# ENVIRONMENTAL MONITORING FOR PUBLIC ACCESS AND COMMUNITY TRACKING (EMPACT) PROGRAM MICROBIOLOGICAL MONITORING OF RECREATIONAL WATERS

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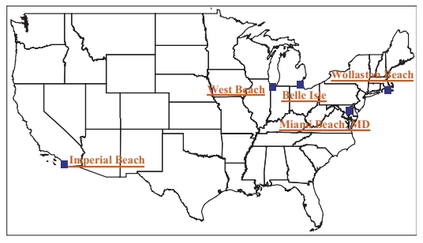
Year of Water: Thirty Years of Progress Through Partnering

- Guidelines for the collection of recreational water samples were last issued in 1968.
- Water quality is currently determined using the average of the results from 5 water samples, taken over a 30-day period.
- Obviously this does not give timely, accurate information for the public or public health officials.

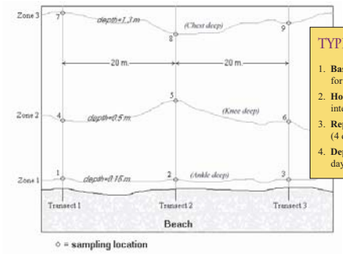
Develop and evaluate a new monitoring protocol that is scientifically defensible, takes into account the various sources of variability, has national applications, and can be translated into a simple system the public can use to make personal decisions about risks associated with recreational water activities (swimming, jet skiing, canoeing, surfing, diving, etc.).

- Examined 5 representative fresh, estuarine, and marine water beaches.




- Sampling design accounted for variations in water depths, length of beach, permissible swimming area, temporal factors (hourly, daily and seasonal variations), weather, tides/currents, and number of bathers/animals on beach.

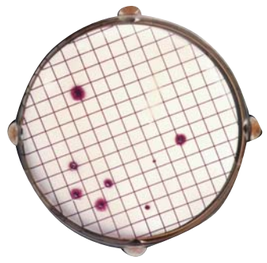
Samples were collected from each of nine locations within the limits of the beach bathing area, each location being determined by an associated *transect* and *zone*, as illustrated in Figure 2. A transect is defined as an imaginary line through a fixed point on the beach and forming a right angle with the shoreline. A zone is defined as a contour line of equal water depth parallel to the shoreline.




**TYPES OF SAMPLES COLLECTED:**

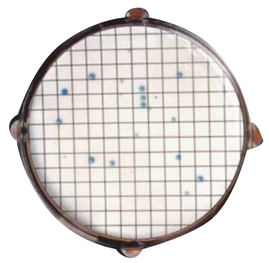
1. **Basic Sampling** - Twice a day (9 AM and 2 PM) at each location for 36 days.
2. **Hourly Sampling** - Ten times a day at each location at hourly intervals (9 AM - 6 PM) for 14 days (1 week each month).
3. **Replicate Sampling** - Two or ten samples per location for 8 days (4 days each month).
4. **Depth Sampling** - One to three depths per location for 4 days (2 days each month).


**US EPA Method 1603**
**Freshwater beaches**

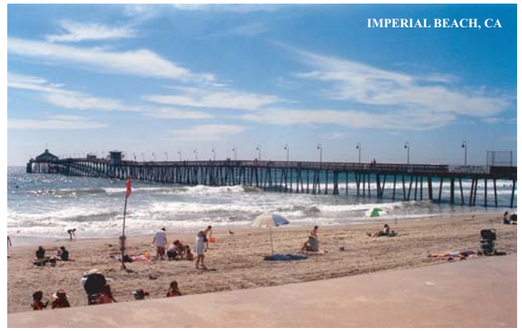


***Escherichia coli*** **colonies on modified mTEC agar.**

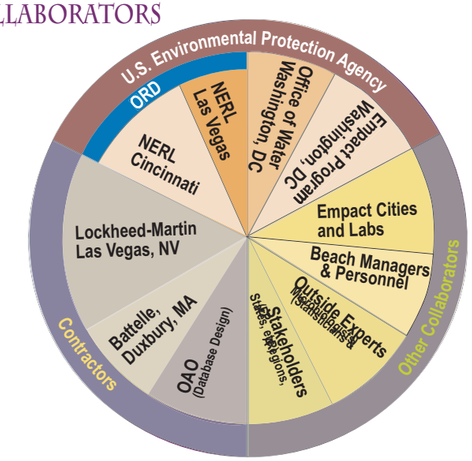
**US EPA Method 1600**
**Estuarine and Marine beaches**



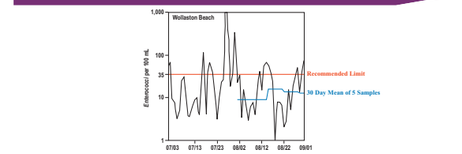
***Enterococci on*** **mEI agar.**




## COLLABORATORS





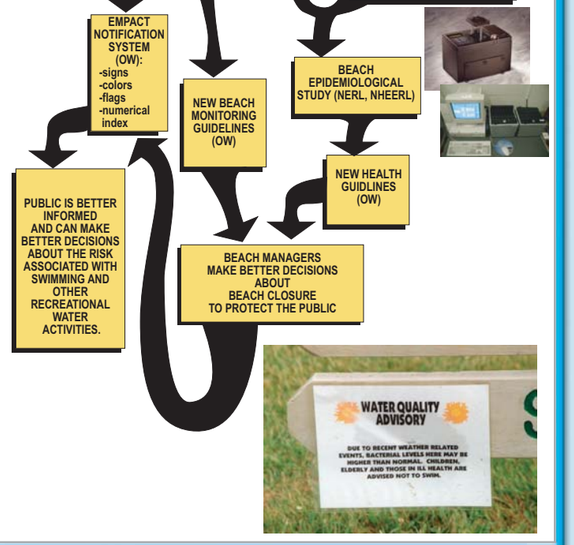



**Bacterial levels were highest:**

- in ankle-deep water; lowest in chest-deep water.
- in the morning vs. the afternoon.
- on cloudy days vs. sunny days.
- after substantial rainfall.
- with onshore winds.

**No differences in bacterial levels along the beach at equal water depth.**

**Bacterial levels measured on any given day were of little value in predicting water quality more than one day in the future.**

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