Engine Generators

Inefficient, software updates and parts no longer available to support operations

# Asset Management Steps

- Develop Asset Database (over 2,300 assets)
- Conduct condition and consequence of failure evaluations for key plant and collection facilities, equipment, and processes
- Prioritize Rehabilitation and Replacement (R/R) needs based on asset condition and consequence of failure (risk)
- Develop a prioritized Capital Improvement Plan (CIP) to address known risks and R/R needs within the plant and collection system

# Condition and Performance Regions



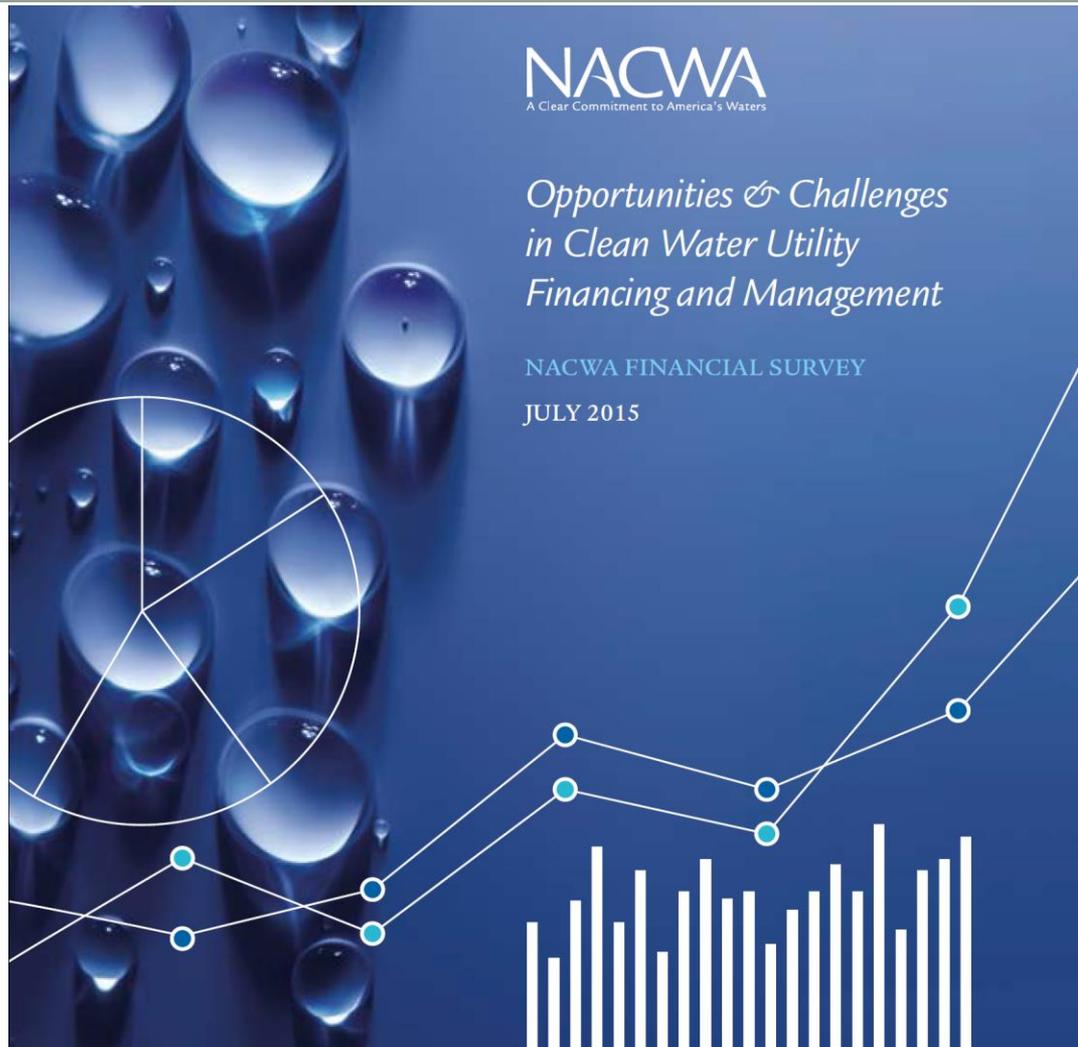
# Recommendations to CVWRF Board

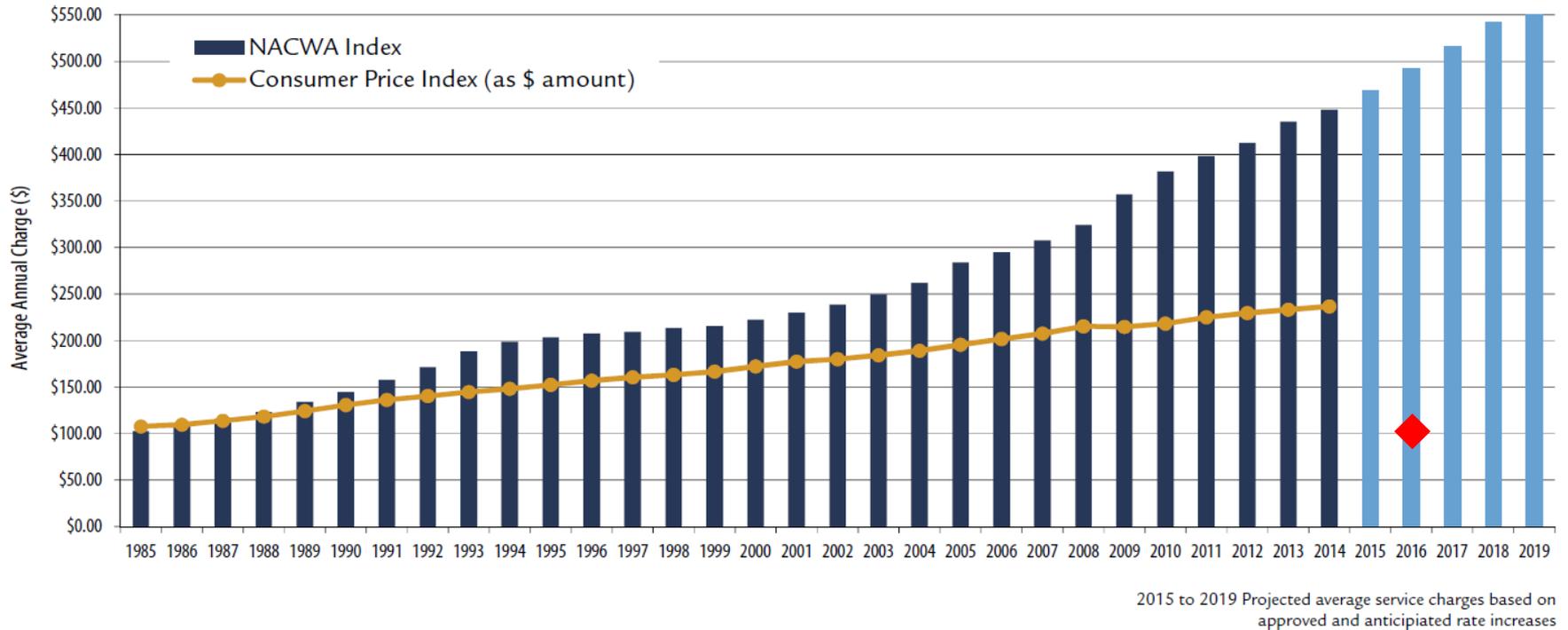
- Fund Asset Management Program to maintain level of service for next 30 years (\$150M over next 20 years)
  - Significant capital expenditures in the next five years (~\$50) should be directed to rehab of interceptors, headworks, primary sedimentation and cogeneration systems
  - Review and update CIP on an annual basis. Combine/accelerate projects as necessary to achieve economies of scale and reduce risk
  - Annual budgeting should include one-year and five-year capital cost schedules

# Financing

- Financial model developed that includes Nutrient and Permit compliance costs as well as Asset Management CIP
- Financing concept includes combination of State loan, bonds and increase in pay-as-you-go capital funding
- Review and update CIP on an annual basis.  
Combine/accelerate projects as necessary to achieve economies of scale and reduce risk
- Annual budgeting should include one-year and five-year capital cost schedules
- Entity discussions to establish a coherent long-term financing strategy

# Benchmarking





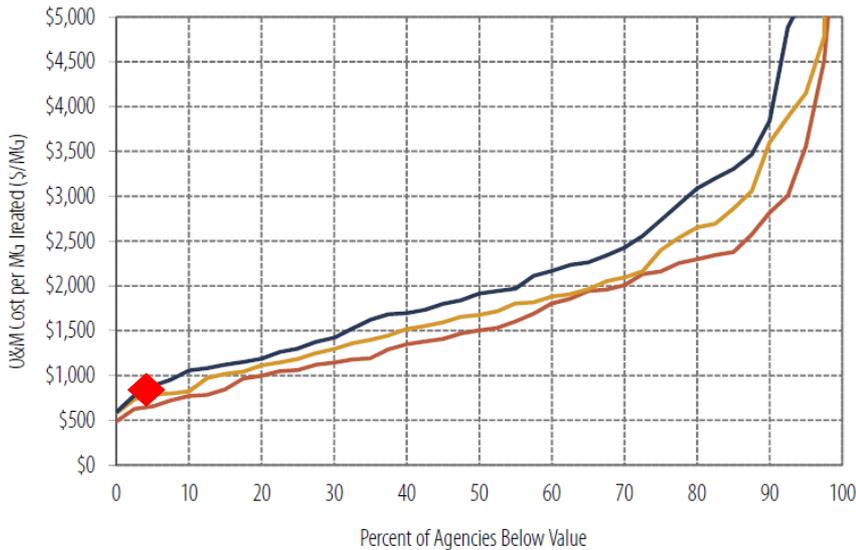
**Figure C.9b** - Historical and projected average single-family residential service charge (1985-2019)

Average sewer charge is \$41.50/month/residential connection

The *NACWA Index* indicates that the long-term average annual change in residential charges was 4.8% per year from 1999 to 2014, double the long-term rate of inflation of 2.4% during the same time period.

**Table B.10** - O&M costs per million gallons treated, 1998-2013

O&M EXPENSE PER MILLION GALLONS TREATED (\$/MG)	2013	2010	2007	2004	2001	1998
- Agencies responding	98	101	86	128	112	91
- Maximum (\$/MG)	\$21,554	\$18,841	\$6,663	\$5,464	\$2,684	\$4,578
- Average (\$/MG)	\$2,406	\$2,100	\$1,747	\$1,484	\$1,129	\$985
- Median (\$/MG)	\$1,913	\$1,676	\$1,503	\$1,252	\$1,050	\$876
- Minimum (\$/MG)	\$591	\$578	\$486	\$301	\$350	\$255



2013  
2010  
2007

CVWRF

- 2016 O&M Cost - \$780/MG
- 2016 O&M and Capital - \$1,140/MG

**Figure B.14** - Wastewater O&M cost per million gallons treated, 2007-2013

Note: Maximum values above \$5000 are not shown on the chart

# Questions

