

Bacterial Contamination at the Beach

Big Questions:

- What is it? What causes it?
- Where does it come from and where does it go?
- How does it affect people?
- How is it measured? What regulates it?
- How do I find out whether it is safe to swim at a given beach?
- What is the role of science in environmental policy?

Story: The Great Huntington Beach Battle

- beach closures and finger-pointing
- sewage outfall and secondary treatment waivers
- state and federal regulations
- scientists, regulators, environmentalists

Topics:

- *Regulation:* California State AB411 standards define bacterial contamination
- *Science:* identifying bacteria
- *Policy:* health effects
- *Science:* transport between sewage outfall and beach
- *Regulation:* Federal Clean Water Act sets sewage treatment requirements
- *Technology:* how sewage is treated
- *Policy:* arguments and decisions --- what would you do?
- *Science:* sources of Huntington beach contamination
- *Science:* effects of chlorination
- *Regulation:* North Carolina beach cleanliness laws
- *Science:* sources of pollution in North Carolina

Resources:

- no text chapters
- class lectures, including movie on internal tides
- posted handout in PowerPoint or pdf
- California beach report cards: www.healthebay.org
- North Carolina beaches: <http://www.earth911.org/WaterQuality>
- annual survey, nationwide: <http://www.beach.com/stateofthebeach2004/home.asp>

Study Questions:

Timeline:

- what did OCSD do that improved water quality?
- what made water quality worse?
- what happened in 1999?

Regulation and Policy:

- what do state AB411 standards regulate?
- odds of getting sick at a closed beach?
- what is the Federal Clean Water Act (1972)?
- what are effects of primary, secondary and tertiary treatment?
- how do North Carolina's regulations differ from California's?

Bacteria:

- what are indicator bacteria?
- can you use a single test to count all types of bacteria?

Huntington Beach enterococcus and coliform bacteria

- describe spatial and temporal patterns
- beach more or less concentrated than outfall?
- do they appear to come from the same source?
- do contaminations occur during spring or neap tides?

Internal Tides

- what is an internal tide?
- how could an internal tide affect transport of sewage?
- do internal tides appear to cause beach contamination?

What do you think?

- Source of beach contamination?
- What should be done?

Homework:

- find a news article about beach pollution, published within the last 12 months
- short report: when? where? what? who? why? effects? cleanup?