



Utilization of Large Scale Rapid Screening with Marine Plankton Toxicity Tests by a Citizen Monitoring Group

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Water Quality Monitoring Program



San Diego Coastkeeper

- We balance community outreach, education, and advocacy to promote stewardship of clean water and a healthy coastal ecosystem.
- MPA's
- Marine Debris
- School Curriculum
- Water Supply
- Sewage Discharges
- Urban Runoff



Water Quality Monitoring Program

- Engage over 250 volunteers a year
- Monthly Sampling from 43 sites throughout 9 of 11 Watersheds in San Diego County
- Bi- Monthly trainings for Field and Lab methods
- Data sharing with CEDEN for TMDL and 305b & 303d
- Primarily State funded, internal funds and partner organizations



Water Quality Monitoring Program

Field

- Air temp
- Water Temp
- Conductivity
- Dissolved Oxygen
- pH

Brief assessment of physical habitat and ecological conditions

Look for illegal discharges and confirm beneficial uses of water body

Lab

- Indicator Bacteria
- Nitrate
- Total Phosphorous
- Ammonia
- Toxicity

Metals

Zinc
Copper
Lead

Rapid Assessment Screening of Toxicity

ASTM E1924

Bioluminescent Dinoflagellate
Pyrocystis lunula

Receive and light phase
of Plankton for testing

Plankton from same culture
are shipped already in similar
light phase at uniform density



Salinity adjustment of Samples

Measure sea salt and keep in micotube for adding pre-determined amount for proper adjustment

Record initial and final levels

30-36 ppt salinity range is reached in all fresh water and brackish samples



Adding Sample to Cartridge

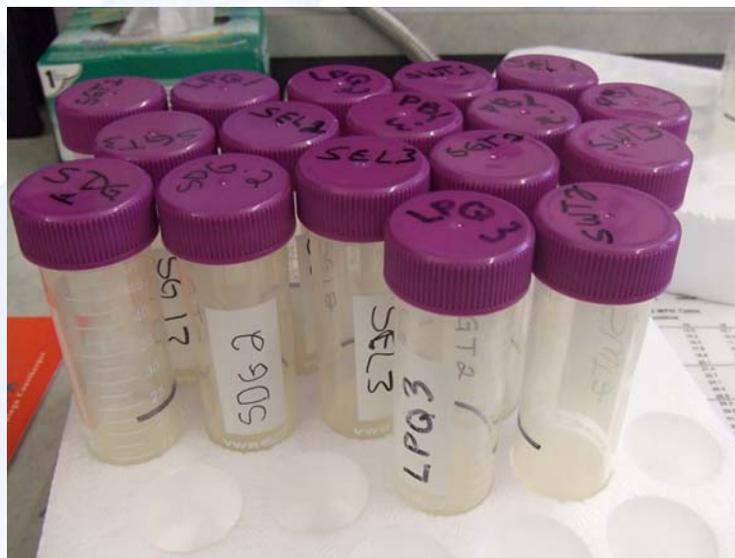
Cuvettes of plankton are gently mixed with salinity adjusted samples and respective controls for each sub-watershed group



Water Samples with Plankton

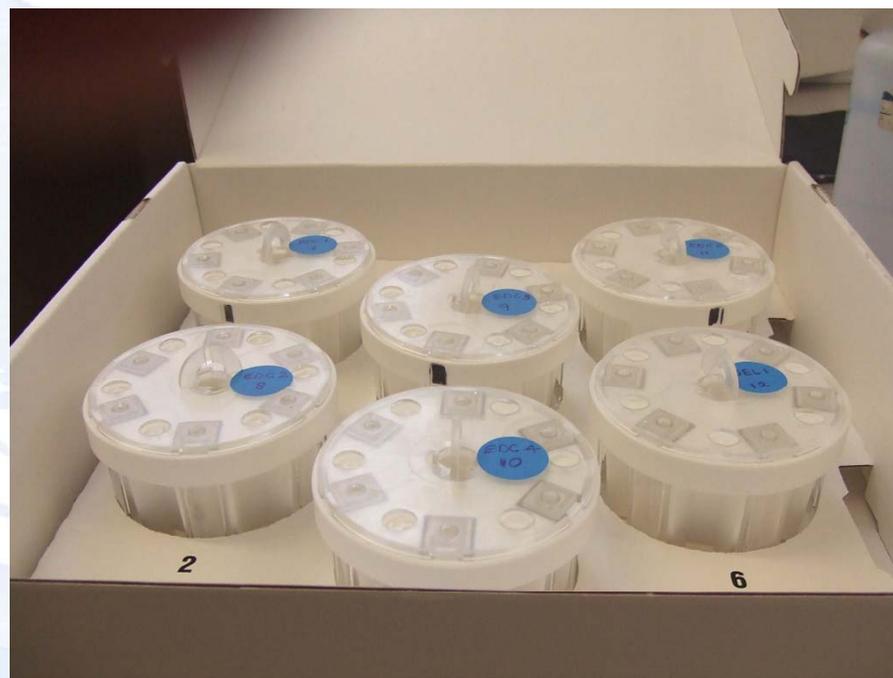
Samples are aliquoted into 6 individual cuvettes per cartridge

Care is given to ensure even distribution



Prepared samples

Times are recorded
and samples are
placed in light box to
incubate 24h
go through 12 hour
dark and 12 hour light
cycle ending 3 hr
prior to testing



Reading Results

Air agitates plankton, causing bioluminescence, lens records
Light emitted from cuvette
6 readings taken

3h after samples have been
in 12h light phase readings
are taken

Light output from samples is
compared against control to
determine if there is inhibition
in sample, likely due to toxicity





Determining BIN Values from Light Readings

Percentage of sample light output compared to control at 100%

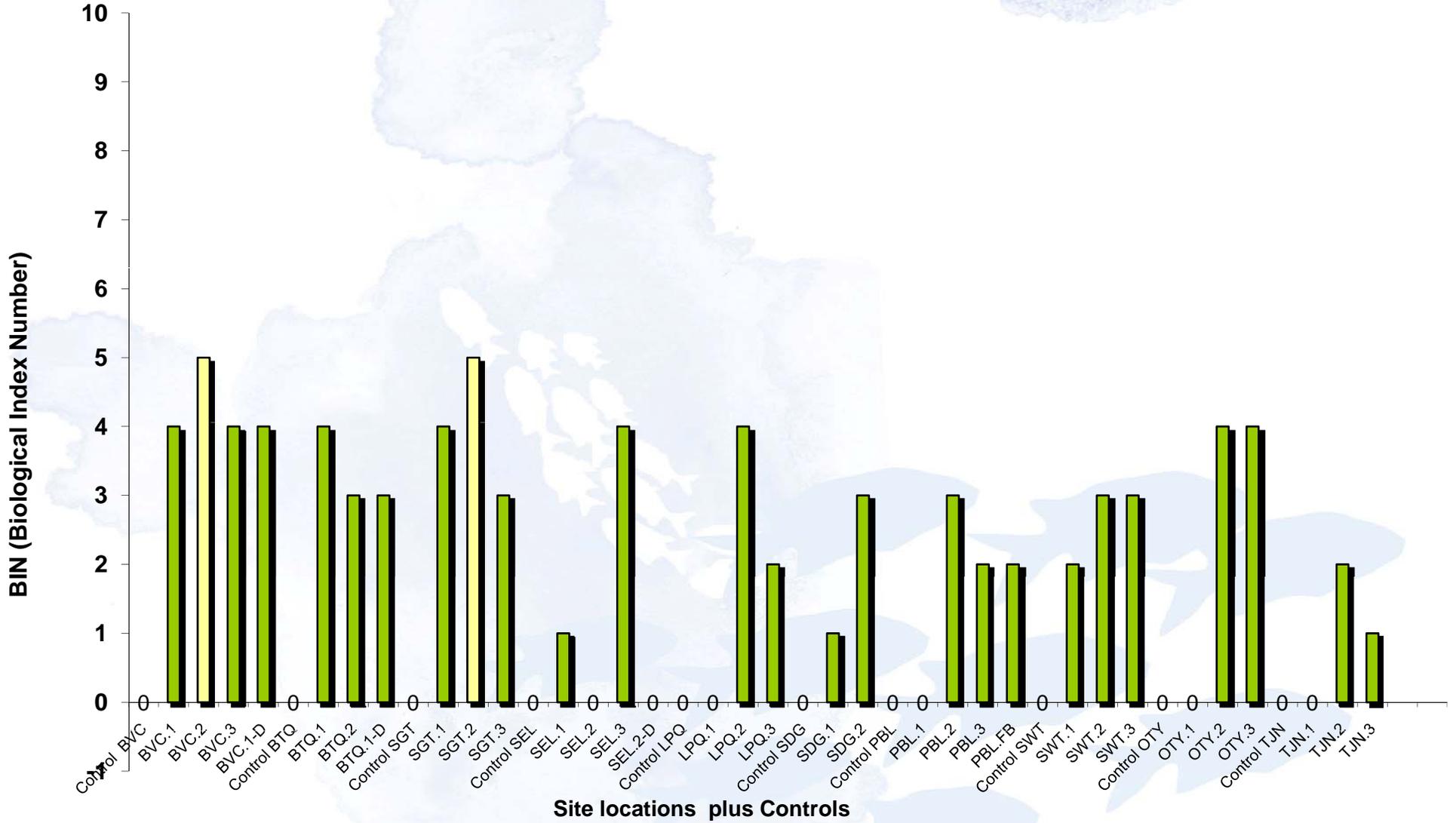
Biological Index Number level inverse to percentage Of sample bioluminescence

Simple 1-10 scale for results



Rapid Toxicity Assessment (RTA) Jan 17 2010

0 to 4 **Normal** 4 to 7 **Review Further** 7 to 10 **Effect Detected**





- Rapid Screening tool for toxicity at a fraction of the cost of other tests
- Effective with volunteer workflow even for large scale applications
- Tool for initial sites and continued assessment for follow up
- Potential tool for sediment testing, comparability study underway



Special Thanks

EPA
Tetra Tech,
Assure Controls
& all of our volunteers