

Determining QMRA Eligibility at Urban Beaches

John F. Griffith

Southern California Coastal Water Research Project

DEFINITIONS

- **Fecal indicator bacteria**
 - Bacteria found in feces used to regulate water quality
 - *Enterococcus* is used for marine water (geomean of 35/100ml)
- **Human Fecal Marker**
 - Human-associated fecal bacteria measured by PCR
- **Total maximum Daily Load (TMDL)**
 - A regulatory action taken under the Clean Water Act to reduce pollutant loads at chronically contaminated sites

BACKGROUND ON QMRA

- **Quantitative Microbial Risk Assessment (QMRA)**
 - Modeling approach used to quantify health risk from microbial pathogens
 - Widely used to estimate health risk from pathogens in drinking water

- **EPA has opened the door to using QMRA to revise numerical standards for *Enterococcus* at non-human impacted beaches**
 - Current criteria assume health risk from exposure to treated wastewater
 - Criteria established using QMRA would be based on exposure to site specific pathogen loads

- **No QMRA studies at marine beaches**
 - SCCWRP collaborated with Ventura County, EPA and the LA Regional Board to conduct the first such study

WHEN TO CONSIDER QMRA

- **Beach with chronic water quality exceedances**
- **No sources of human fecal contamination**
- **Obvious or suspected source of non-human contamination**

PROCEED WITH CAUTION

- **Identify major sources of indicator bacteria to beach**
 - Historical data: FIB, BMP's, sewer rehabilitation
 - Sanitary survey
 - Collect direct observations and local knowledge
 - Collect FIB and filters for later molecular analysis
 - Verify using source-specific markers or microbial community analysis
- **Verify that little or no human source of contamination is present**
 - Test for presence of human markers
- **Measure pathogen and indicator bacteria load in source(s) and water**
 - Data used to populate model

CASE STUDY: HOBIE AND KIDDIE BEACH







Site 1

Site 2

Site 3

Site 4

Site 5

Site 6

Site 7

Site 8

Lakeshore Dr

Lakeshore Ct

Laurel Ct

Sunset Dr

S Victoria Ave

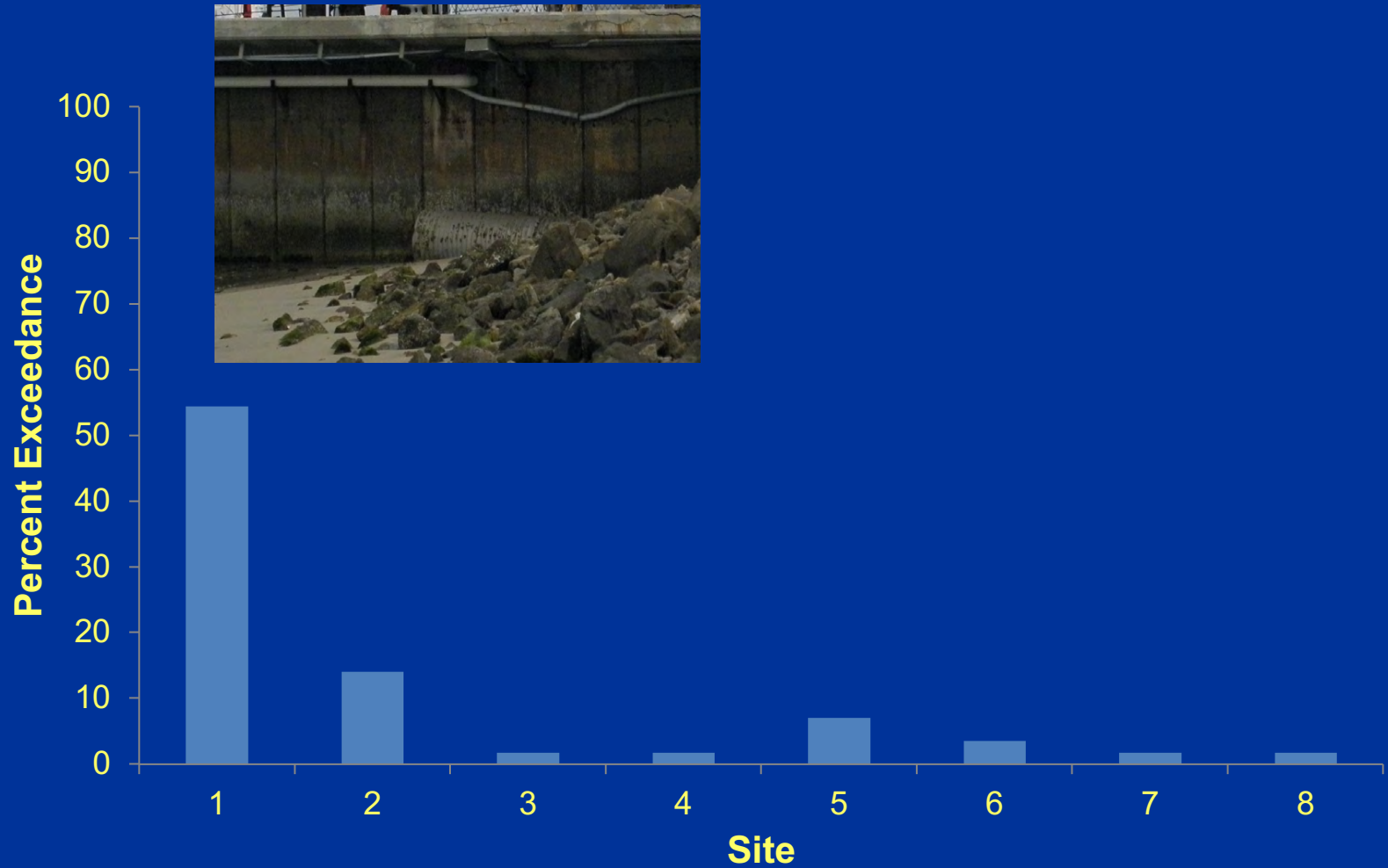
Hollywood Blvd

Harbor Blvd

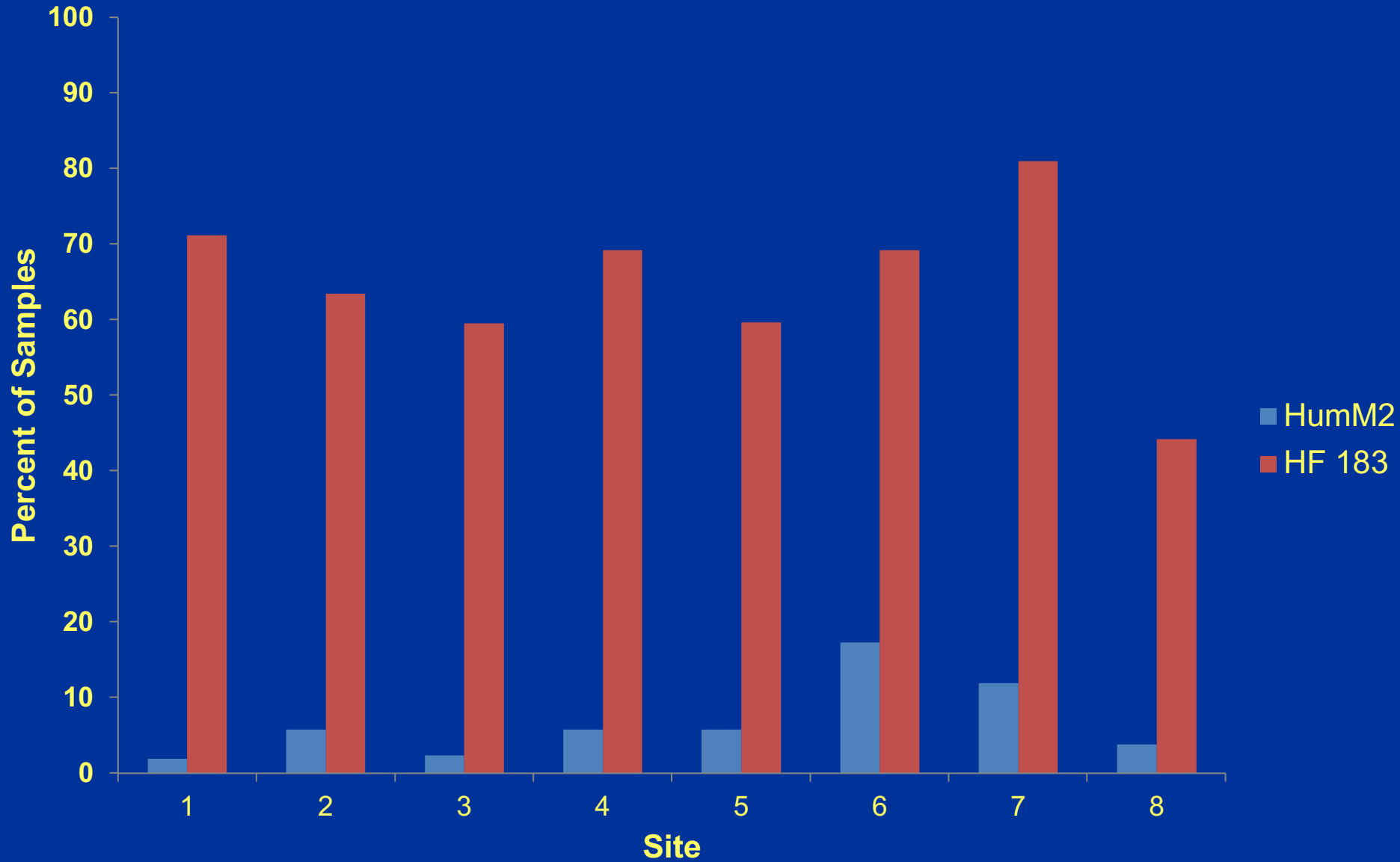
© 2012 Google
Image U.S. Geological Survey

Google earth

ENTEROCOCCUS FREQUENCY OF EXCEEDANCE



HUMAN FECAL MARKER HITS



PROCEED WITH CAUTION

- **Identify major sources of indicator bacteria to beach**
 - Historical data
 - Sanitary survey
 - Verify using source-specific markers or microbial community analysis
- **Verify that little or no human source of contamination is present**
 - Test for presence of human markers
- **Measure pathogen and indicator bacteria load in source(s) and water**
 - This data will be used to populate model

EPILOGUE

- **QMRA study suspended**
 - But dry weather water quality has improved
- **Leaking sewer line repaired**
 - Dry weather is now in compliance with TMDL
- **Wet weather still out of compliance**

WHAT NEXT?

- **SCCWRP is assisting Ventura County with a wet weather source identification study**
- **Assessing two hypotheses**
 - Urban runoff and groundwater from local storm drains is contaminating the beach
 - Contamination is coming to the beach from the harbor

QUESTIONS?

johng@sccwrp.org