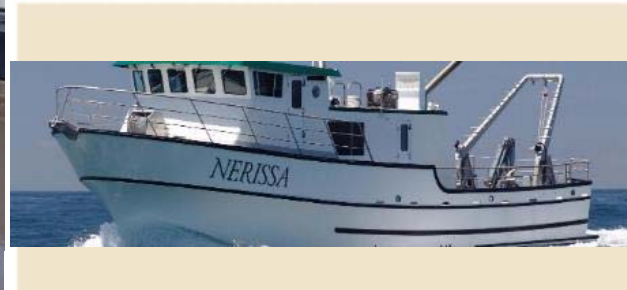


Environmental Monitoring in the Information Age: Why aren't we doing more?



Ron Coss
Orange County Sanitation
District



OCSD Service Area

479 square miles

186 million gallons per day

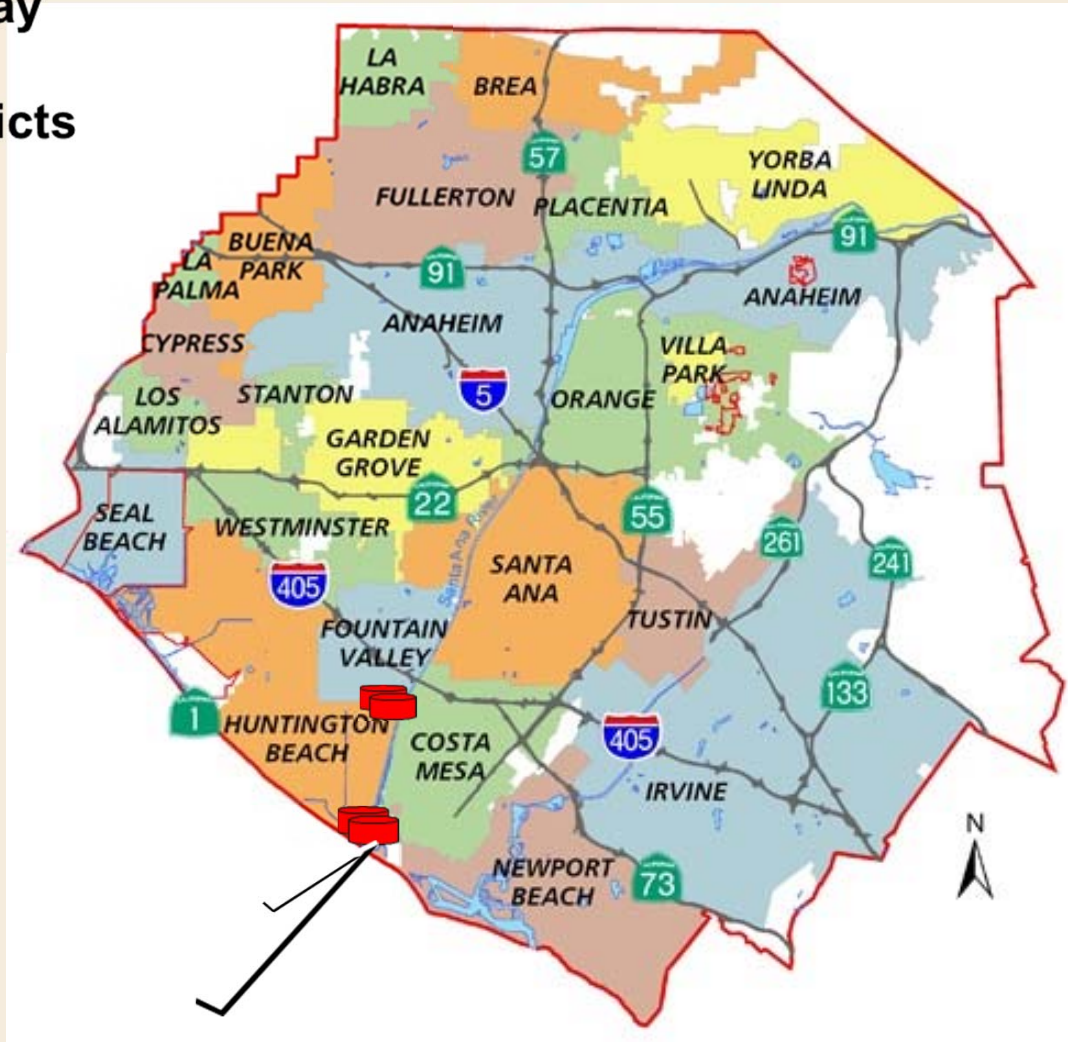
2.6 million population

21 cities, 3 special districts

579 miles sewer lines

15 pumping facilities

2  treatment plants



Applied Technology

- 2010 – Used qPCR to post same day bacterial data to beach patrons.
- 2012 – Used qPCR to report bacterial data, SCCOOS buoy/satellite system to track ocean currents, computer models to project discharge plume, SCCWRP & USC AUVs to measure plume in near real time, deployed instrument arrays to monitor Harmful Algal blooms.
- 2012 – 2016 OCSD has collaborated with USEPA to develop and refine new PCR methods.

Monitoring water from above and below

The Orange County Sanitation District is diverting wastewater discharge from its main outfall pipe, 4 1/2 miles offshore, to a shorter, secondary outfall pipe that extends only a mile offshore. That is giving scientists a chance to measure the effects of the treated effluent on algae and other ocean organisms. Boats towing sensors will be part of the extensive ocean monitoring to track the movement of the wastewater plume.

In-Plant

An enhanced disinfection program during the diversion to the 78-inch outfall will meet water quality standards.

Nearshore

Daily shoreline sampling for several factors including fecal indicator bacteria, salinity and ammonia from Sunset Beach to Crystal Cove.

Weekly sampling of phytoplankton and nutrients will be taken at the Newport and Huntington Beach municipal piers.

Offshore

Three telemetry moorings will measure and transmit ocean currents and water quality. One mooring will be deployed at the short outfall with the other two deployed up- and down-coast of the outfall.

Two remote-control underwater vehicles will sample for temperature and biological and optical water quality measures along a pre-programmed course.

Remote sensing

High-frequency radar installations along the coast measure ocean surface current - velocity fields.



NASA's Jet Propulsion Lab provides satellite images during the diversion to identify any surface discharge plumes.

Regional Ocean Modeling System is a computer program that creates three-dimensional models showing water currents and temperatures.

A coastal buoy system monitors stratification and subsurface currents.

A profiler collects water-column profile sampling with a conductivity-temperature-density instrument.

**Why aren't we using these
technologies?**

Fear of Change



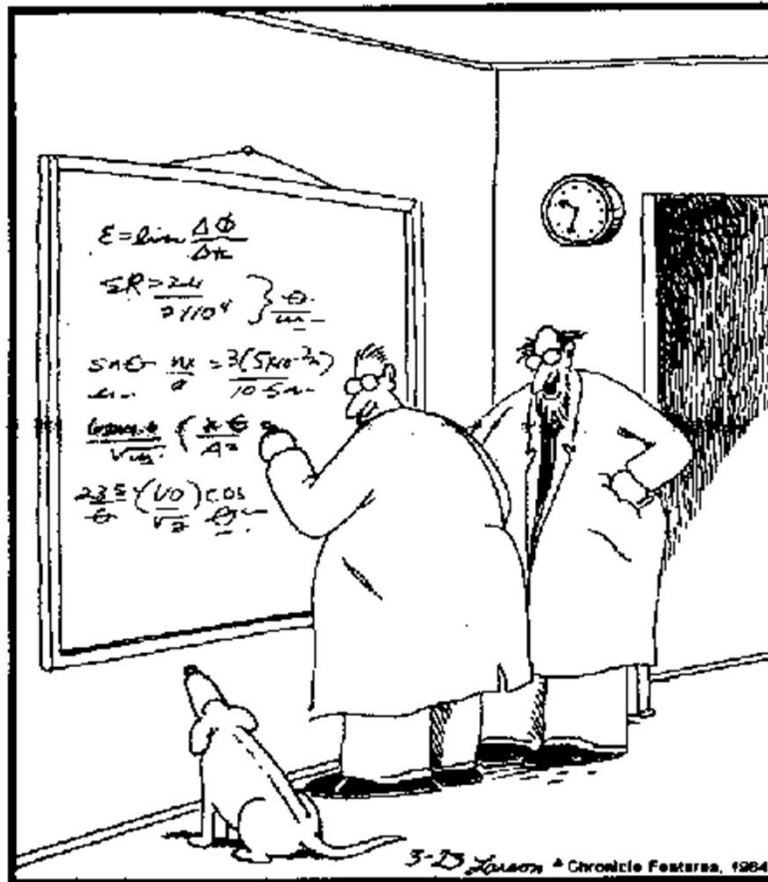
Adopting new standards can be problematic



Interpretation of Data

THE FAR SIDE

By GARY LARSON



"Ohhhhhh... Look at that, Schuster...
Dogs are so cute when they try to comprehend
quantum mechanics."

Regulation/Permit Compliance



Cost / Benefit Analysis



Overcoming Impediments



Flexible Regulations



STAKEHOLDERS

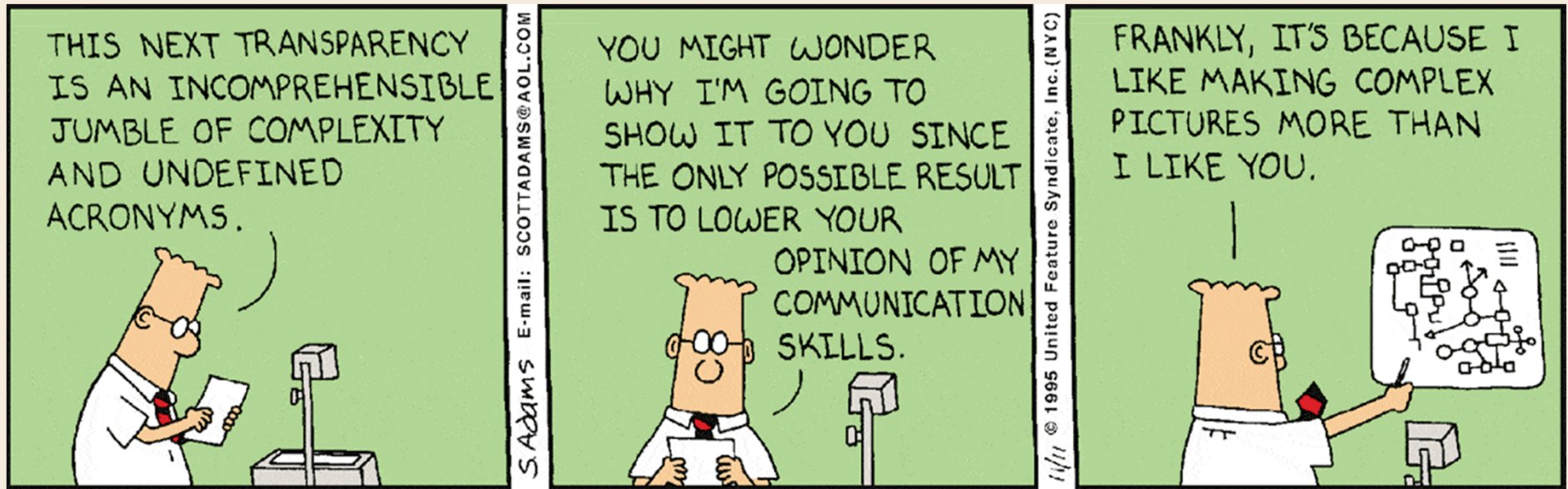
Some stakeholders are completely behind the project, so they can stab it
in the back







Public Health

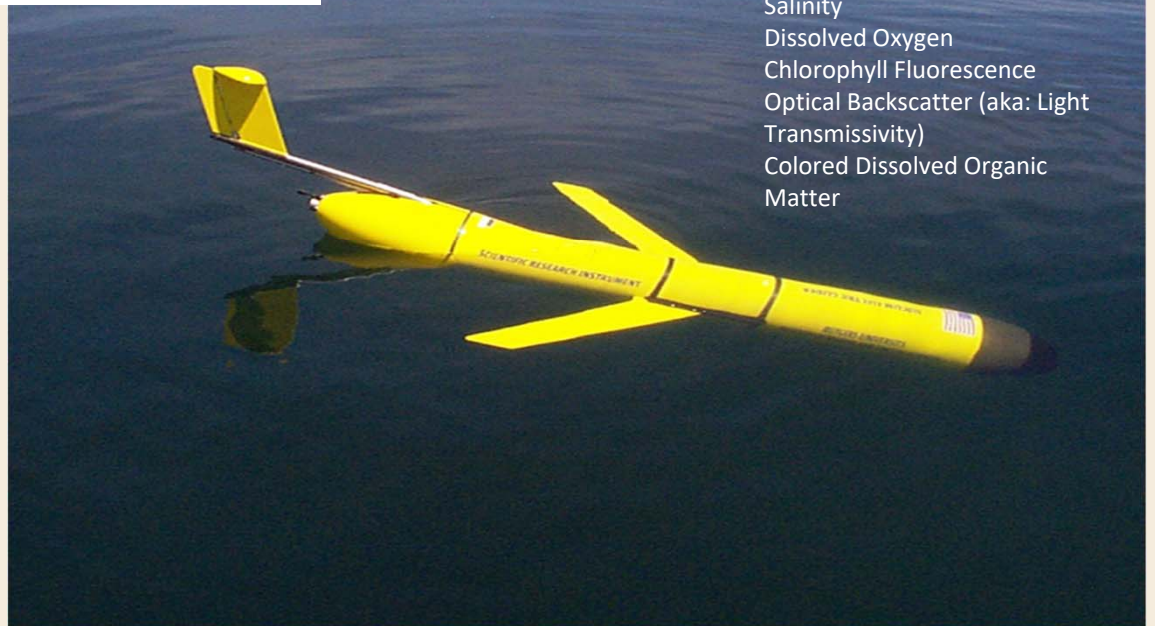


Communication



*Water quality lab of the Denver Union Water Company in
1896*

Monitoring Parameters
Temperature
pH
Salinity
Dissolved Oxygen
Chlorophyll Fluorescence
Optical Backscatter (aka: Light
Transmissivity)
Colored Dissolved Organic
Matter



Questions?

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150 Years in Microbiology

- 1854 Waterborne disease identified
- 1890's Coliform bacteria described
- 1912 Indicator bacteria concept
- 1918 Multiple tube fermentation Technique
- 1950's Membrane Filtration Technique
- 1980's Colilert Technique
- 2000's PCR Technology
- 2010's Chip Technology