Municipal Wastewater:
Regulator Perspective

Bill Johnson

San Francisco Bay
Regional Water Quality Control Board

October 10, 2019

CALIFORNIA
Water Boards

Clean Water Act §101

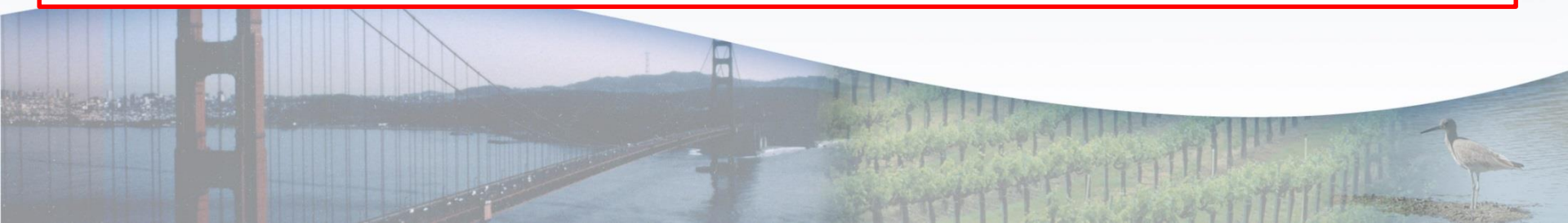
- Objective:
  - Restore and maintain chemical, physical, and biological integrity of Nation's waters
- Goals:
  - Eliminate pollutant discharges (by 1985)
  - Provide for protection and propagation of fish, shellfish, and wildlife, and provide for water recreation (by 1983)

Clean Water Act §301

- Permit required to discharge pollutants to waters of the United States
  - Technology-based limits

Secondary Treatment Standards:

Total Suspended Solids
Biochemical Oxygen Demand
pH



Clean Water Act §303

- States must…
  - Adopt water quality standards
  - Identify waters not meeting water quality standards
  - Calculate total maximum daily loads **(TMDLs)**
  - Undertake continuing planning process

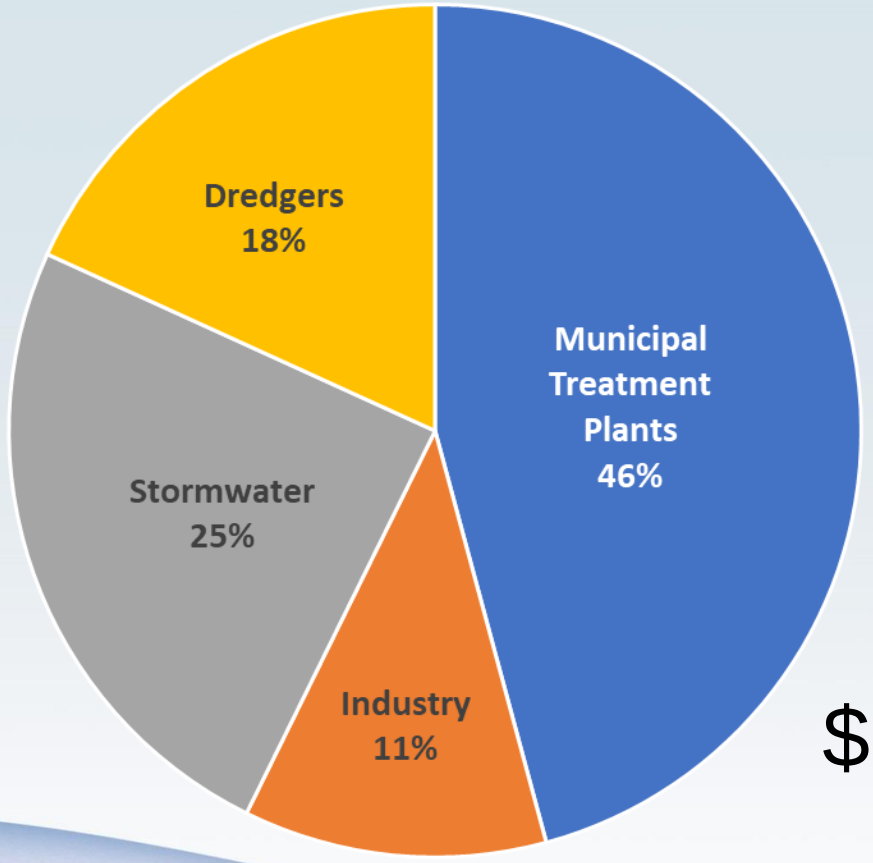
Clean Water Act §402

- National Pollutant Discharge Elimination System **(NPDES)** permits contain:
  - Discharge Prohibitions
  - Effluent and Receiving Water Limitations
  - Provisions (fine print)
  - Monitoring Requirements:
    - Influent and Effluent
    - Receiving Water

Receiving Water Monitoring

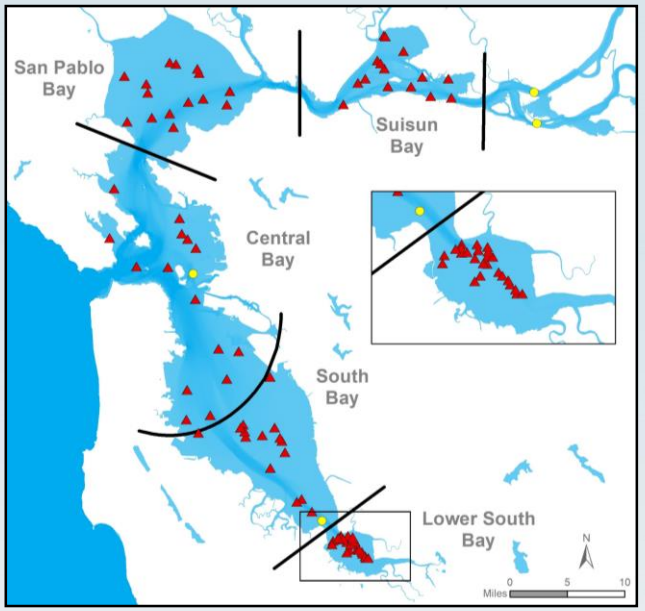
*"The Discharger shall continue to participate in the **Regional Monitoring Program**, which collects data on pollutants and toxicity in San Francisco Bay water, sediment, and biota."*

$3.7 Million RMP Funding



$1.7 Million

Clean Water Act §402



- National Pollutant Discharge Elimination System (NPDES) Permits contain:
  - Discharge Prohibitions
  - Effluent and Receiving Water Limitations
  - Provisions (fine print)
  - Monitoring Requirements:
    - Influent and Effluent
    - Receiving Water

Clean Water Act §303

- States must…
  - Adopt water quality standards
  - Identify waters not meeting water quality standards
  - Calculate total maximum daily loads (TMDLs)
  - Undertake continuing planning process

Clean Water Act §303

- States mu
  - Adopt wa
  - Identify w ality standards
  - Calculate (TMDLs)
  - Undertak ess

Site-Specific
Water Quality Objectives

Copper
Nickel

Cyanide
Mercury

Clean Water Act §303

Pollutants that Impair San Francisco Bay

Chlordane
DDT
Dieldrin
Dioxins and Furans
Invasive Species
Mercury
PAHs
PCBs
Selenium
Trash

San Francisco Bay TMDLs

Mercury
PCBs
Selenium

“De-Listed” Pollutants

Cyanide
Copper
Nickel

Clean Water Act §301

- Permit required to discharge pollutants to waters of the United States
  - Technology-based limits
  - Water quality-based limits

Translations

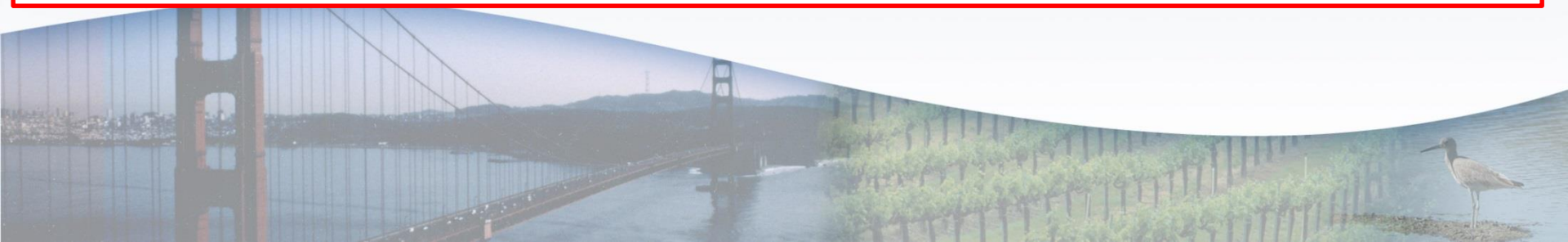
Total Metal ⇄ Dissolved Metal

Total Ammonia ⇄ Un-Ionized Ammonia

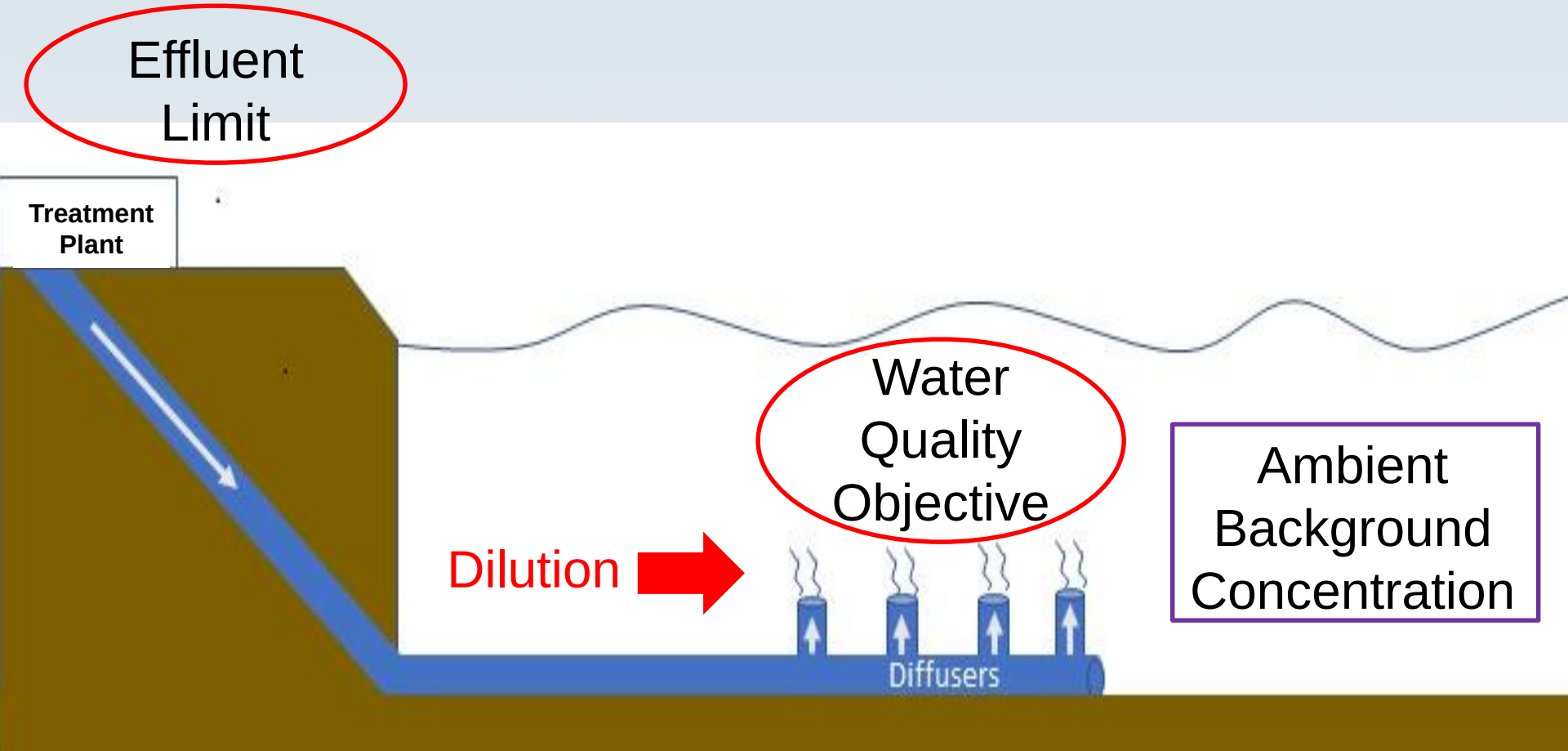
Clean Water Act §301

- Permit required to discharge pollutants to waters of the United States
  - Technology-based limits
  - Water quality-based limits

4-day Cadmium Objective = $e^{(0.7852 \times \ln[\text{hardness}]) - 3.490}$



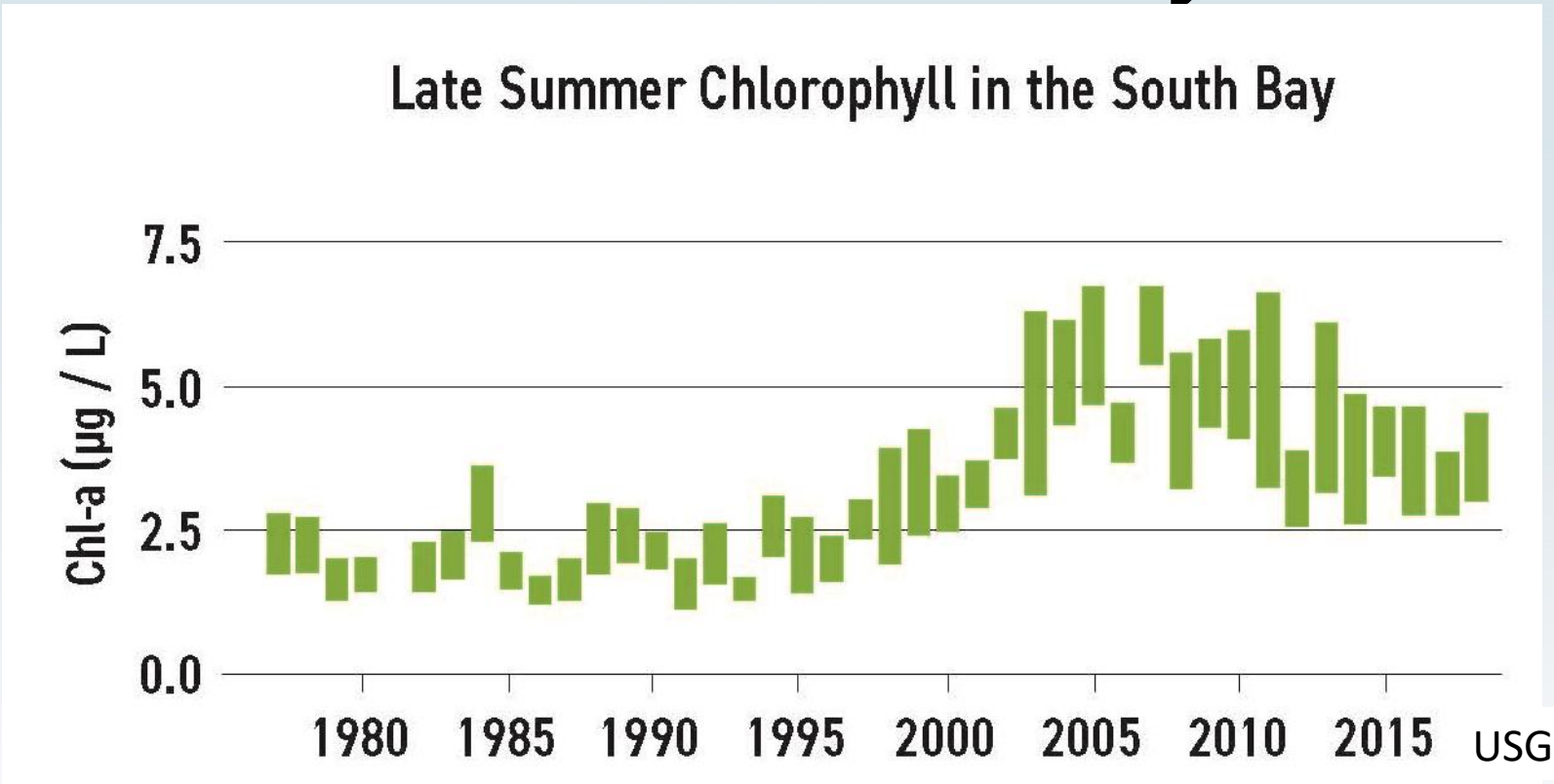
Water Quality-Based Effluent Limit Calculation



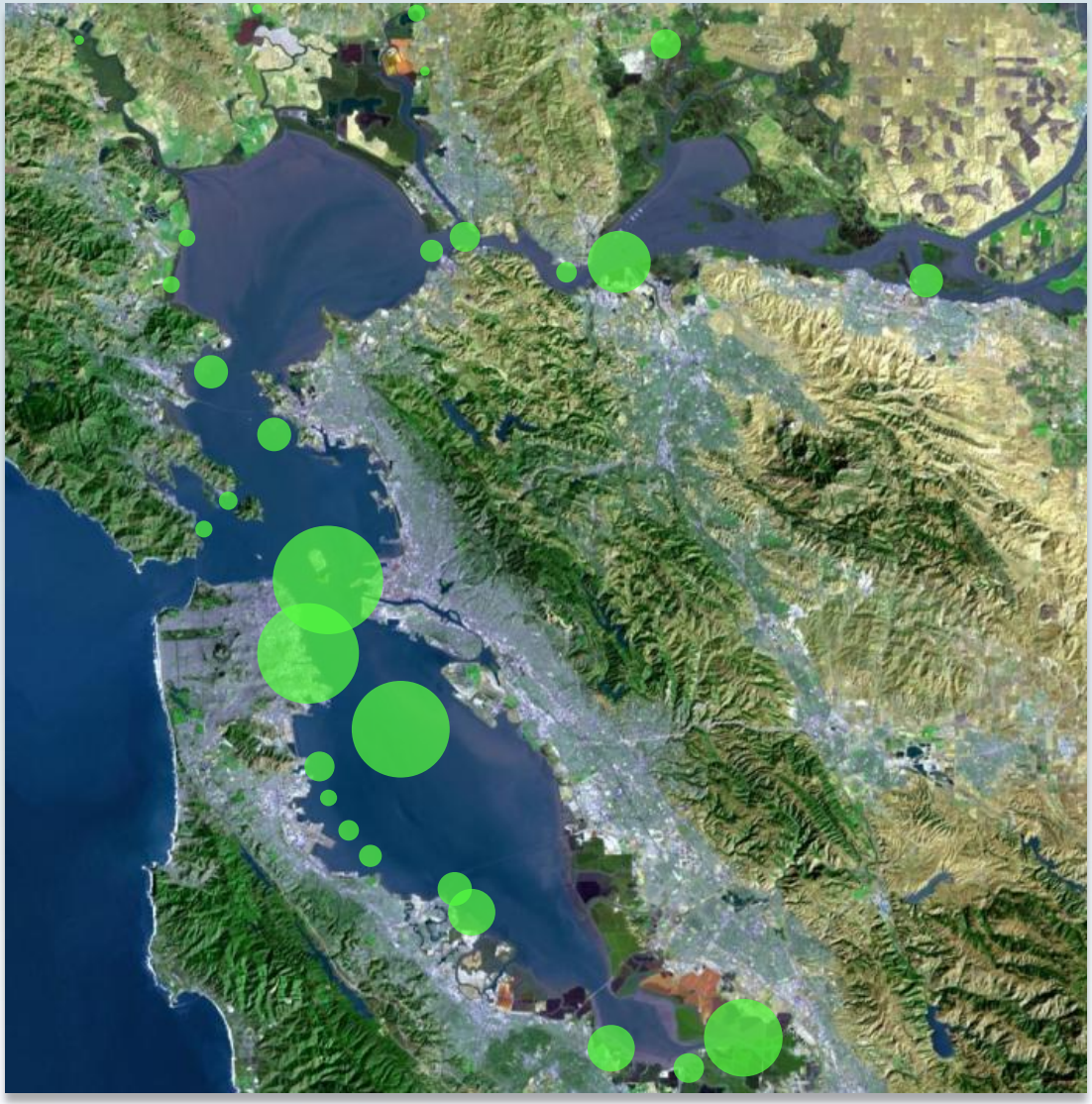
Clean Water Act §101

- Objective:
  - Restore and maintain chemical, physical, and biological integrity of Nation's waters
- Goals:
  - Eliminate pollutant discharges (by 1985)
  - Provide for protection and propagation of fish, shellfish, and wildlife, and provide for water recreation (by 1983)

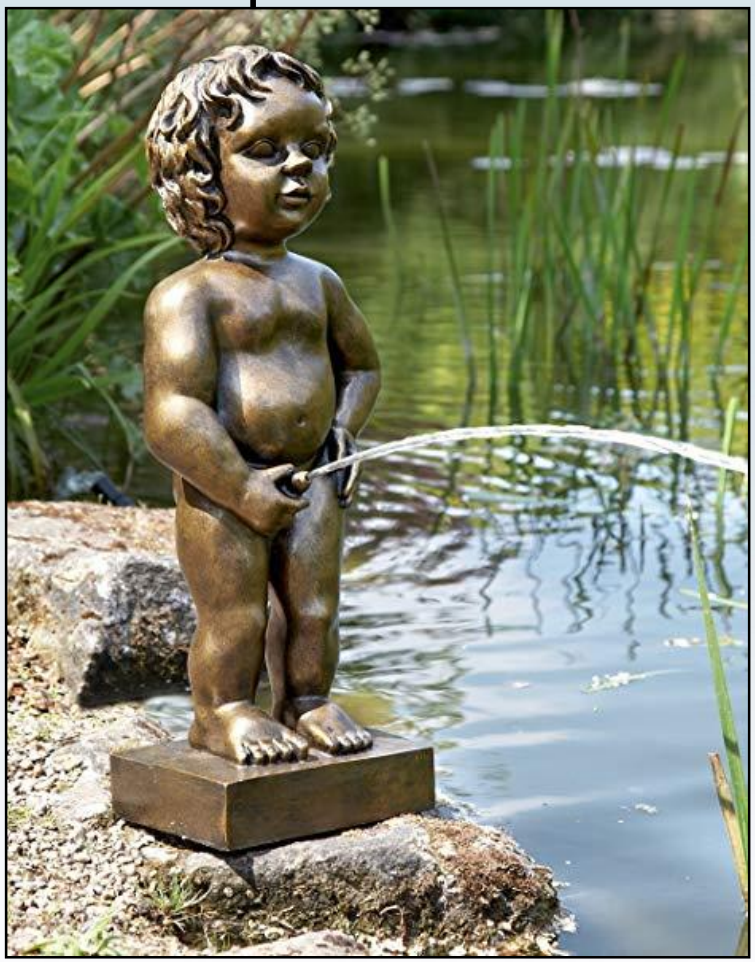
Do Nutrients Affect Integrity of San Francisco Bay?



USGS/SFEI



- 65% of SF Bay nitrogen load is from municipal wastewater



Optimization - Upgrades
Natural Systems - Recycling

Take Away

- RMP studies are critical
  - Routine decisions
  - Decisions requiring wisdom and vision
    - Future of wastewater management
    - Future of San Francisco Bay
      and its chemical, physical, and biological integrity

Municipal Wastewater:
Regulator Perspective

Bill Johnson

San Francisco Bay
Regional Water Quality Control Board

October 10, 2019

CALIFORNIA
Water Boards