

Developing a Human Health Risk- Based Threshold for HF183 in Stormwater

Presentation to the SCCWRP Commission

June 7, 2024

FIB is challenging in wet weather

- In wet weather fecal indicator bacteria (FIB) are above thresholds almost everywhere
- Growing interest in using HF183 as a management prioritization mechanism
 - HF183 allows you to prioritize human contamination

No threshold for HF183

- Biggest challenge to using HF183 is there is no risk-based threshold
- Thresholds for FIB were established at sewage-impacted beaches
 - Don't yet have epidemiology studies for HF183 using stormwater
- Data gap is hindering management action

Figuring out how much HF183 is too much

- EPA has advocated using Quantitative Microbial Risk Assessment (QMRA) to model health risk
- EPA risk guidance is 32 illnesses per 1000 swimmers
 - Health risk equivalent to the current standards for E. coli or Enterococcus
- Provide a technical foundation for a risk-based HF183 threshold

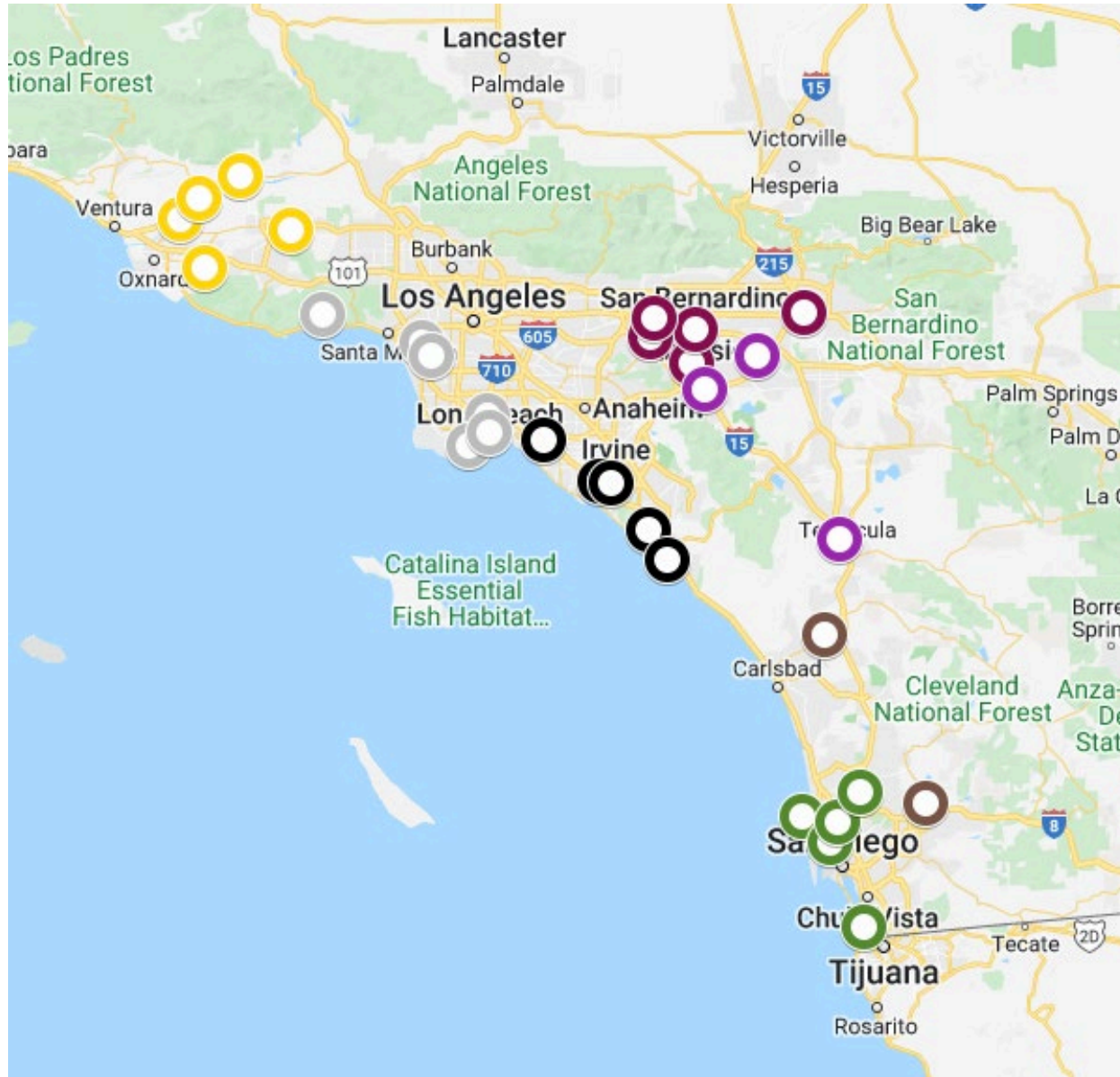
Health risk model (QMRA) approach

- QMRA needs three inputs to estimate illness risk
 - Pathogens
 - Exposure
 - Dose-response
- Combine illness risk with HF183 measurements to get risk-based threshold

Technical Review Committee

- Melissa Turcotte – LA County Public Works
- Yiping Cao – Orange County Sanitation District
- Larry Honeybourne – Orange County Public Health (retired)
- Jimmy Smith - Regional Water Quality Control Board
- Eric Dubinsky - EPA Region 9

Regional snapshot of stormwater



➤ Pathogens:

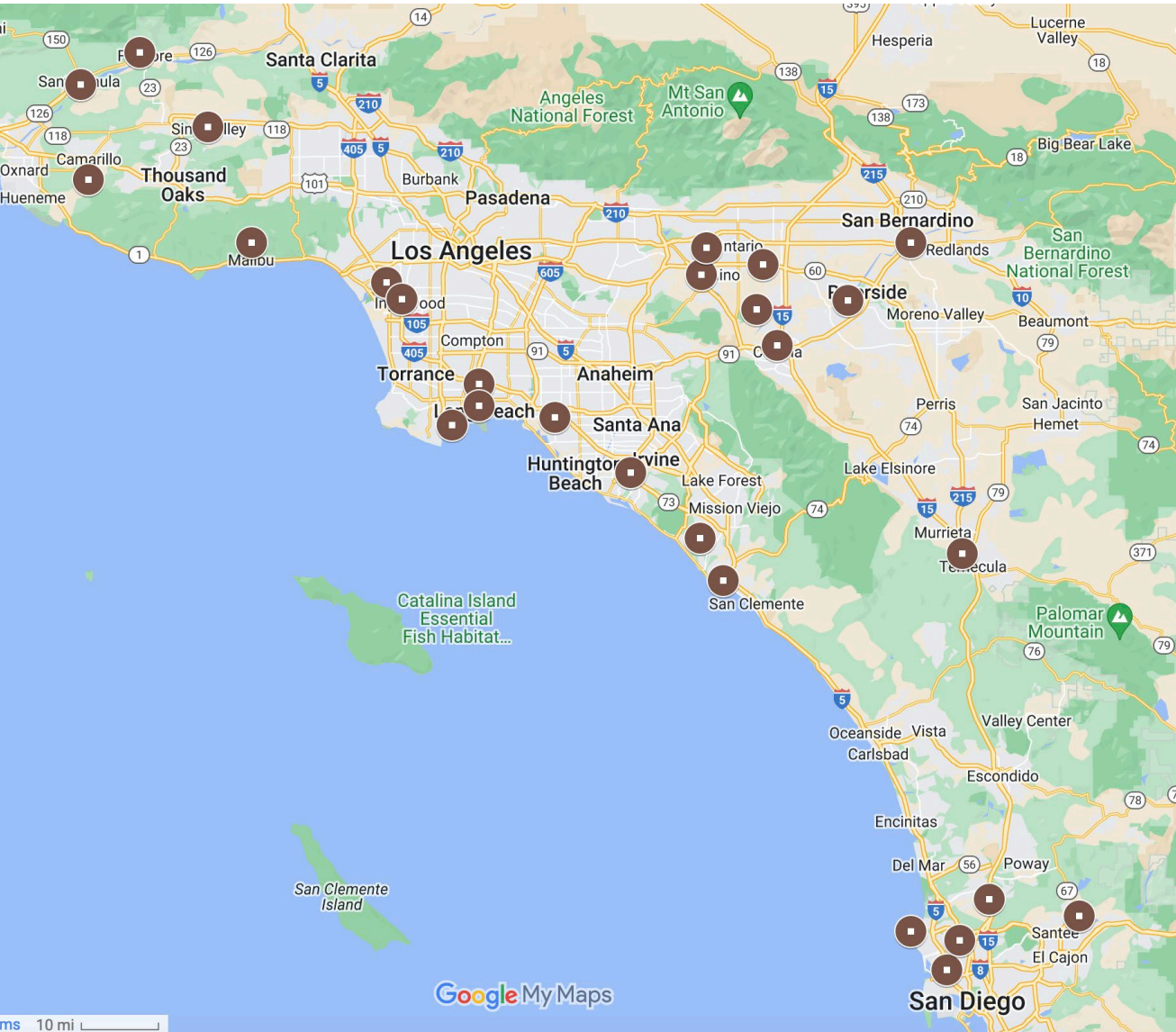
- Campylobacter
- Salmonella
- Human norovirus
- Human adenovirus

➤ HF183

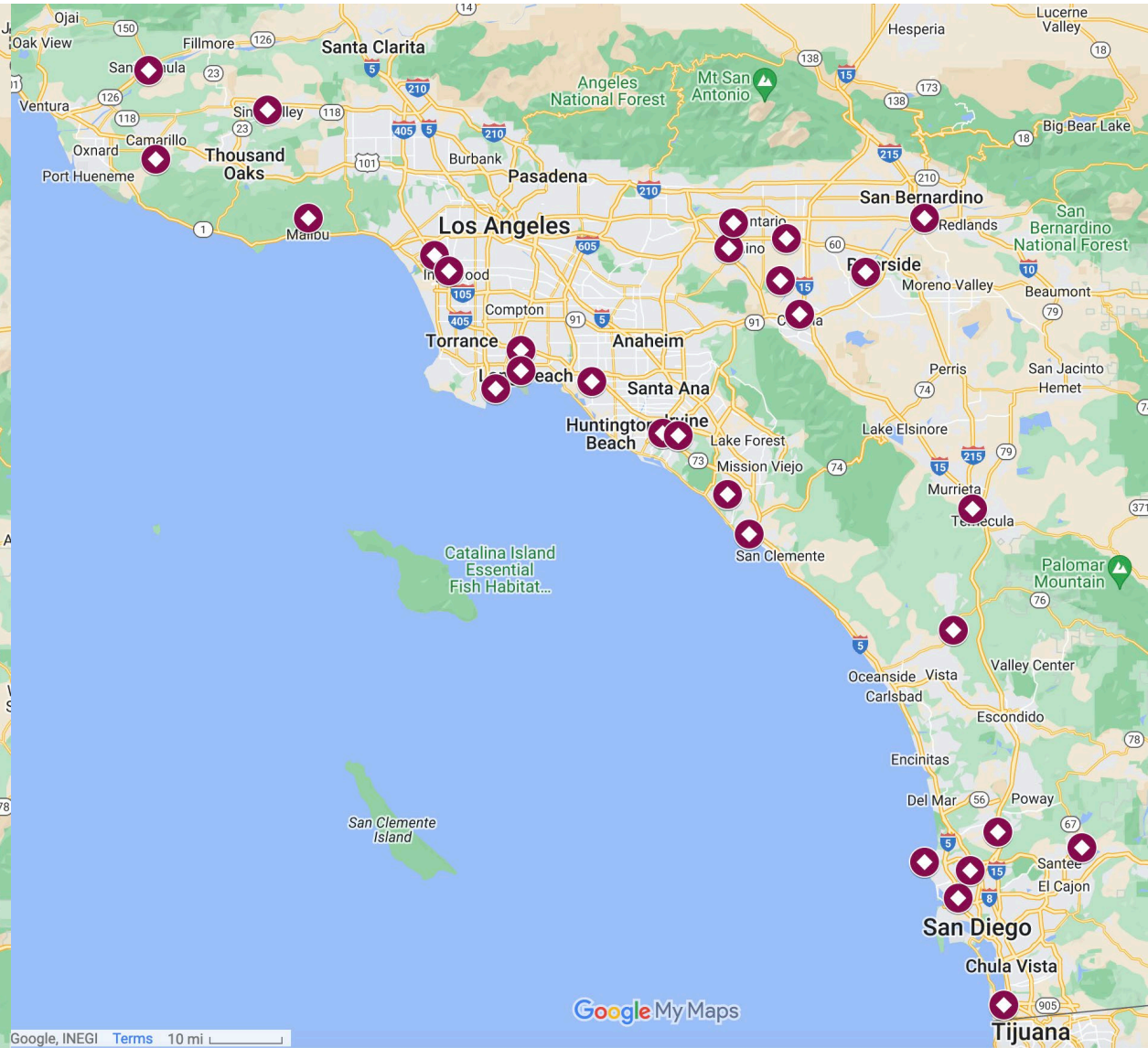
➤ Summary of sampling:

- 2 wet seasons
- 31 sites
- 2-3 samples per site
- 70 samples

HF183 Detection



Norovirus Detection



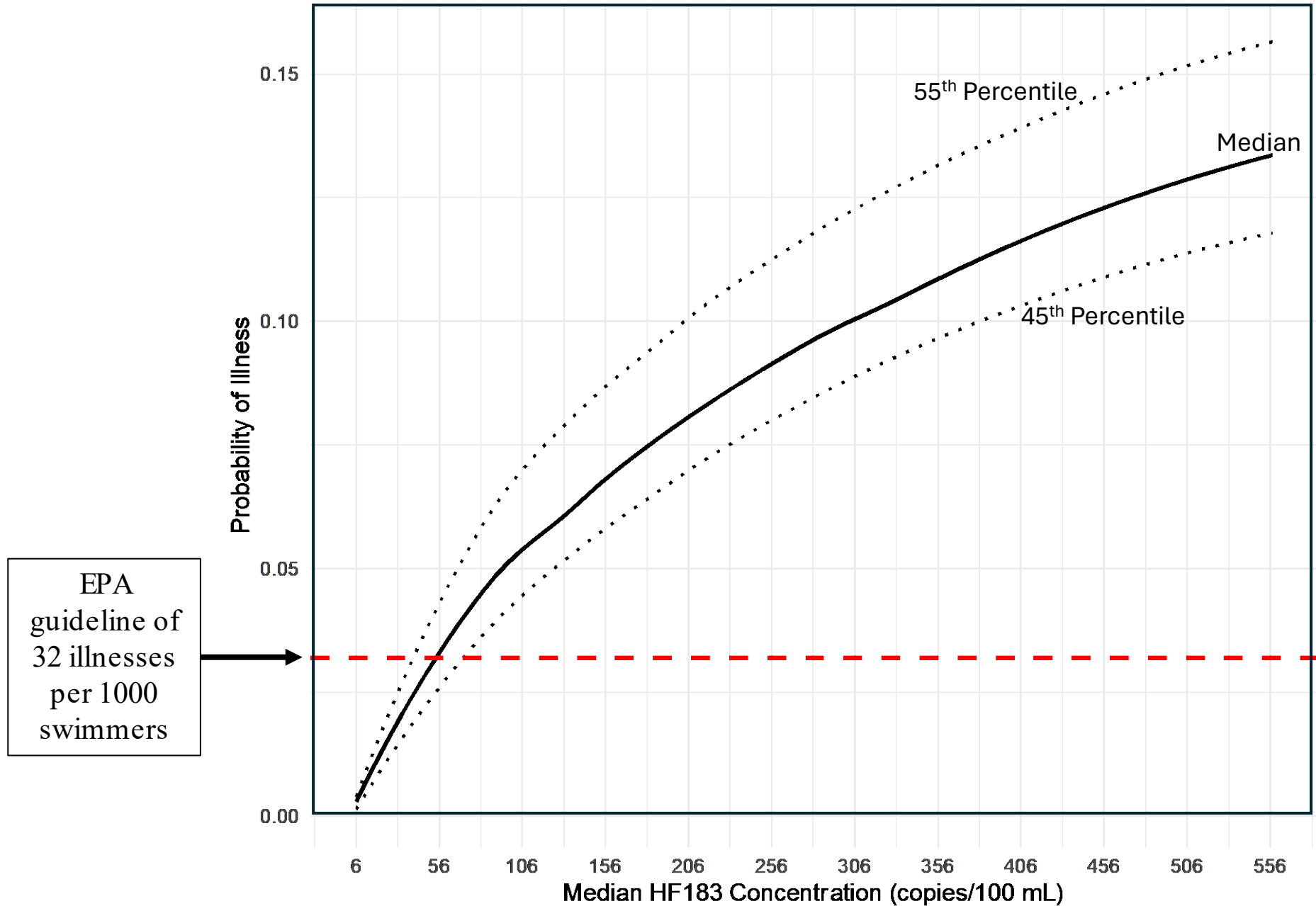
QMRA results in stormwater

- 140 illnesses per 1,000 swimmers in stormwater
 - median risk across region
- About 50 HF183 GC/100 mL approximates EPA health risk threshold
 - EPA guideline is 32 illnesses per 1000 swimmers

Agreement with Surfer Health Study QMRA

Study	Exposure Assessment	Estimated Risk
This study	Measured across Southern California	140 illnesses/1000 swimmers
Surfer Health Study	Measured in San Diego	146 illnesses/1000 swimmers

HF183 vs Risk Curve



Translation to management: deciding how to implement a risk-based threshold

- Should the threshold be in stormwater or where swimmers are?
 - Regional vs site specific
- How will this be monitored?
 - Single sample
 - Multiple storm
- What is the appropriate use of risk-based threshold?
 - Prioritization tool
 - Regulatory objective