

# **Microbial Source Tracking: Connecting Science with Application**

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# BACKGROUND

- **One of SCCWRP's greatest strengths is its ability to transition technology from research to application**
  - Few entities enjoy the relationship we have with the user community
- **Transitioning involves more than doing a research project**
  - A multi-year commitment to a research theme
  - Interactions with other scientists to develop consensus
  - Effective communication/partnership with the user community
- **Microbial source tracking is a good example of where we have succeeded in this commitment**
  - MST is about to become a focal point for beach management in California

# WHAT IS MST?

- **A collection of tools for determining a fecal source**
- **Most of California's obvious beach problems have been addressed**
  - The challenge now is identifying the problem to be fixed at remaining beaches
  - Source identification techniques allow identification of the source type, and in many cases the specific source
- **SCCWRP has been a leader in the MST field for more than a decade**
  - Started with recommendations from the 1998 Huntington Beach closure expert panel
  - This is the year we brought the pieces together

# MST RESEARCH THEME STAGES

- **Method development**
- **Method evaluation**
- **Technology transfer**
- **Expansion to new applications**

# METHOD EVALUATION

- **Our forte**
  - Scientists respect our neutrality in conducting such studies
  - They also recognize our connection to the user community
- **We have conducted two MST method evaluation studies**
  - Both included more than 25 of the top researchers in the world
  - Both led to dedicated issues of scientific journals
- **The 2003 study completely upset the apple cart**
  - We found that most methods did not work
  - It completely transformed the field
- **The 2011 study led to scientific consensus**
  - We now have recommended markers for human, cow, dog, gull, pig, and horse sources

# 2011 METHOD EVALUATION STUDY

- **Challenge methods with 64 blind samples**
  - Singletons and doubletons of 12 source types
  - Core methods run by multiple labs to assess method repeatability
- **41 MST methods evaluated**
  - 27 participating laboratories
- **Key is that we brought the scientists in early to help design the study**
  - We also brought them in to jointly develop the conclusions
  - Lead authors for most of the 18 articles from the study were not SCCWRP staff
  - That level of consensus building is rare in science

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# TECHNOLOGY TRANSFER

- **Demonstration projects**
  - It's a lot more than laboratory techniques
  - How do the different pieces fit together?
  - How many samples are needed?
  - We conducted collaborative demonstration projects at multiple sites
- **Guidance manual preparation**
- **Training and proficiency testing**

# SOURCE IDENTIFICATION MANUAL

- **We are presently developing a guidance manual**
- **Introduces a cost-effective phased approach**
  - Start with cheaper methods to localize and refine the problem
  - Use more expensive methods in a focused manner
  - Manual will also include detailed standard operating procedures
- **Document goes to the Clean Beach Task Force and CTAG for review at the end of this month**
  - Final document will be in your December Commission materials
  - EPA has expressed interest in potentially using it as national guidance

# MST TRAINING

- **Last month, we held an MST training course**
- **We had 14 organizations participate**
  - We are the only place in the nation offering such training
- **Three day course**
  - Day 1: Classroom theory and pipetting basics
  - Day 2: Laboratory basics on how to do QPCR
  - Day 3: Additional laboratory techniques necessary to do MST methods
- **We will follow this with a proficiency testing next month**
  - Our goal is to achieve statewide consistency in application



# AGENCIES TRAINED

- **LA County Sanitation Districts**
- **Orange County Sanitation Districts**
- **City of Los Angeles**
- **City of San Diego**
- **Ventura County Public Health**
- **San Diego County Department of Public Works**
- **OC Public Health Lab**
- **Long Beach Public Health Lab**
- **San Mateo County Public Health Lab**
- **San Francisco Water Utility**
- **Santa Cruz County Environmental Health**
- **Monterey Bay Aquarium Research institute**
- **NOAA**
- **Weston Solutions**

# EXPANSION TO NEW APPLICATIONS

- **While the core application is identifying contamination sources within a watershed, there are other managerially relevant applications**
  - We are now expanding the technology to address those other questions
- **Regional assessment: Have we eliminated human fecal source prevalence at beaches?**
  - One of our Bight '13 questions
- **How do you manage a watershed differently if MST shows that human fecal material is absent?**
  - Quantitative microbial risk assessment
- **These are your next two presentations**