

Bight '08 Shoreline Microbiology

Presentation to the SCCWRP Commission

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BACKGROUND

- *Enterococcus* is a non-specific indicator of bacterial contamination
- Non-human sources are often blamed for poor beach water quality
- The SCCWRP Source identification Method Evaluation Study validated markers specific for human fecal contamination
- We can now confidently differentiate between human and non-human sources of *Enterococcus*

BIGHT '08 MICROBIOLOGY QUESTIONS

- What percentage of frequently contaminated beaches have a human source of *Enterococcus*?
- What is the contribution of *Enterococcus* to these beaches from sand and wrack?

Surfrider Beach • • Topanga State Beach
• Dockweiler State Beach

Los Angeles County

Santa Ana River •
• Corona Del Mar
• Salt Creek Beach
Doheny State Beach •
• Poche Beach
San Clemente Pier •

Orange County

San Luis Rey •
Moonlight State Beach •

San Diego County

Ocean Beach • Visitor's Center at Mission Bay
Tijuana River •

© 2012 Cnes/Spot Image
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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Data LDEO-Columbia, NSF, NOAA

33°20'31.94" N 117°33'53.92" W elev -2 ft

Google earth

Eye alt 178.54 mi

FINDINGS

- **Human contamination appears to be a frequent source**
 - We found human markers at more than 50% of beaches where *Enterococcus* was present
- **Our sample size at the remaining beaches was too small to definitively say human contamination was not present**
- **Contributions from sand and wrack appear to be minor**
 - Only two beaches showed a potential contribution of bacteria from sand
 - Only three beaches showed a potential contribution from wrack

HITS ON HUMAN MARKERS

Site	In Drain
Salt Creek	4 / 4
Poche	3 / 4
Doheny	2 / 3
Tijuana River	2 / 6
San Clemente Pier	2 / 10
Moonlight Bay	1 / 10
Mission Bay	0 / 7
Ocean Beach	0 / 4
San Luis Rey	0 / 2
Topanga	0 / 3
Surfrider	0 / 1
Dockweiler	-
Santa Ana River	-
Corona del Mar	-

HITS ON HUMAN MARKERS

Site	In Drain	At Wavewash
Salt Creek	4 / 4	4 / 4
Poche	3 / 4	0 / 3
Doheny	2 / 3	1 / 3
Tijuana River	2 / 6	1 / 2
San Clemente Pier	2 / 10	0 / 5
Moonlight Bay	1 / 10	0 / 5
Mission Bay	0 / 7	0 / 3
Ocean Beach	0 / 4	0 / 3
San Luis Rey	0 / 2	0 / 2
Topanga	0 / 3	0 / 3
Surfrider	0 / 1	0 / 2
Dockweiler	-	-
Santa Ana River	-	-
Corona del Mar	-	-

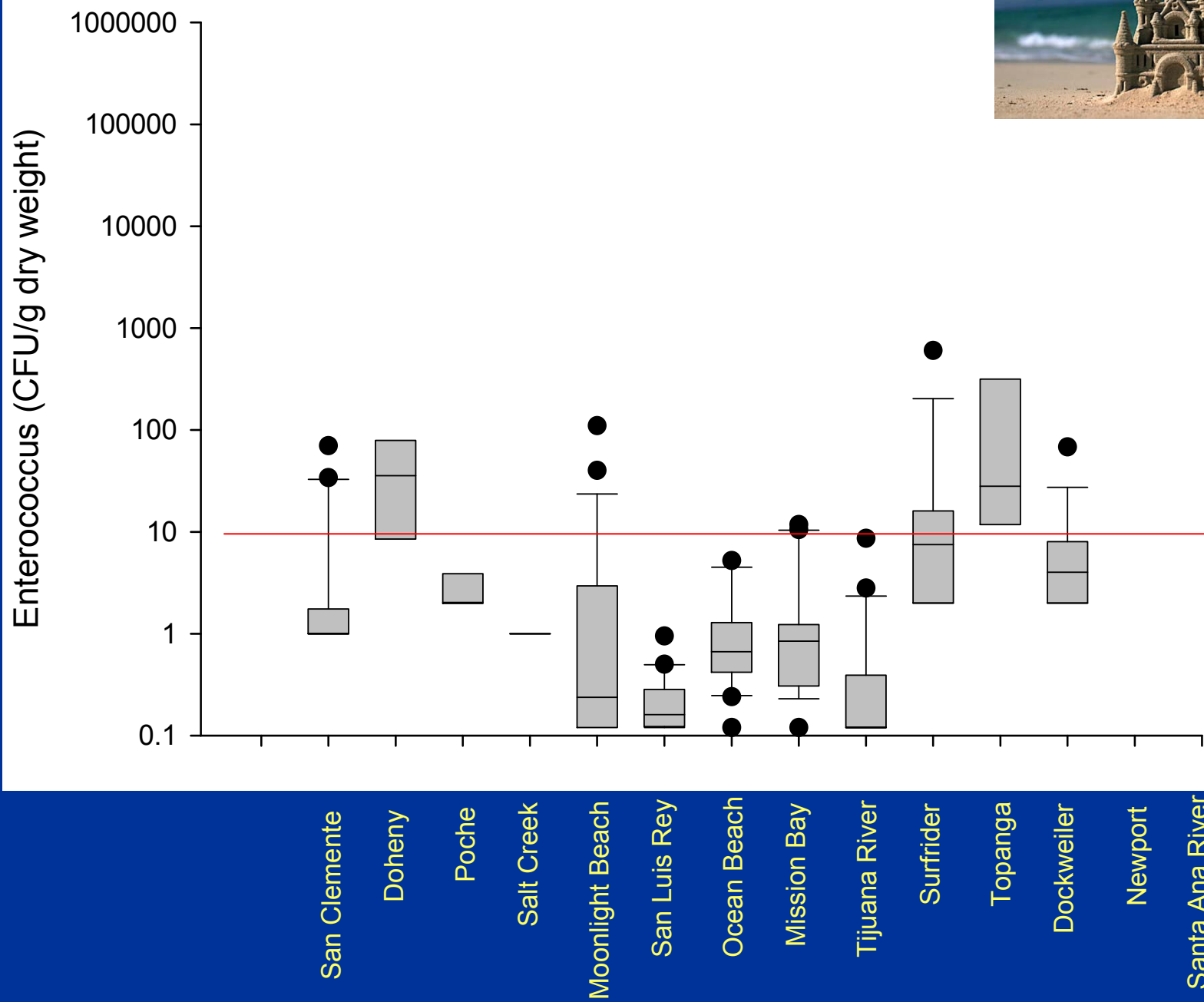
HITS ON HUMAN MARKERS

Site	In Drain	At Wavewash	25 yards Downcurrent
Salt Creek	4 / 4	4 / 4	0 / 0
Poche	3 / 4	0 / 3	0 / 2
Doheny	2 / 3	1 / 3	1 / 3
Tijuana River	2 / 6	1 / 2	0 / 2
San Clemente Pier	2 / 10	0 / 5	0 / 2
Moonlight Bay	1 / 10	0 / 5	0 / 2
Mission Bay	0 / 7	0 / 3	0 / 0
Ocean Beach	0 / 4	0 / 3	0 / 1
San Luis Rey	0 / 2	0 / 2	0 / 2
Topanga	0 / 3	0 / 3	0 / 1
Surfrider	0 / 1	0 / 2	0 / 1
Dockweiler	-	-	-
Santa Ana River	-	-	-
Corona del Mar	-	-	-

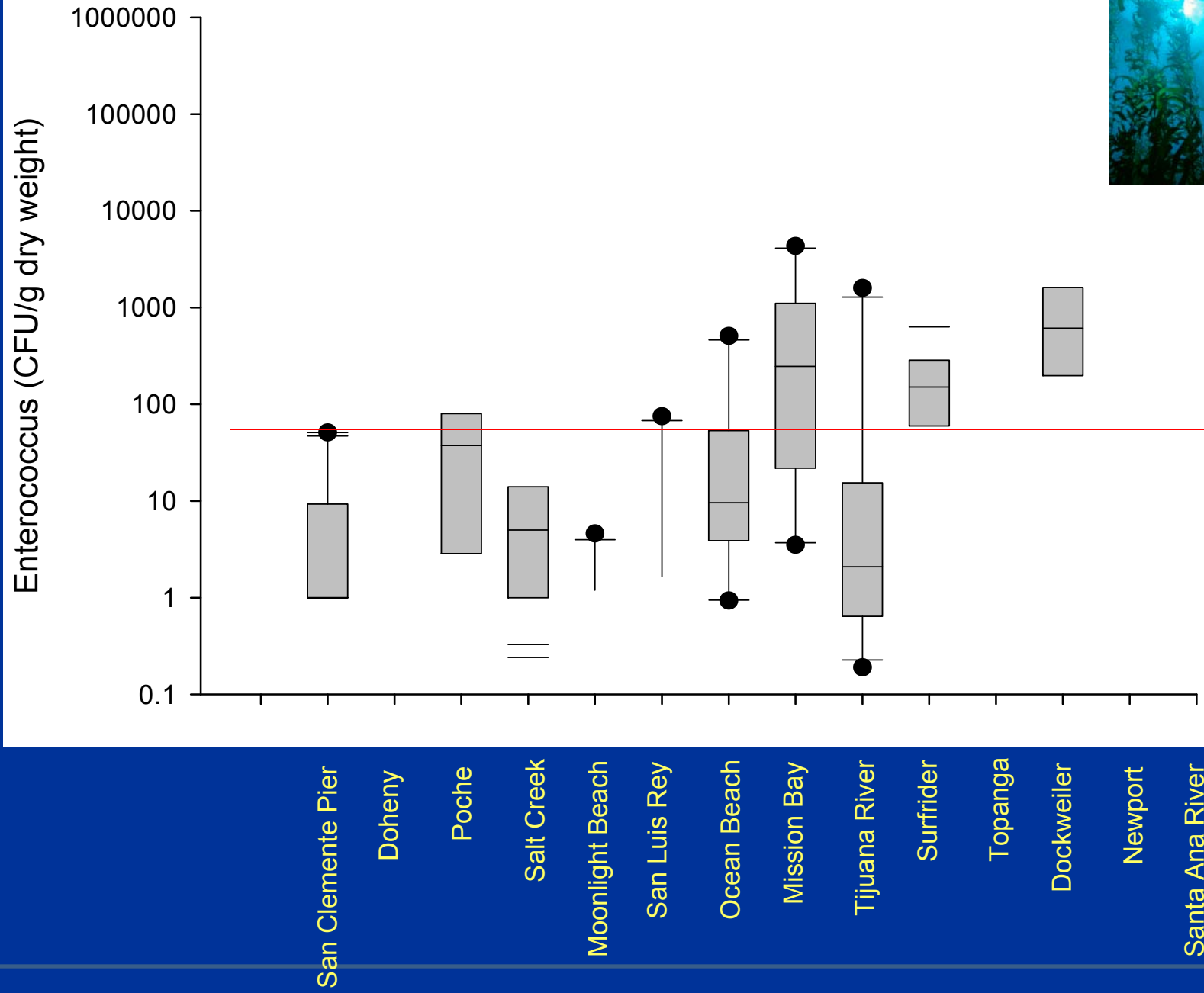
ASSESSING CONTRIBUTIONS FROM SAND AND WRACK

- **Used mass balance approach**
- **Factors included in the mass balance**
 - Volume of sand or wrack
 - Measured *Enterococcus* concentration
 - Wash off rate
 - Water volume overlying beach

Sand



Wrack



NEXT STEPS

- **Building an algorithm to provide managers statistical confidence to confirm or rule out a human source**
- **Application at other beaches to refine health risk assessments**
 - QMRA
- **The state will use human marker data to prioritize beaches for Clean Beach Initiative grant funds**