Clean Beach Task Force

Source Identification Pilot Program

SIPP

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BACKGROUND

- Beach water quality standards are based on concentrations of fecal indicator bacteria (FIB): Total coliforms, fecal coliforms and enterococci
- AB411 monitoring in California revealed a high incidence of beaches exceeding FIB standards
- Key legislation was enacted to protect and restore California's coastal water quality
  - Clean Beach Initiative (CBI) Grant Program (2001)
- Since then over $1,000,000 in funding appropriated from Propositions 13, 40 & 50 for CBI projects

UNRESOLVED ISSUES

- Beaches with obvious fixes have been mitigated, however, there are a number of beaches where FIB sources still unidentified or unresolved
- Prop 84 funding available to clean these beaches
- Proposals submitted have been technically limited, indicating knowledge gaps regarding Source Tracking "Tools" or methods & approaches:
  - *What are the most accurate & reliable laboratory methods for finding human/non-human sources of fecal indicator bacteria?*
  - *How are they used in the lab?*
  - *What is the best approach for applying these methods?*

SOURCE IDENTIFICATION TEAM

- Created by State Water Board and CBTF in 2008
- Objective: to develop & implement SOURCE IDENTIFICATION PILOT PROGRAM (SIPP) to address knowledge gaps on conducting source ID studies
- Source ID Team:
  - Ali Boehm, Stanford University
  - Trish Holden, UC Santa Barbara
  - Jenny Jay, UCLA
  - Steve Weisberg, SCCWRP

STANFORD UNIVERSITY

UCSB

UCLA

SCCWRP Established 1969

SPECIFIC GOALS OF SIPP

- Select Source Identification Methods
- Develop Beach/Watershed Selection Criteria
  - Frequencies of violations in FIB standards
- Conduct Reconnaissance Survey
- Conduct Upstream Surveys
- Implement training for local laboratories on using source ID protocols
- Develop source identification manual
  - Source ID approaches & protocols

Create an infrastructure that outlives this project

SELECTING SOURCE ID METHODS

- Many source ID methods available
- Uncertainties associated with methods
  - Most methods are not standardized
  - Few method evaluation studies conducted worldwide
    - None in the last 5 years – methods have since improved
    - No evaluation studies have focused on assessing inter-laboratory repeatability
- Need for updated method evaluation study

SOURCE ID METHODS

- Bacteroides
- F+ Coliphage
- Human Polyoma virus
- Enterovirus
- Enterococcus speciation

Target human, non-human sources

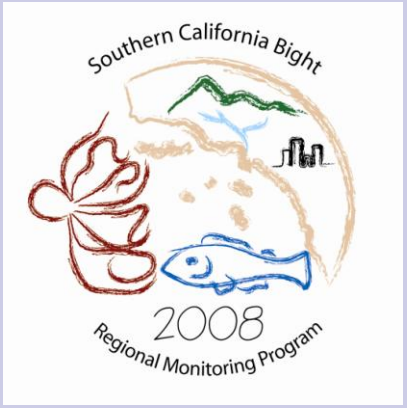
What proportion of enterococci being measured come from non-fecal sources such as grass or plants?

- New research methods
  - New Bacteroides methods, Enterococcus community analysis, Chemical markers, Sediments & IMS-ATP
- SIPP will conduct a Methods Evalution Study to evaluate and select methods

RECONNAISSANCE SURVEY

- SIPP will be implemented as regional wide survey & include at least 4 beaches where human fecal contributions have not been identified previously
- Bight '08 Microbiology studies provide opportunity for collaboration. Both groups interested in:

  "What percent of frequently contaminated beaches result from human fecal sources?"



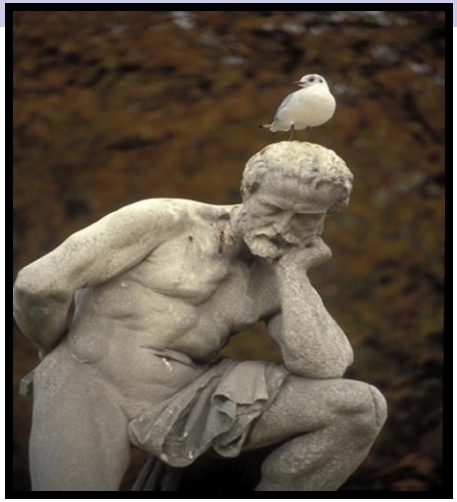
- Great outreach opportunity to local labs
  - Local labs will do all the base collections
  - SIPP team to train labs on advanced source ID methods

UPSTREAM SURVEYS

- **Phased approach:**

Start with cheaper methods to localize and refine the problem

Use more expensive methods in a more focused way to pinpoint the problem



PHASED SURVEY

- Phase 1: Watershed characterization
  - Involves watershed-wide sampling with traditional indicators to identify hot spots
- Phase 2: Human/non-human source identification
  - Includes using source ID methods to determine which hot spots are derived from human fecal sources
- Phase 3: Spatially intensive sampling
  - Conducting more intensive sampling at hot spots contaminated with human waste to determine specific sources
- Phase 4: Source-specific identification
  - Conducted if no clear hot spots identified in previous phases
  - Involves using additional source ID methods, including library-based genetic methods; such methods are more expensive and not highly reliable

TECHNOLOGY TRANSFER

- Source ID capability will live on after SIPP team dissolves
  - Source ID manual & training video (protocols) & Hands-On-Training for Labs
    - Lab proficiency: inter-calibration study to assess and enhance lab performance using source ID methods
- Labs that have expressed interest in participating
  - Orange County Sanitation District
  - City of San Diego
  - Los Angeles County Sanitation District
  - Orange County Public Health Lab
  - Ventura County Public Health Lab
  - Weston Solutions
  - Others???

TIMELINE

Tasks	Dates	Completed
Develop Workplan	Dec 2008	√
Select Methods: Evaluation Study	Mar 2009	
Conduct Reconnaissance & Upstream Surveys (Year 1)	May - Oct, 2009	
Conduct Training	2009 - 2011	
Conduct Lab Inter-calibration Study	2011	
Source ID Manual	2012	

PROJECT STATUS

- Study is on hold due to state's bond funding issues
- Bight '08 Microbiology group has agreed to postpone their efforts to coordinate their study with SIPP

Questions?