# ASSESSING APPROPRIATENESS OF RECREATIONAL SHELLFISH HARVESTING BACTERIAL STANDARDS

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# BACKGROUND

- Bacterial monitoring and remediation has focused primarily on the Rec-1 standard
- However, California also has water quality standards for recreational shellfish harvesting (SHEL)
  - Total Coliform median < 70 MPN/100 mL</li>
  - Monthly median Fecal coliform <14 MPN/100 mL</li>
  - < 10% of samples to exceed Fecal Coliform 43 MPN/100 mL</p>
- Shellfish harvesting standards are very stringent

# BACKGROUND

- The SHELL standard applies to almost all marine/estuarine areas regardless of whether shellfish are presently harvested
- Many areas fail the shellfish harvesting water quality objectives
  - A SCCWRP study several years ago found that 40% of reference areas in the State fail the SHELL standards
  - Used beach monitoring data from 2000-2009
  - Characterized reference watershed as >93% undeveloped
- The standard doesn't have a firm scientific basis
  - The standard is nearly 100 years old, with little documentation or local validation studies

### **STUDY APPROACH**

- Evaluate if there is a relationship between water column fecal coliform standards and the beneficial use they are intended to protect
- Compare fecal indicator levels in the water column with pathogen
  presence in bivalves





# **NEWPORT BAY SHELLFISH STUDY**

- Newport Bay is the first water body where the SHELL standard has become a regulatory focus
  - TMDL scheduled for implementation in 2022 that includes the SHELL Fecal Coliform standards
- Newport Bay achieves the Rec-1 standard for most sites in the summer
  - However, the SHEL standard is exceeded year-round

# PHASED IMPLEMENTATION

#### Comprehensive study was originally designed

- Three sets of flow conditions (dry weather, wet weather, flowing dry weather)
- Two species of bivalves

#### Phased approach was initiated

 Start with a single season and single species to determine whether further study is warranted

#### • You will hear results today from the first phase

– Summer season with a single species

# NEWPORT BAY SHELLFISH STUDY

 Fecal indicators in the water column sampled concomitantly with pathogens and indicators in bivalves

 12 sites representative of varied shellfish habitat: rip rap, mud flats



# **METHODS**



# METHODS

- Measurements in water:
  - Enterococcus
  - Fecal coliform
  - E. coli
  - F+ Coliphage

- Measurements in shellfish:
  - Fecal coliform
  - E. coli
  - F+ Coliphage
  - Human Adenovirus
  - Norovirus G1
  - Norovirus G2

#### **SPATIAL WATER QUALITY RESULTS**



# SHELLFISH TISSUE QUALITY

- Viral pathogen detection
  - Human Adenovirus
  - Norovirus G1/G2



- F+ Coliphage NSSP Criteria for re-opening shellfish beds after a sewage spill
  - 50 PFU/100 g



# SHELLFISH TISSUE QUALITY

- Norovirus G1/G2 not detected in any samples
- Human Adenovirus only detected in samples collected Week 6
   Following and adjacent to sewage spill
- Coliphage detected above NSSP criteria in 1 sample collected Week 6
  - Following and adjacent to sewage spill

# **SEWAGE SPILL EVENTS- OYSTERS**



### SHELL FECAL COLIFORM STANDARD



# **NEXT STEPS**

- Continue to address this issue in Newport Bay:
  - Original study design called for multiple seasons and shellfish types
    - Three sets of flow conditions (dry weather, wet weather, flowing dry weather)
    - Two species of shellfish
  - Next steps will likely include a wet weather study in Newport Bay
- Ideally expand study framework to different areas