EAST BAY MUNICIPAL UTILITY DISTRICT

Nutrients Update

Planning Committee

July 10, 2018

Agenda

- Background
- Potential Nutrient Reduction Study at Bay Area Wastewater Treatment Plants
- Nutrient Permit Renewal in July 2019
- Summary and Next Steps

1,400 pages

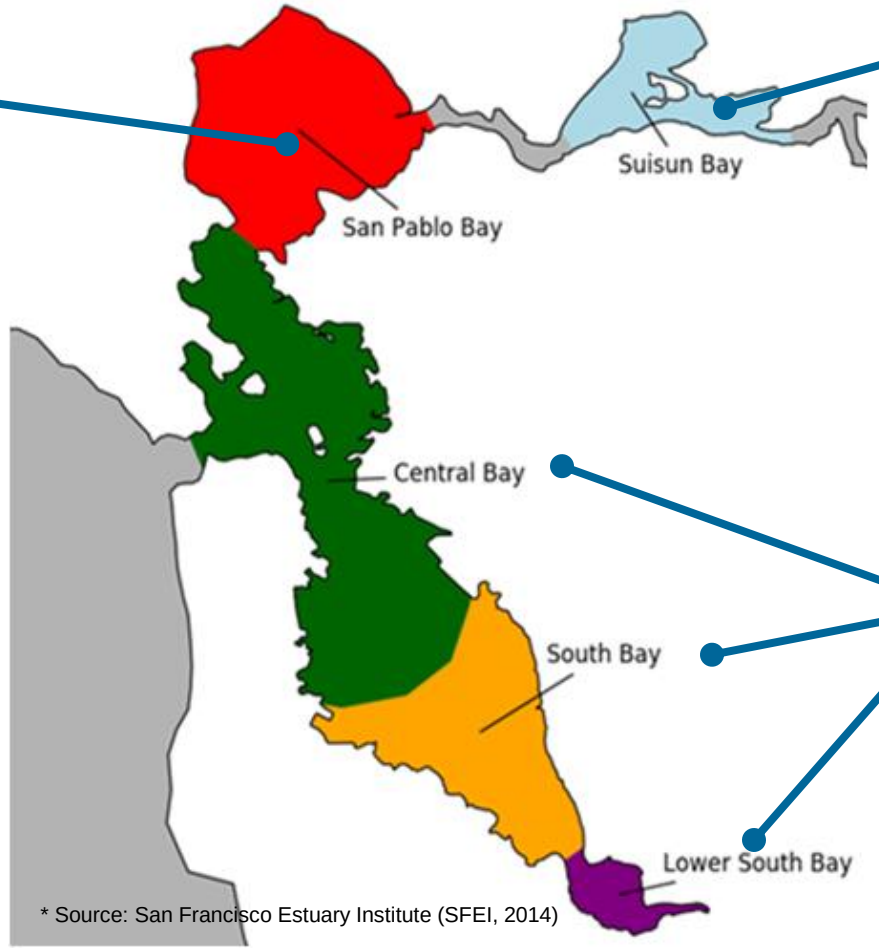
Major Nutrient Sources to San Francisco Bay

Nutrient Sources to the San Francisco Bay*

21%

by Publicly Owned Treatment Works (**POTWs**)

- Rest by Delta and storm water
- Large seasonal variability



24%

by **POTWs**

- Rest by Delta and storm water
- Large seasonal variability

> 90%

by **POTWs**

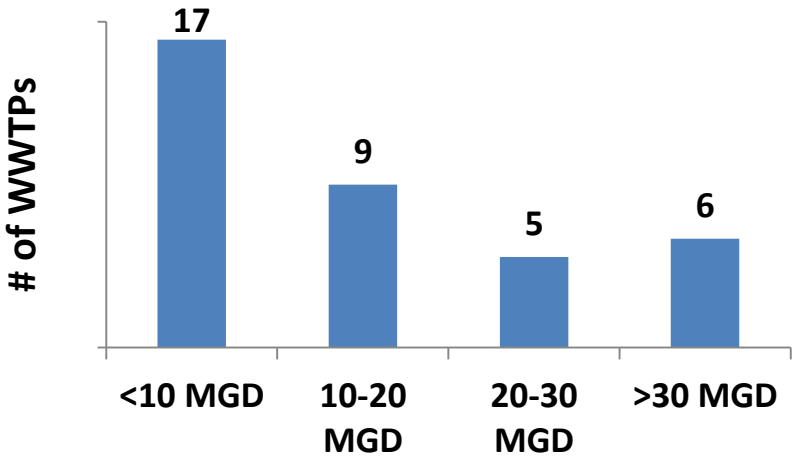
- Rest by storm water
- Minimal seasonal variability

* Source: San Francisco Estuary Institute (SFEI, 2014)

Bay Area Wastewater Treatment Plants

37 WWTPs | **~450 MGD** Treated wastewater | **7⁺ million** Service population

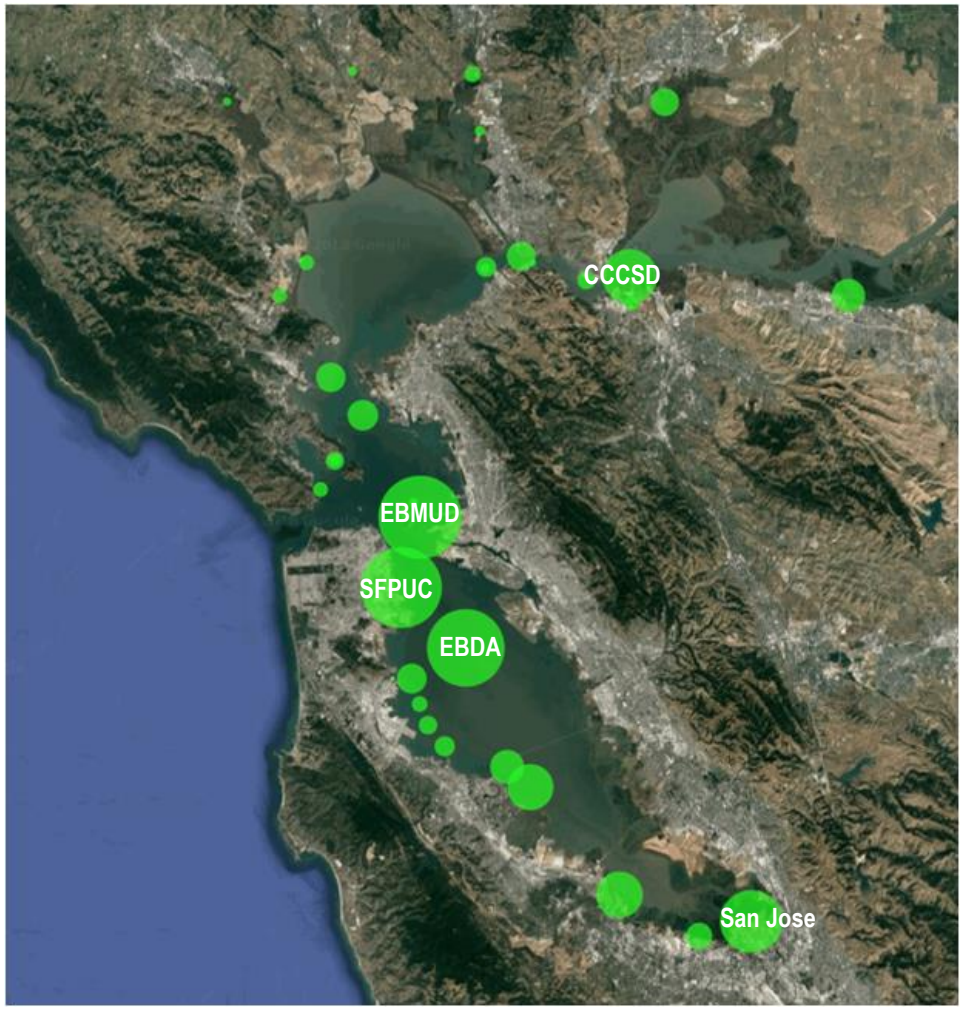
- Various treatment processes
- Plant size ranges from 1–167 MGD



WWTP Size
(by permitted average dry weather flow)

Bay Area WWTPs Nutrient Discharge

Dissolved Inorganic Nitrogen (DIN) Discharge (kg-N/day)
(DIN = ammonium + nitrite + nitrate)



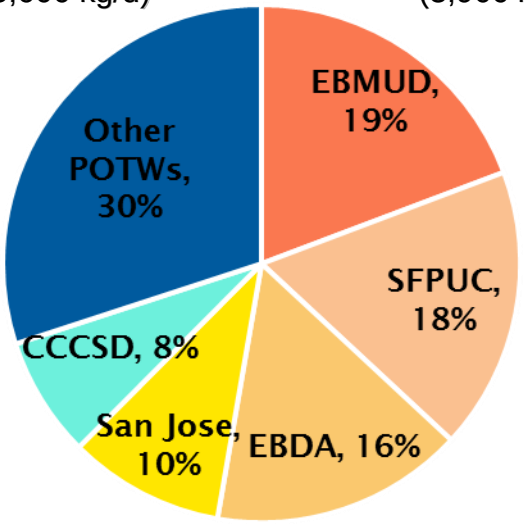
~450 MGD
Treated wastewater to the Bay

7 N Nitrogen 14.007

15 P Phosphorus 30.974

12,200 lbs/day
(55,600 kg/d)

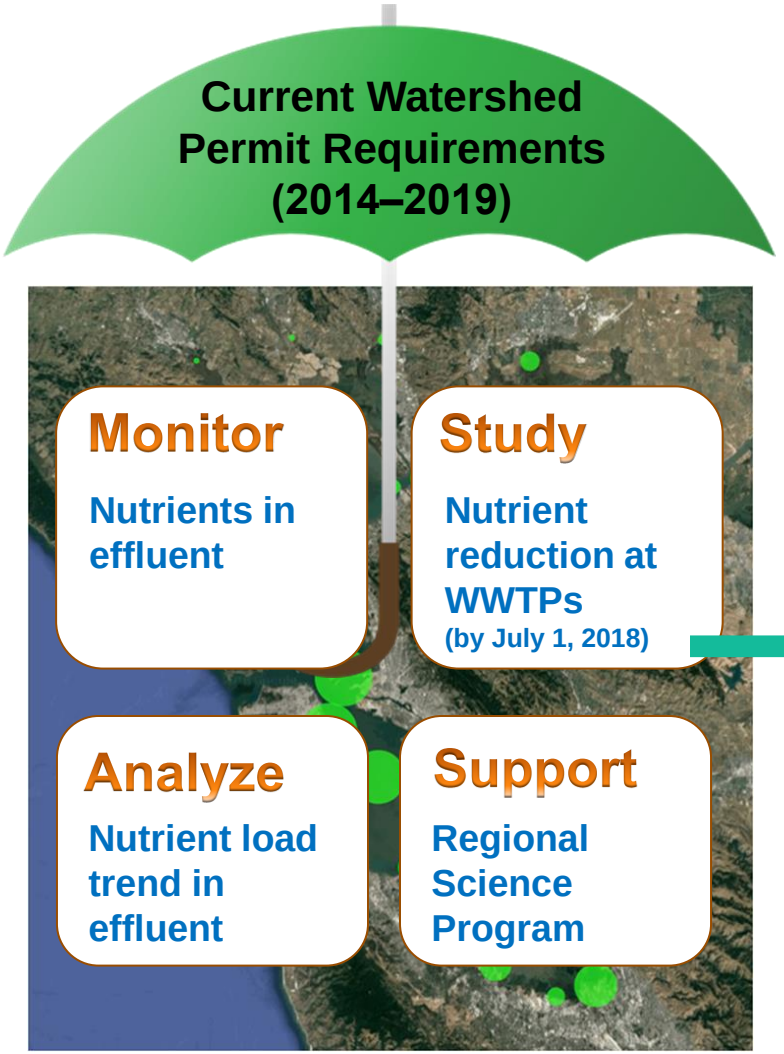
8,600 lbs/day
(3,900 kg/d)



Total Nitrogen Discharge
(70% by the top five dischargers)

Data by BACWA/HDR (2016 average), graph by SFEI. CCCSD = Central Contra Costa Sanitary District; EBDA = East Bay Dischargers Authority (joint power of five local agencies); SFPUC = San Francisco Public Utilities Commission Southeast Plant; San Jose = San Jose-Santa Clara Regional Wastewater Facility

Current Nutrient Watershed Permit

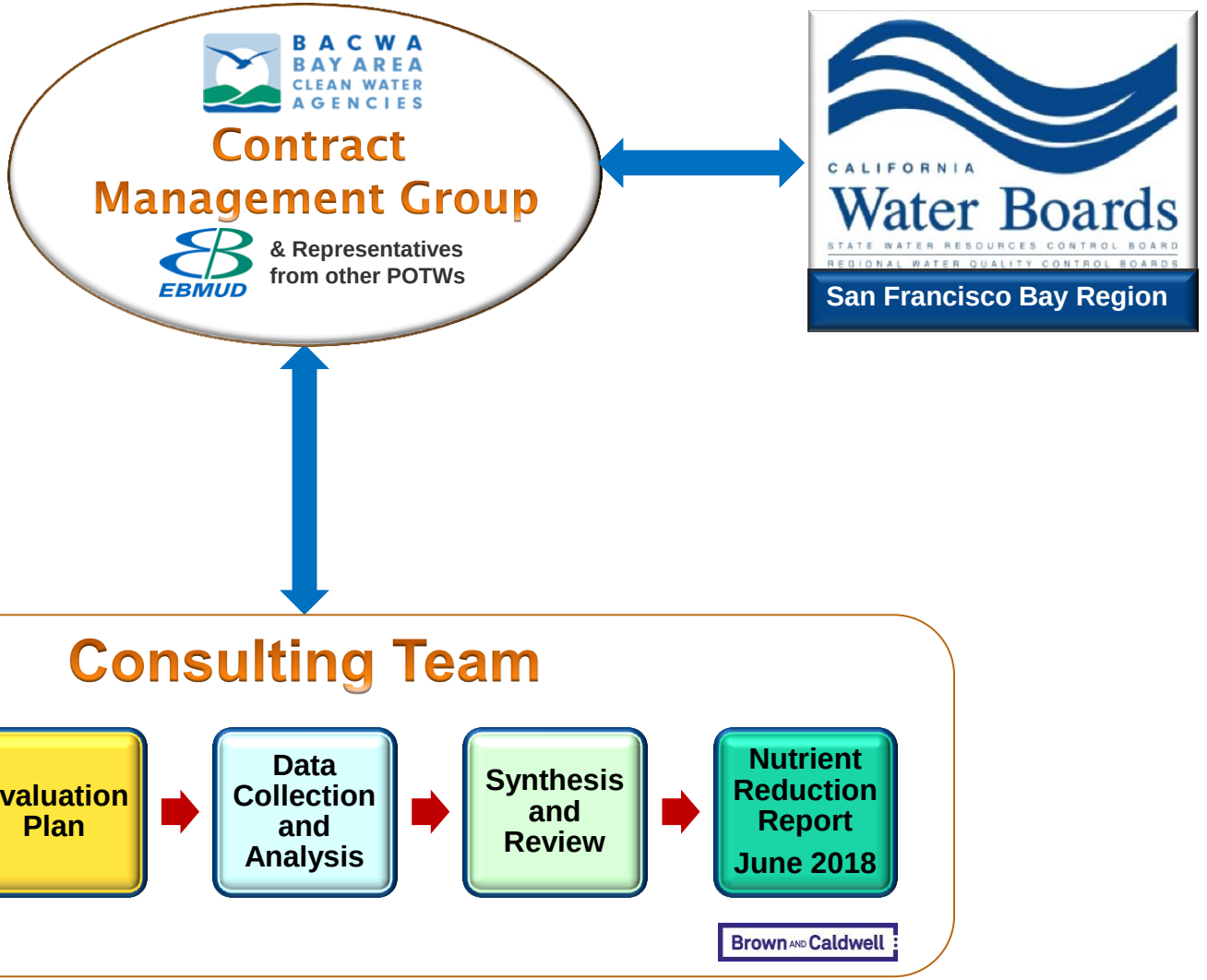


Nutrient Management Strategy (NMS)

To develop the best science-supported nutrient management solutions for San Francisco Bay

Action	Status
Investigate nutrients impact to the Bay through scientific studies	In Progress SFEI AQUATIC SCIENCE CENTER
Understand potential nutrient load reduction and costs at WWTPs	√
Explore non-WWTPs solutions (wetland, water recycling etc.)	Next

Nutrient Reduction Study Approach



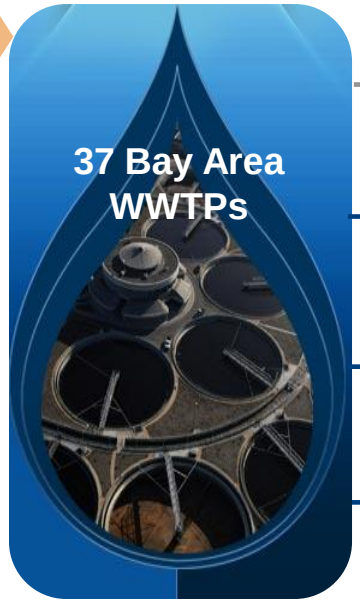
Study Assumptions

Conceptual-level Study

Influent*

~50 mg-N/l

~6 mg-P/l



Current Effluent Concentration*

~35 mg-N/l; ~2–3 mg-P/l
(~⅓ N removal, ~⅔ P removal)

Optimization (10-y project life, no eff. target)

Sidestream (30-y project life, no eff. target)

Upgrades (30-y project life, yes eff. targets)

Level 2

15 mg-N/l; 1.0 mg-P/l

Level 3

6 mg-N/l; 0.3 mg-P/l

* Source: BACWA/HDR, based on limited data available

Study Findings for EBMUD MWWTP

Not a candidate for Optimization — difficult for pure oxygen plant with limited reactor volume

A candidate for sidestream treatment

If upgrade to

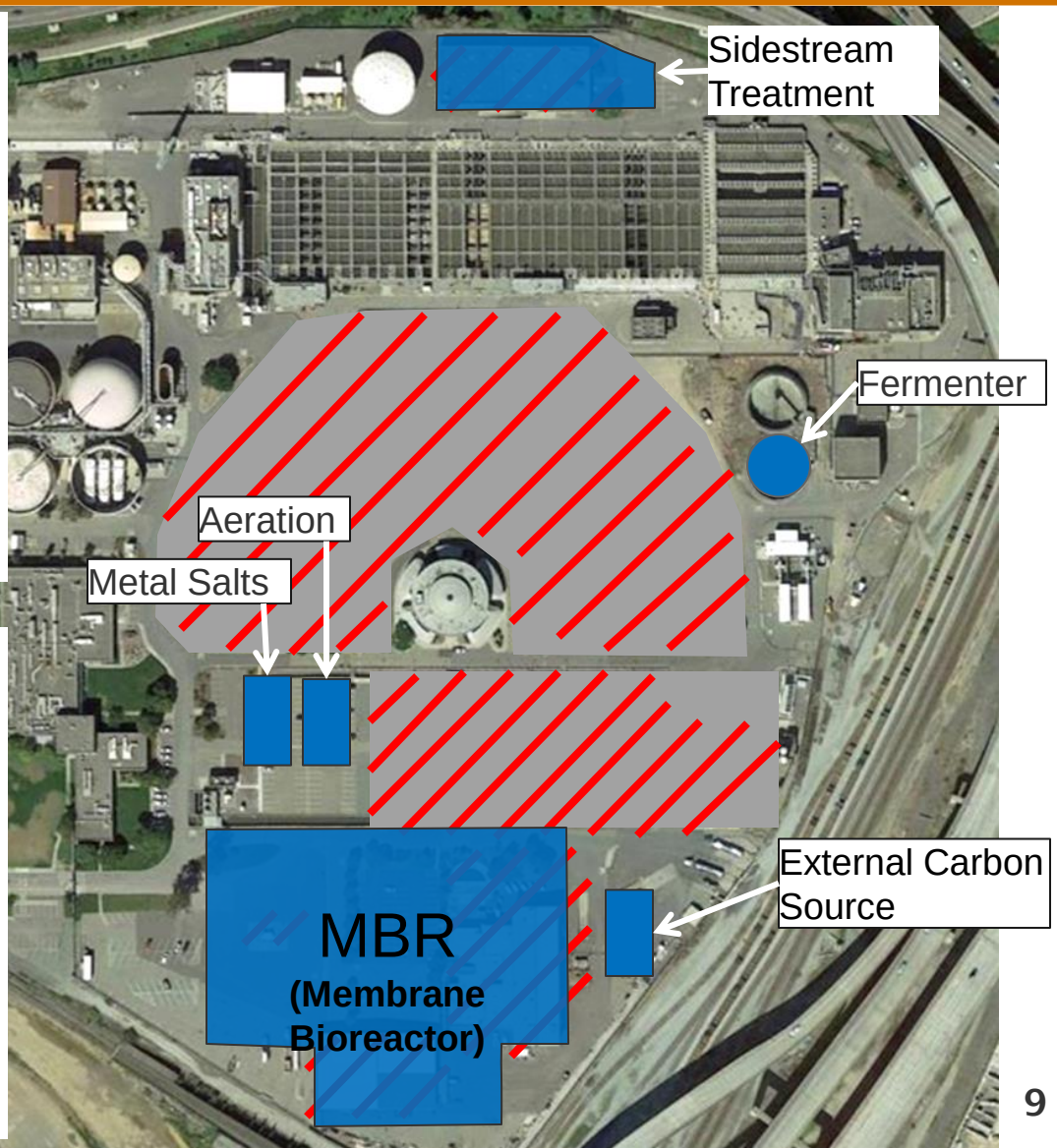
- Treat 120 MGD permitted dry weather flow (current ~50 MGD)
- Build new secondary treatment
- Build new sidestream treatment **$164M ($75M capital)**

$2.6B for Level 2 ($2.3B capital)

$2.9B for Level 3 ($2.4B capital)

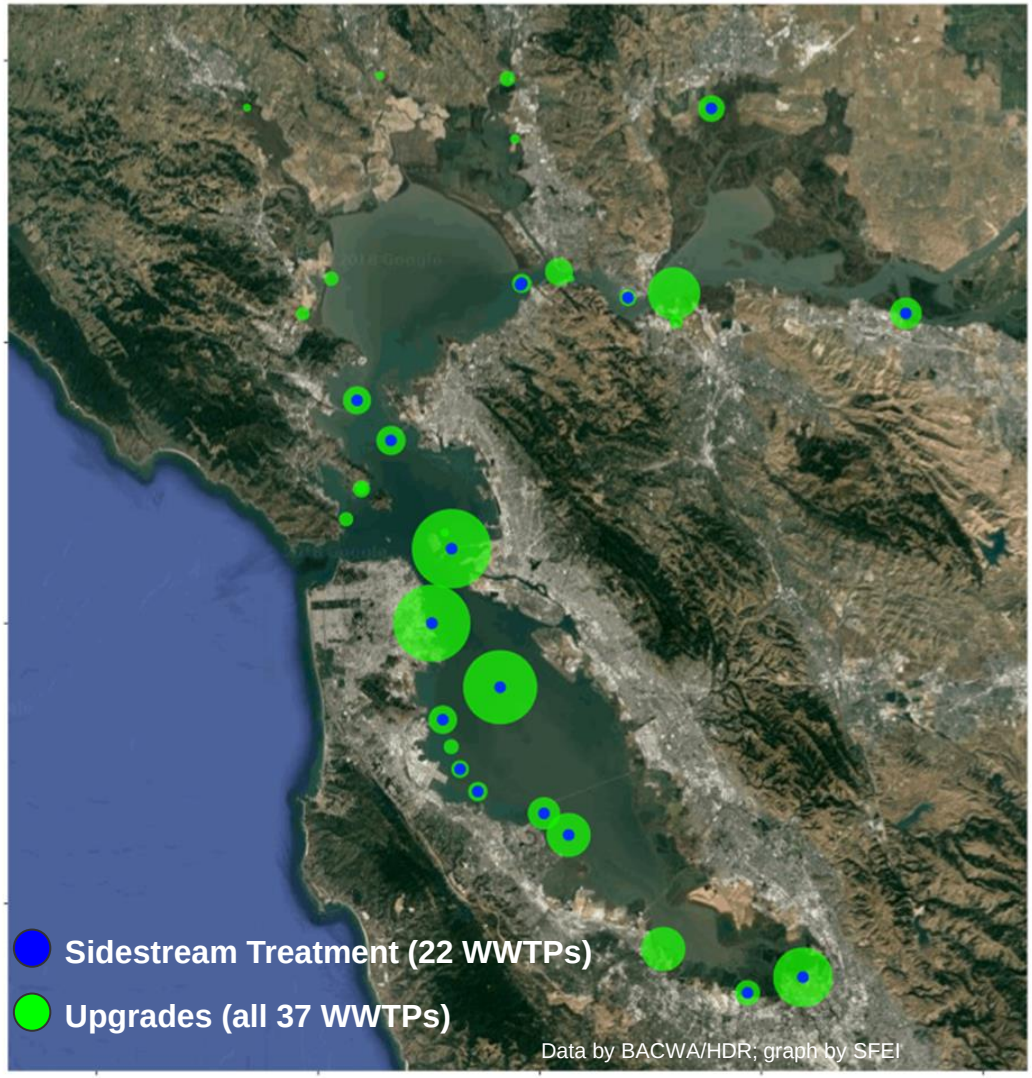
$2.4B Level 3 Upgrade Details

- Demolish/relocate Maintenance Facility
- Construct membrane bioreactor
- Construct aeration system
- Demolish Reactors, O2 Plant, Secondary Clarifiers, and Old Maintenance Building
- Construct Sidestream Treatment Reactor
- Construct Fermenter to treat primary solids (to produce carbon needed)
- Construct chemical addition facility (external carbon source)
- Construct chemical addition facility (metal salts)



Region-wide Study Findings

Candidate WWTPs for TN Removal

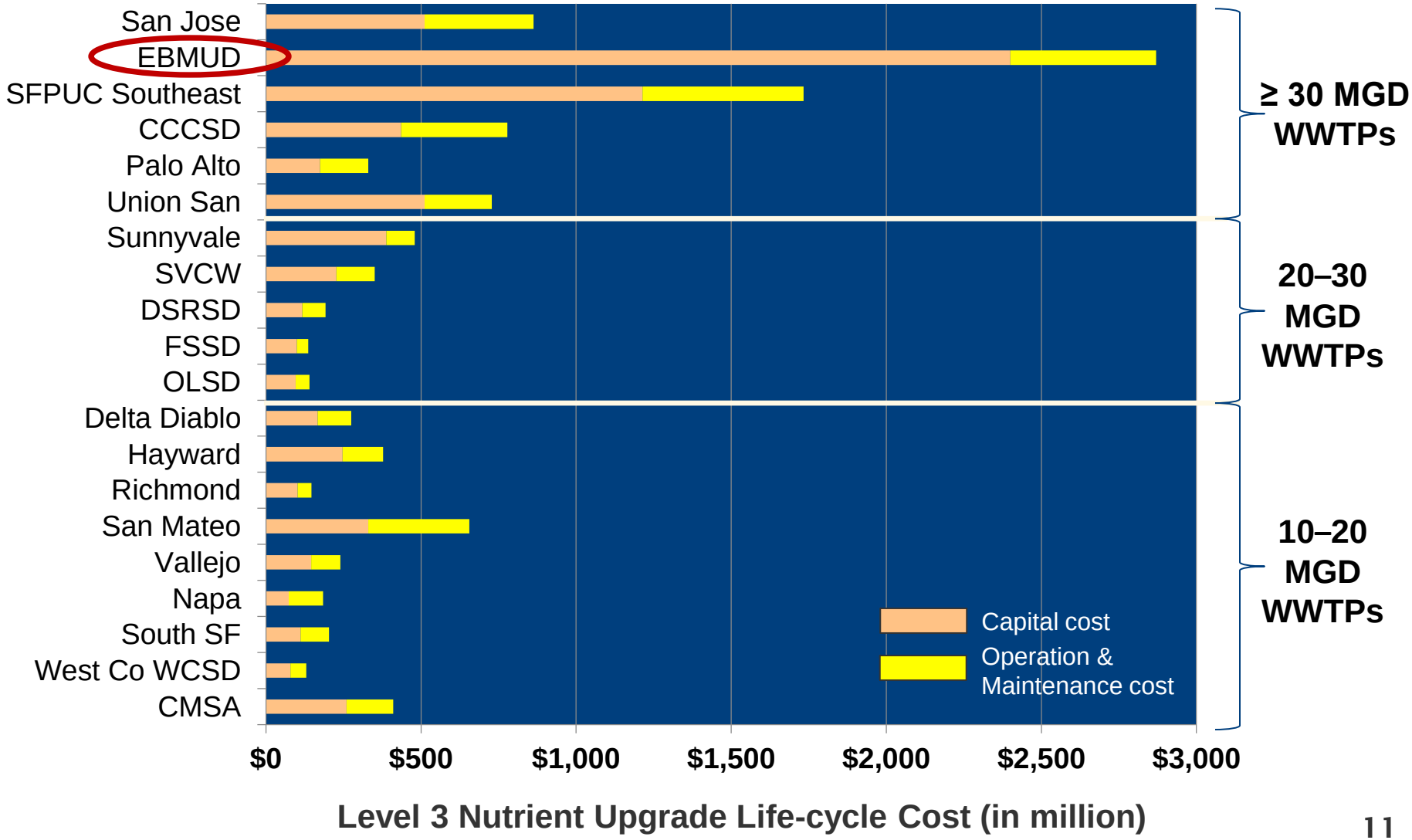


Region-wide Summary

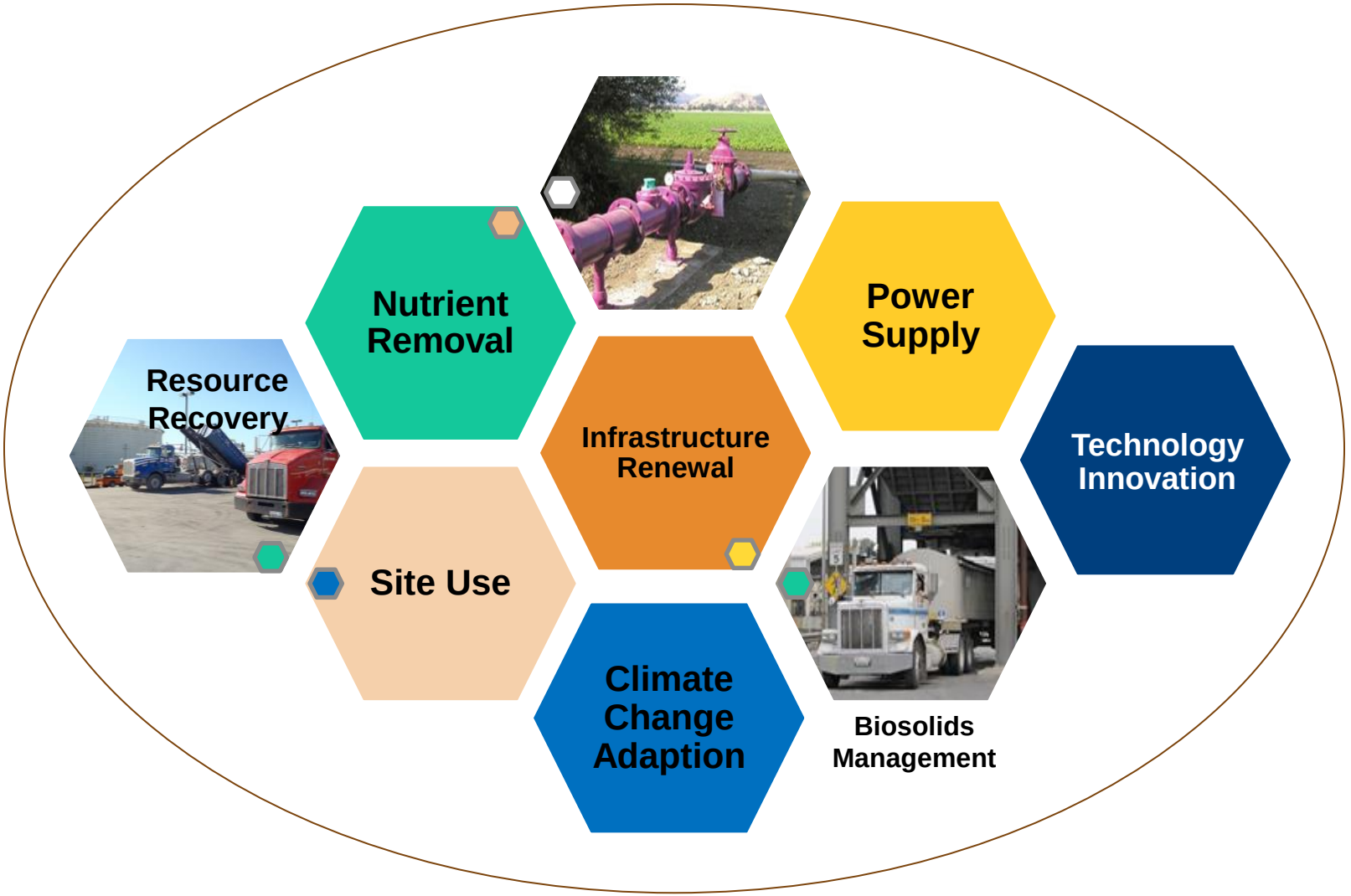
Strategy	TN Load Reduction to the Bay	Standalone Life-cycle Cost* (Capital cost)
Optimization	**7%**	**$266M** ($119M)
Sidestream Treatment	**19%**	**$736M** ($391M)
Upgrade Level 2	**57%**	**$9.4B** ($7B)
Upgrade Level 3	**82%**	**$12.4B** ($8.5B)

* Costs for both TN and TP reductions

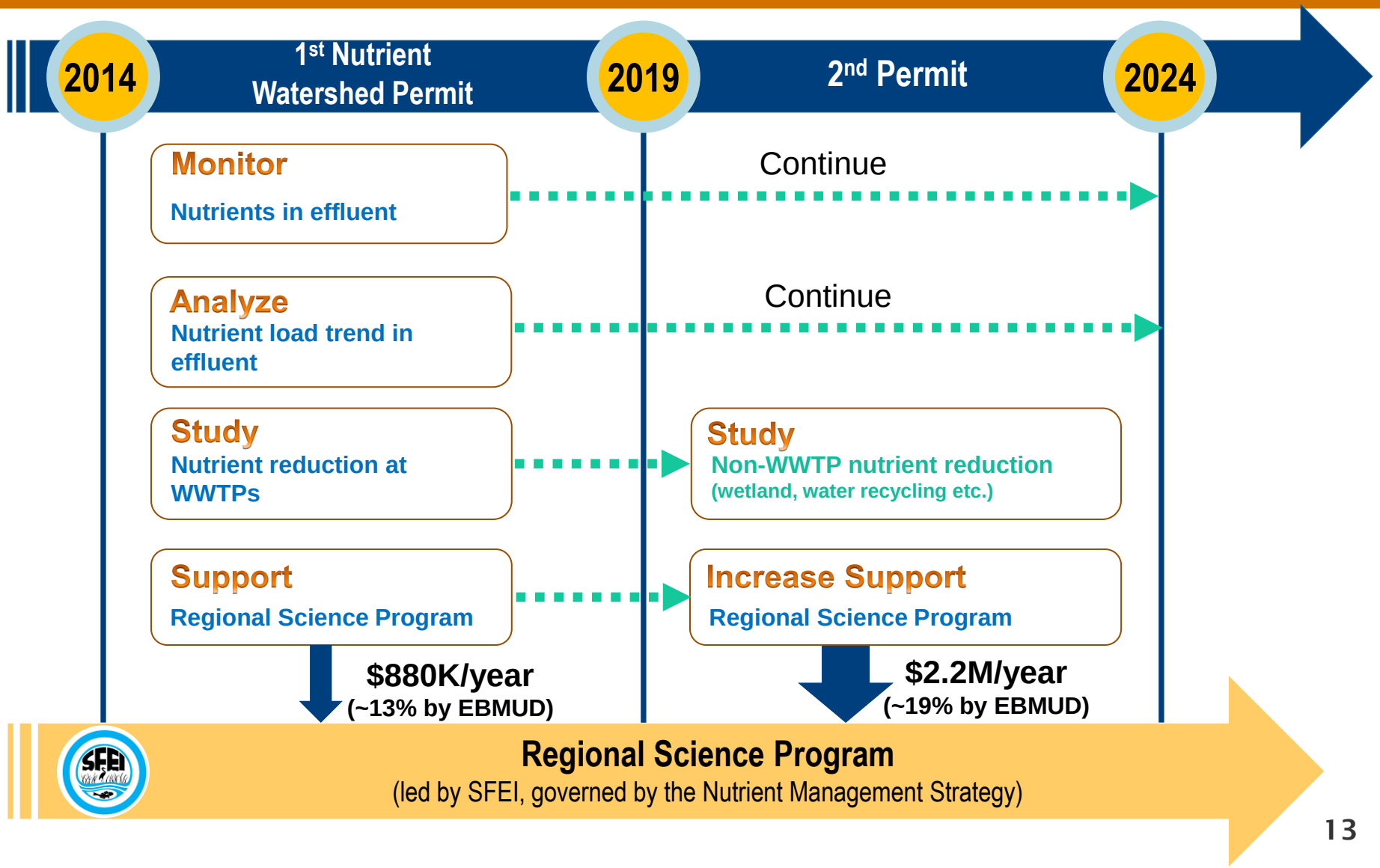
Nutrient Upgrade Costs for WWTPs (with ≥10 MGD permitted flow)



Develop Integrated Master Plan for the MWWTP



Possible Requirements for 2019 Nutrient Watershed Permit



Summary and Next Steps

- **Costs for nutrient upgrades at WWTPs will be substantial**
- **Science is critical to inform future nutrient management decisions**
- **Regional collaboration is important to develop the best nutrient management decisions**

EBMUD Actions	
Continue support the regional scientific studies	✓
Continue regulatory strategy development	✓
Develop MWWTP Master Plan	✓
Continue regional collaboration	✓
Provide ongoing Board updates	✓

$12.4B

Nutrient upgrade costs for 37 Bay Area WWTPs