Doing Our Part to Wipe Out Gulf Hypoxia

2022 Missouri Water Seminar

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Introduction

- Gulf Hypoxia Task Force
- Missouri DNR Proposed Rulemaking
- Lessons Learned: St. Louis MSD Nutrient Reduction Master Plan
- Indirect Discharger Impacts
- Questions & Answers

Hypoxia Task Force

- Established in 1997
- Charter issued in 1998
- Mission: The Task Force is established to understand the causes and effects of eutrophication in the Gulf of Mexico, to coordinate activities to **reduce the size, severity and duration of this phenomenon, and to ameliorate its effects**. Activities include coordinating and supporting nutrient management activities from all sources, restoring habitats to trap and assimilate nutrients, and supporting other hypoxia-related activities in the Mississippi River and Gulf of Mexico watersheds.

Hypoxia Task Force

- Roles and Responsibilities: The role of the Task Force is to provide executive level direction and support for coordinating the actions of participating organizations working on **nutrient management within the Mississippi River/Gulf of Mexico Watershed**. The Task Force will designate members of a Coordinating Committee, and solicit information from interested stakeholders.

Hypoxia Task Force

- 18 charter members
- 7 Federal agency members
  - EPA: Assistant Administrator for Water
  - USDA: Under Secretary for Research, Education & Economics; and Under Secretary for Natural Resources & Environment
  - Army Corps of Engineers: Assistant Secretary of the Army for Civil Works
  - NOAA: Deputy Assistant Secretary for Oceans and Atmosphere
  - DOI: Assistant Secretary for Water and Science
  - DOJ: Assistant Attorney General for Environment and Natural Resources Division
  - Office of Science and Technology Policy: Associate Director for Environment

Hypoxia Task Force

- 11 state and tribal members to be “balanced in terms of program responsibility for agricultural, environmental and natural resources agencies”
  - Arkansas: Soil and Water Conservation Commission
  - Illinois: Agriculture Department
  - Iowa: Department of Agriculture and Land Stewardship
  - Louisiana: Department of Environmental Quality
  - Minnesota: Pollution Control Agency
  - Mississippi: Department of Environmental Quality
  - Missouri: Natural Resources Department
  - Tennessee: Agriculture Department
  - Wisconsin: Natural Resources Department
  - Mississippi Band of Choctaw Indians
  - Prairie Island Indian Community

Hypoxia Task Force

- 2001: First HTF Action Plan
- Five Principles
  - Encourage actions that are voluntary, practical, and cost-effective
  - Utilize existing programs, including existing State and Federal regulatory mechanisms
  - Follow adaptive management
  - Identify additional funding needs and sources during the annual Agency budget process
  - Provide measurable outcomes

Hypoxia Task Force

- 2001: First HTF Action Plan
- Three Goals
  - Coastal Goal: By 2015, subject to the availability of additional resources, **reduce the 5-year average areal extent of the hypoxic zone to less than 5,000 square kilometers**
  - Within Basin Goal: Restore and protect waters of 31 states and tribal lands through implementation of nutrient and sediment reduction plans
  - Quality of Life Goal: Improve the communities and economic conditions across the basin, in particular the agriculture, fisheries, and recreation sectors, through improved public and private land management and a cooperative, incentive based approach

Hypoxia Task Force

- 2007: EPA Science Advisory Board
  - Reaffirmed that changes in the hypoxic area of the Gulf of Mexico are “primarily related to nutrient loads” from the Mississippi River basin
  - Reaffirmed the target to reduce the 5-year average areal extent of the hypoxic zone to less than 5,000 square kilometers
  - Recommended a dual nutrient strategy targeting a **45% reduction in both riverine total nitrogen flux and riverine total phosphorus flux**, both measured against average flux over 1980-1996 time period

Hypoxia Task Force

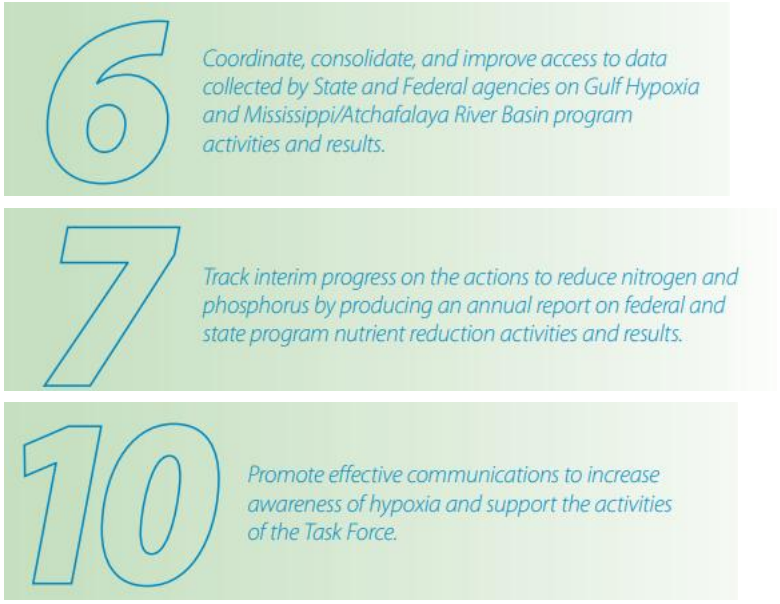
- 2008: Updated HTF Action Plan
- Reaffirmed the five principles
- Revised and reaffirmed the three goals
  - Subject to the availability of additional resources, we **strive to reduce or make significant progress toward reducing** the five-year average areal extent of the Gulf of Mexico hypoxic zone to less than 5,000 square kilometers by 2015
  - The Task Force understands the difficulty of meeting the 2015 goal so is therefore including a revision that takes into account the uncertainty of the task but attempts to maintain momentum and progress achieved to date

Hypoxia Task Force

- 2008: Updated HTF Action Plan
- Eleven new action items identified
- Three actions to accelerate the reduction of nitrogen and phosphorus

Hypoxia Task Force

- 2008: Updated HTF Action Plan
- Eight actions to advance the science, track progress and raise awareness



Hypoxia Task Force

- 2015: Goal Framework
- Updated the time to attain the goal to 2035
- Set an initial target of 20% reduction (from 1980-1996 period) of nitrogen and phosphorus loading by 2025
- Shifted focus from planning and development of state nutrient reduction plans to implementation

Related Litigation

- 2008: Mississippi River Collaborative (MRC) petitioned EPA to establish numeric nutrient criteria and a nitrogen & phosphorus TMDL for the Mississippi River Basin
- 2011: EPA denied the petition; MRC challenged the denial
- 2016: Court upheld EPA's denial

Related Litigation

- Notable quotes from the 2016 court decision:
  - The CWA is by design a states-in-the-first-instance regulatory scheme
  - EPA's assessment that the best approach **at this time** is to continue in its comprehensive strategy of bringing the States along without the use of federal rulemaking is subject to the highly deferential and limited review...
  - **Presumably, there is a point in time at which the agency will have abused its great discretion by refusing to concede that the current approach—albeit the one of first choice under the CWA—is simply not going to work**

Missouri Nutrient Loss Reduction Strategy

- Developed over three-years through consensus-building process
- Established in 2014
  - Actions for point and nonpoint sources
  - Monitoring to be included in point source permits
  - Determination of feasible nutrient reduction targets for point sources
- Updated in 2018 and 2020

Proposed Total Phosphorus Rule

- Implements the Nutrient Loss Reduction Strategy
- Proposed amendments to 10 CSR 20-7.015 (9)(B)2 to establish point source phosphorus reduction targets
- Applies to
  - Domestic point sources with a design flow of ≥1MGD
  - Industrial point sources categorized as “major” that typically discharge phosphorus in wastewater

Proposed Total Phosphorus Rule

- Phosphorus target reduction levels:
  - Annual average total phosphorus target of 1.0 mg/L
  - Annual mass loading equal to 1.0 mg/L based on design flow
  - Overall reduction of total phosphorus from influent to effluent by 75%
  - Overall reduction of total phosphorus discharged by 75%

Proposed Total Phosphorus Rule

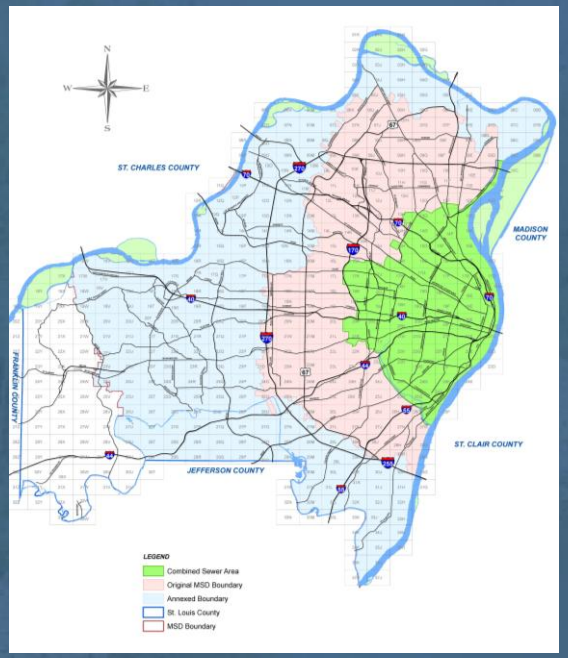
- Implementation dates:
  - January 1, 2029: Domestic point sources with design flow greater than 15 MGD
  - January 1, 2033: Domestic point sources with design flows between 1 MGD but less than 15 MGD
  - January 1, 2034 for industrial facilities

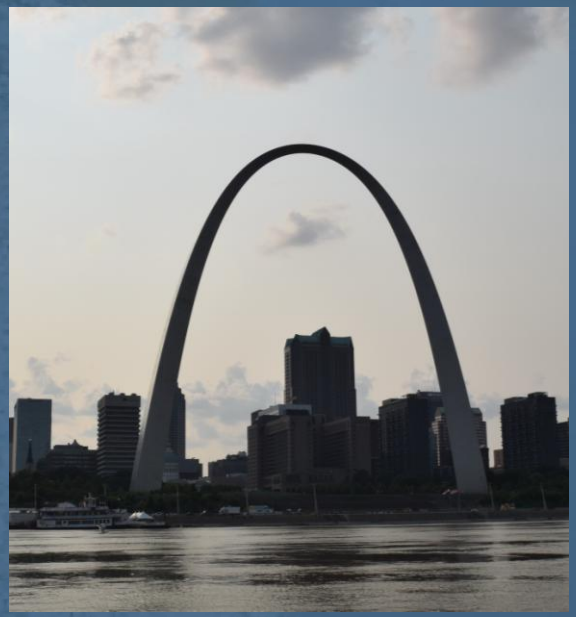
Proposed Total Phosphorus Rule

- Flexibilities:
  - Alternate reduction targets may be requested for combined sewer systems
  - Alternate implementation dates may be requested based on
    - Affordability analysis
    - Integrated Management Plans
    - Expected regionalization plans
    - Cost of implementation would cause undue financial burden
    - DNR-approved Nutrient Reduction Master Plan that reduces both phosphorus and nitrogen
    - Aggregate assessment or allocation

Proposed Total Phosphorus Rule

- Nutrient credits and trading
  - Nutrient credits may be used to comply with reduction targets
  - “Nutrient Credit” defined as “an actual reduction in discharges of nutrients in pounds that is greater than the reduction required by law or permit conditions, including a non-point source installing best management practices, and which can be sold or purchased or aggregated between multiple facilities under common ownership or operational control, and used to achieve compliance with the nutrient target reductions”
  - Nutrient credits may be generated in accordance with
    - Nonpoint Source Credit Generation Plan
    - Point Source Trade Plan
    - Early compliance with reduction targets
    - Aggregate assessment and allocation plan





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MSD
wastewater + stormwater

MSD Overview

- 525 square mile service area
  - 1,300,000 customers
  - 90 municipalities served
- 350+ million gallons/day wastewater treated
  - 7 treatment plants
  - ~30% of the statewide TP point source load
- Year 10 of SSO/CSO Consent Decree
  - ~$400M/annual capital program

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MSD Nutrient Master Plan

- Influent Characterization
- Process Modeling
- Alternatives Selection
- Regulatory Strategies

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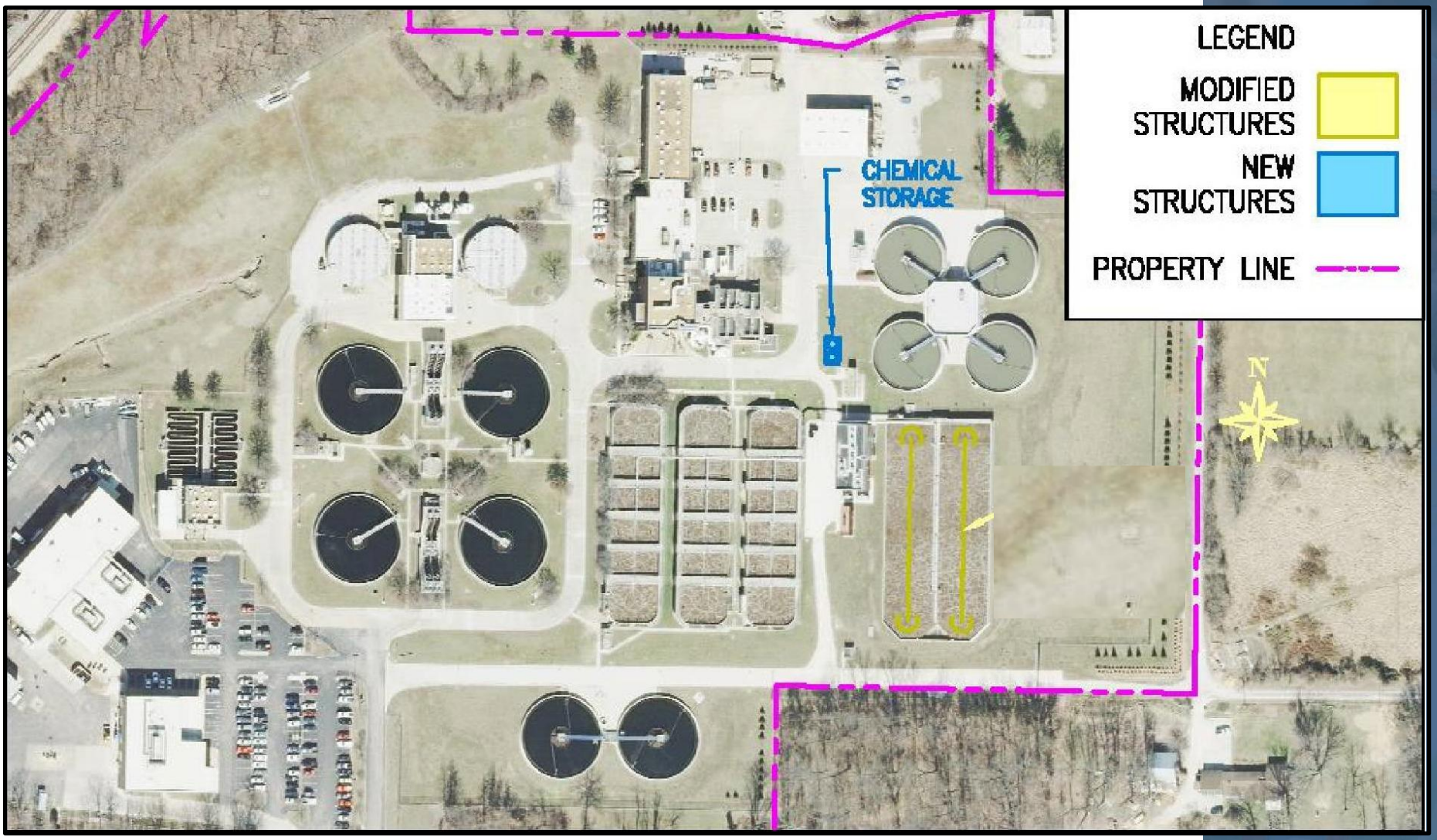
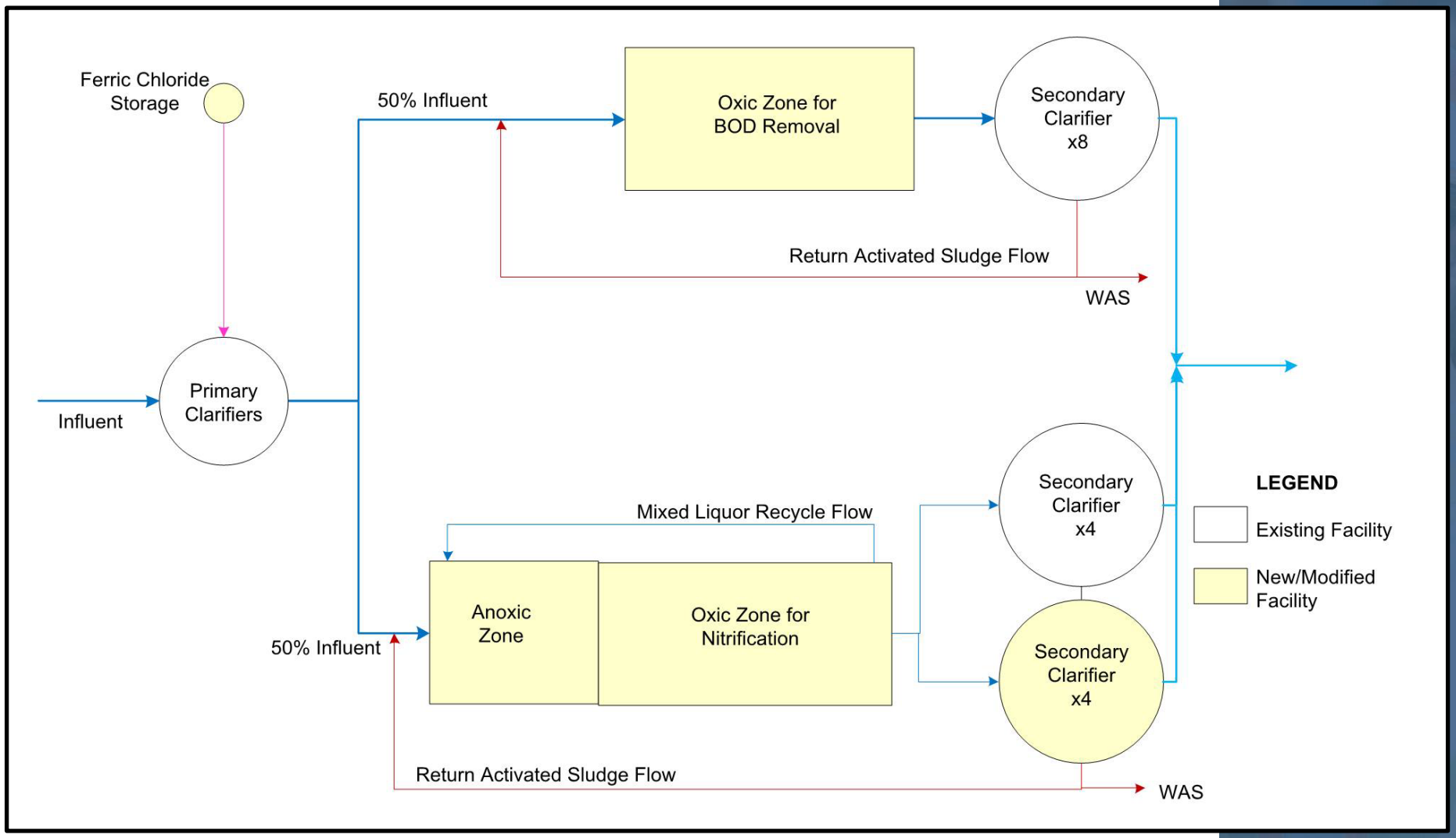
Phosphorous (Chemical) Removal

Phosphorous (Chemical) Removal



Nitrogen & Phosphorous Removal (Bissell Point WWTP)



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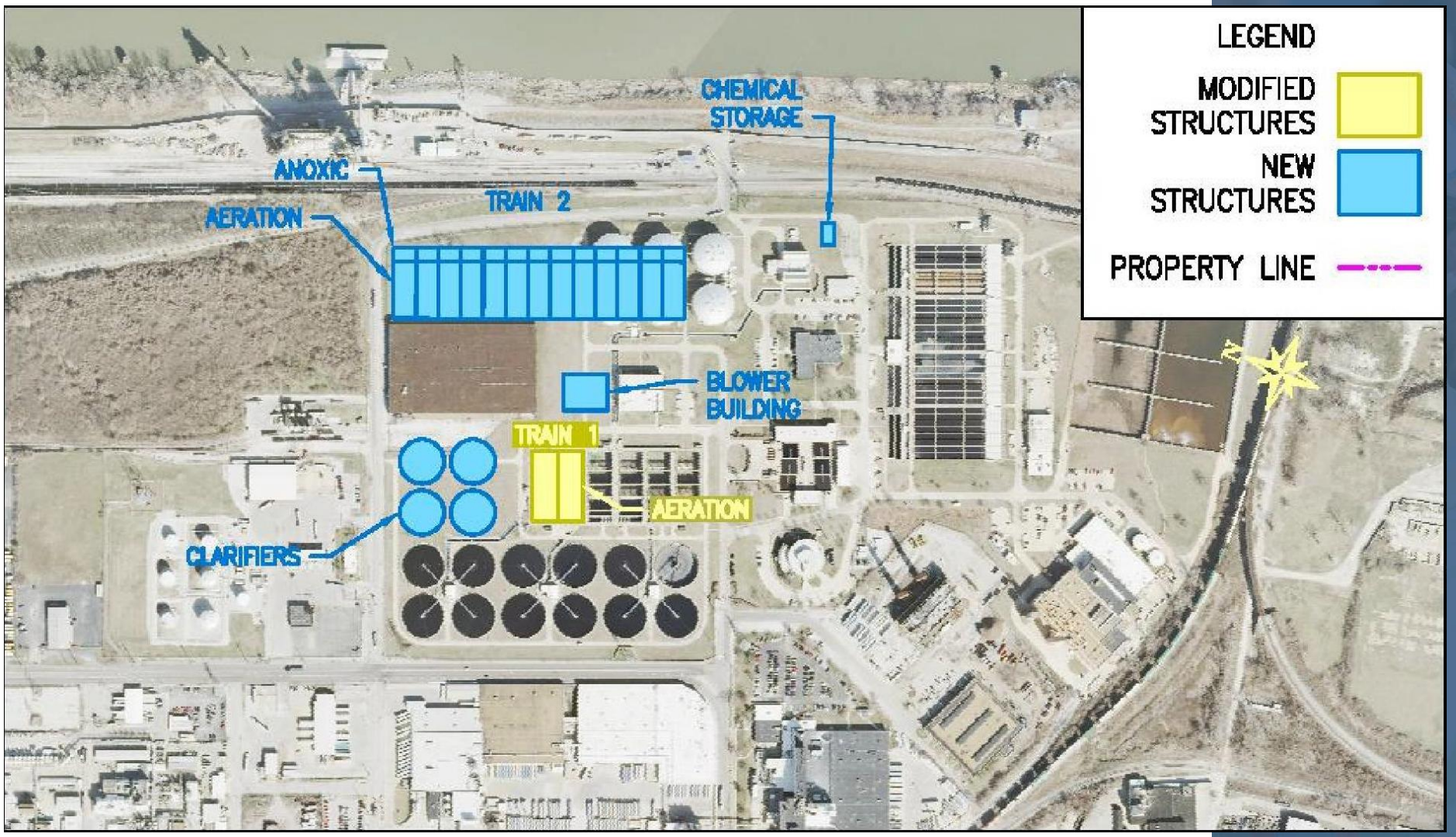
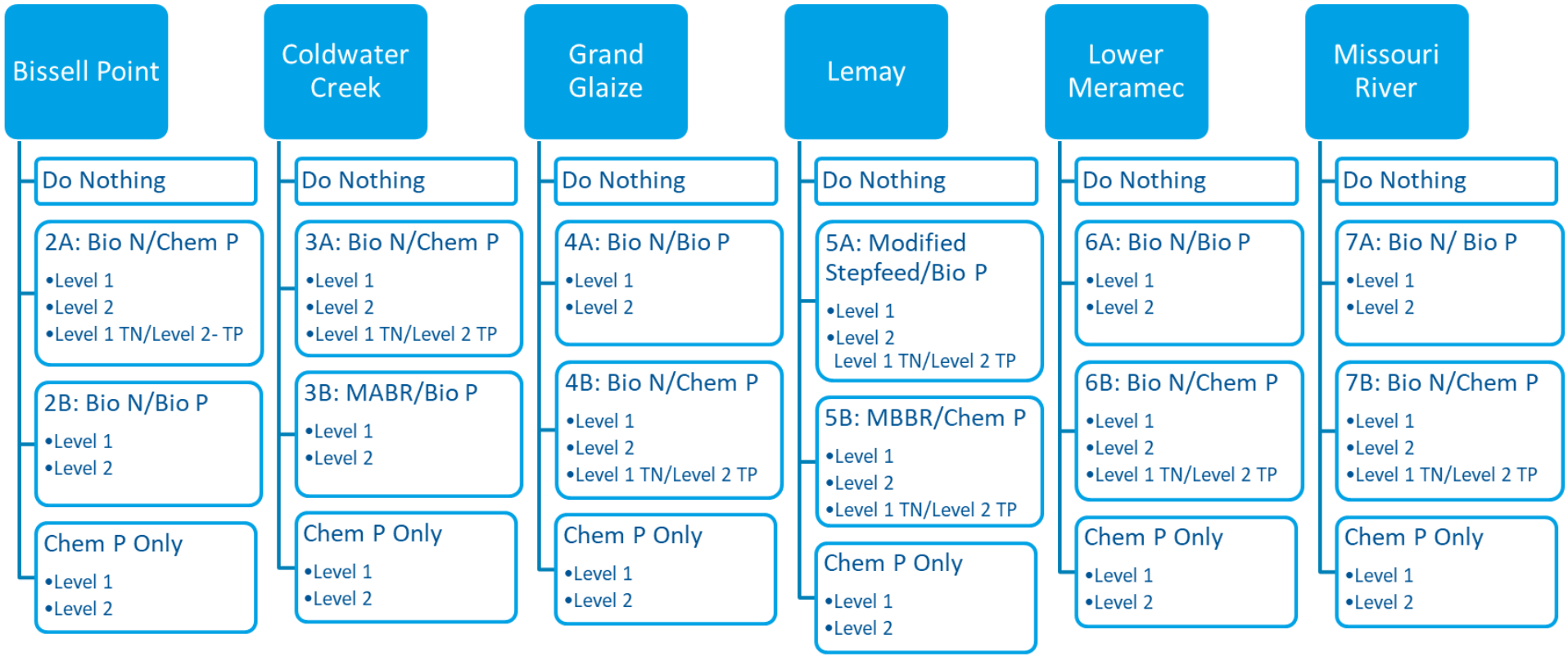
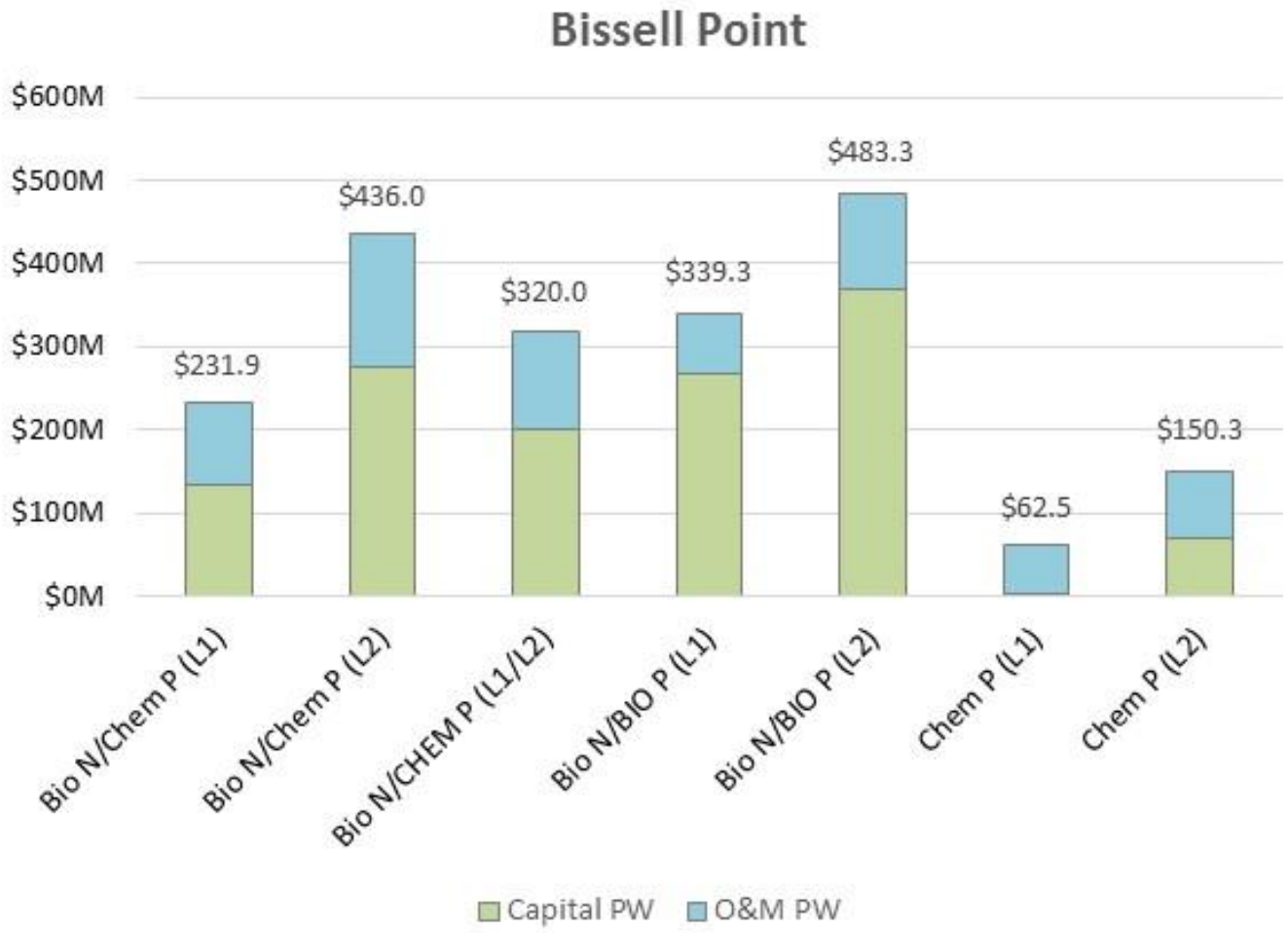


Nutrient Recovery Treatment Alternatives

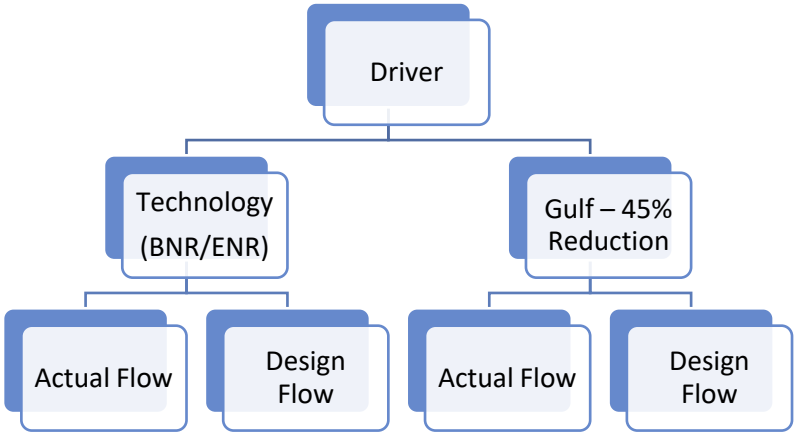


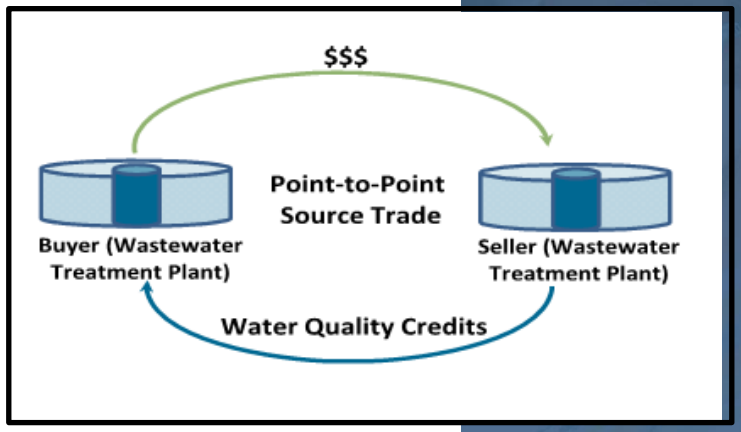
Level 1 (BNR) – TN = 10 mg/L, TP = 1 mg/L
Level 2 (ENR) – TN = 5 mg/L, TP = 0.5 mg/L

Nitrogen & Phosphorous Removal (Bissell Point WWTP)



Nutrient Recovery Regulatory Strategies



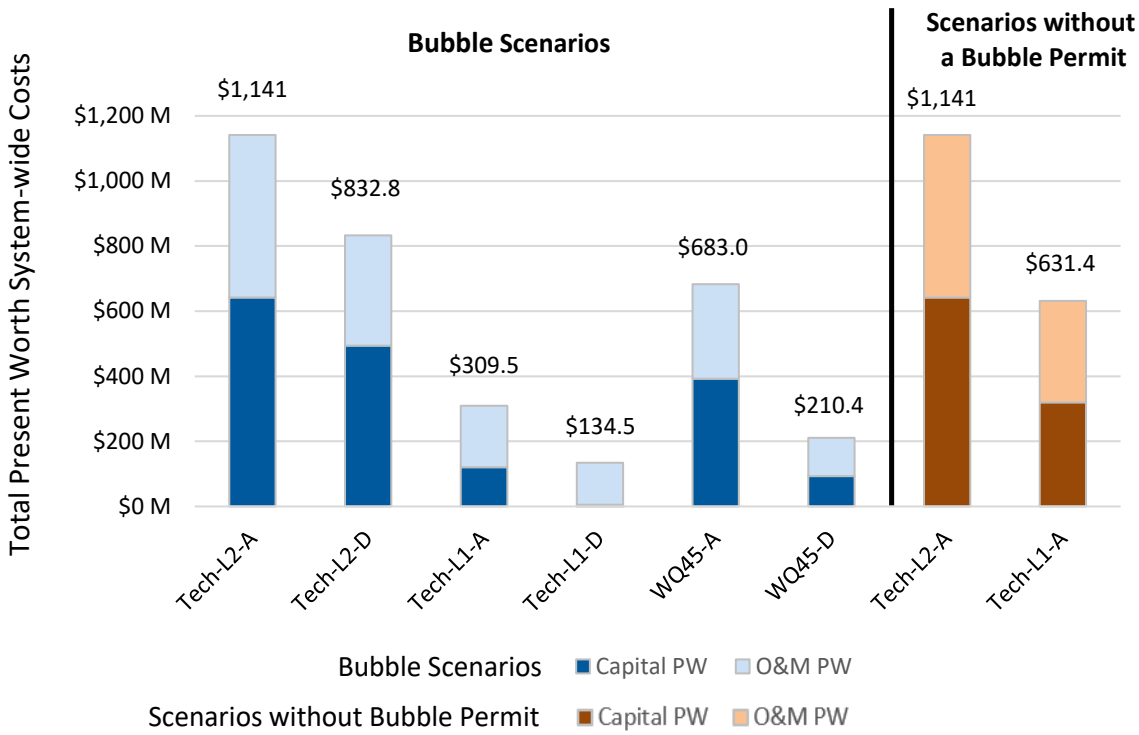


Systemwide Costs

Cost range: $135M - $1.1B

Trading significantly saved capital and operating costs

Optimal recovery strategy depends on nutrient driver and load reduction targets

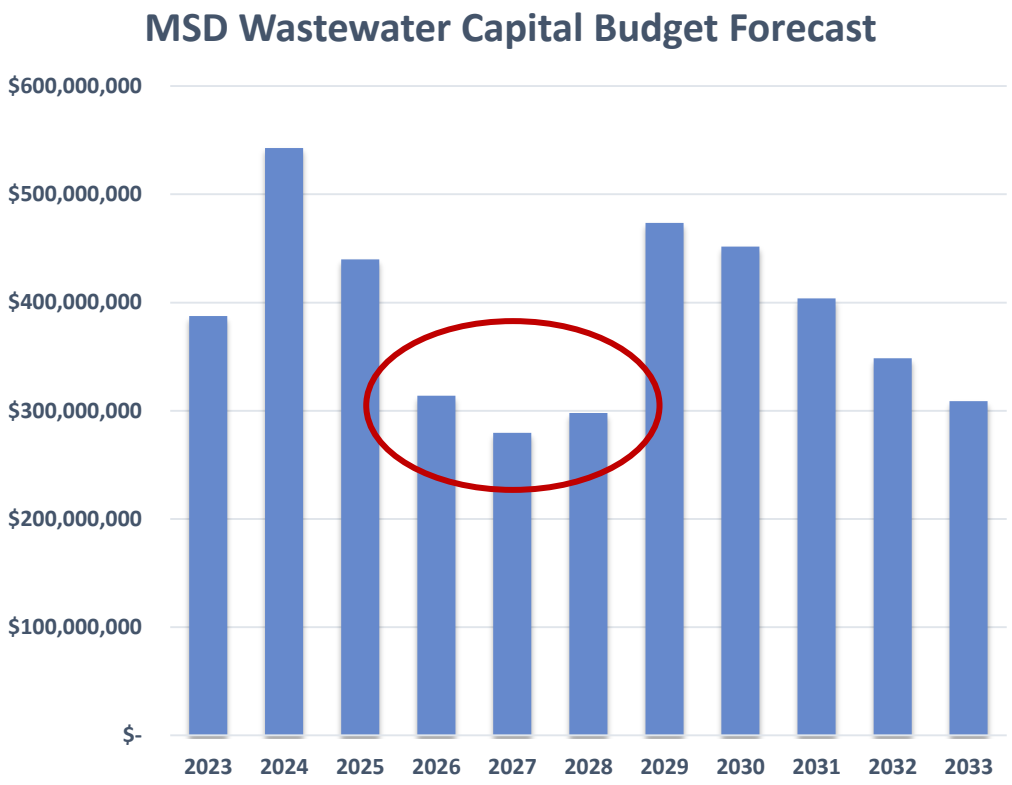


Total Capital Project Spending

MSD Capital Project Priorities

Timing & Cost of State TP Reduction Rule is Manageable

TN Reduction Would Disrupt Capital Program & Rates



Indirect (Industrial) Dischargers

- Wastewater Billing
  - Wastewater Quantity
  - Wastewater Strength
  - Other Services
- Future rate studies
  - 2024-2028 Study Ongoing
  - 2029+ Operational Rate Impacts
- Industrial Loading Data
  - 2% of Companies are 94% of TP Load
  - Chemicals, Pharma, & Beverage

Questions