

# Toxicity Provisions

Proposed Toxicity Provision to the Water Quality Control Plan  
for Inland Surface Waters, Enclosed Bays, and Estuaries of  
California

Karen Mogus, Deputy Director  
State Water Resources Control Board

October 2018

- Background
- Goals
- Description of the Provisions
- TST
- Outreach
- Timeline

# Background

- WQO 2003-0012 stated that numeric effluent limitations for chronic toxicity should be considered in a regulatory setting
- Resolutions 2003-0070 and 2005-0019 direct staff to amend the State Implementation Policy to address narrative toxicity control provisions
- October 2010 – Draft Policy released for comment
- November 2010 – Public workshop on the draft Policy
- July 2011 – TST Test Drive Report released
- June 2012 – Revised draft Policy was released for comment
- August 2012 – Public Hearing on revised draft Policy
- 2012 to present
  - Revised Policy to a statewide Water Quality Control Plan (Toxicity Provisions)
  - Significant revisions to provisions
  - Thorough analysis in staff report
  - Several Regional Water Boards incorporate TST into permits
- October 2018 – Released Toxicity Provisions for comment

# Goals

1. Adopt consistent, statewide numeric water quality objectives for acute and chronic toxicity
2. Adopt a program of implementation
3. Create a consistent, yet flexible framework for monitoring toxicity and laboratory analysis
4. Incorporate a statewide statistical approach to analyze test results that will provide a transparent determination of toxicity

# Toxicity Provisions

- Establish statewide numeric water quality toxicity objectives
- Apply to inland surface waters and enclosed bays and estuaries designated to protect aquatic life beneficial uses
- Establish program of implementation
- Supersede portions of Basin Plans that:
  - Specify methods compliance with water quality objectives for chronic or acute toxicity
  - Address toxicity testing and data interpretation
  - Are in conflict with Toxicity Provisions
- Supersede section 4 of the State Implementation Policy
- Do not supersede narrative toxicity water quality objectives, site specific water quality objectives, or chemical specific limitations

# Numeric Water Quality Objectives for Toxicity

## Numeric Chronic Aquatic Toxicity Objective

*Null Hypothesis ( $H_0$ ):*

*Mean Response (ambient receiving water)  $\leq$  0.75 x Mean Response (control)*

## Numeric Acute Aquatic Toxicity Objective

*Null Hypothesis ( $H_0$ ):*

*Mean Response (ambient receiving water)  $\leq$  0.80 x Mean Response (control)*

# Aquatic Toxicity Test Methods

- Toxicity tests shall be conducted using one or more test species in Table 1 of the Toxicity Provisions
- Methods shall follow EPA method manuals



Fathead Minnow



Green Algae (*Selenastrum*)

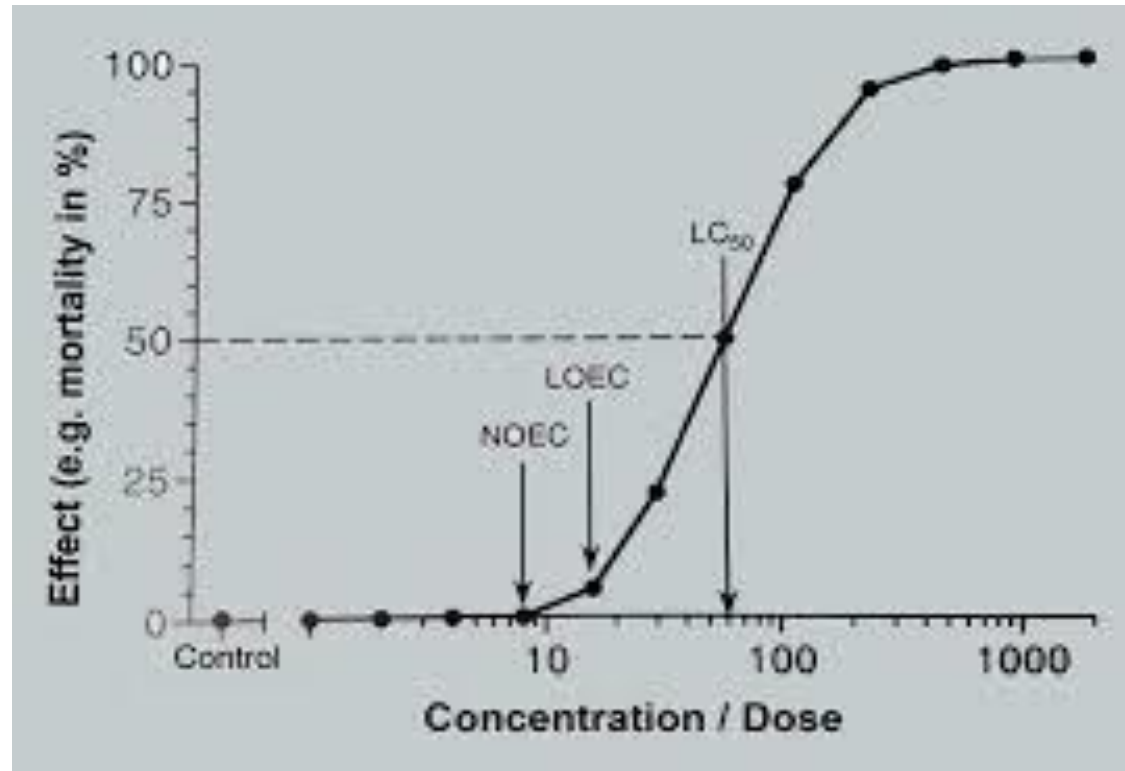


Water flea (*Ceriodaphnia*)

# Test of Significant Toxicity

- A statistical hypothesis test
- Data analysis approach, not a change to test methods
- Developed by the U.S. EPA
- Tests the hypothesis: “does the effluent concentration of concern (e.g., IWC) and the control differ by a biologically significant amount?”
- Produces a clear pass/fail result
- Provides greater confidence
- Incorporates the regulatory management decision (RMD)

# TST Compared to other Data Analysis Approaches



NOEC – No Observed Effect Concentration

LOEC – Lowest Observed Effect Concentration

LC<sub>50</sub> – Lethal Concentration at which there is 50% mortality of exposed organisms



# Test Drive: Test of Significant Toxicity

- The validity of the TST was evaluated by the U.S. EPA TST Test Drive and the California TST Test Drive
- California TST Test Drive
  - Test results using the TST and the current NOEC approach were generally the same overall, indicating the use of the TST is not expected to change the number of exceedances
- Experience with the TST
  - 5 of 9 Regional Water Boards use the TST in NPDES permits
  - Regions 4 and 9 establish effluent limitation similar to the proposed Provisions



# Program of Implementation

- Non-Stormwater NPDES Dischargers
  - Species Sensitivity Screening
  - Reasonable Potential Analysis
  - Routine Monitoring Frequency
  - Effluent Limitations
  - Toxicity Reduction Evaluation
  - Additional Considerations
- Storm Water and Nonpoint Source Dischargers

# Program of Implementation

## Implementation for Non-Stormwater NPDES Dischargers

# Species Sensitivity Screening

- Screening conducted as follows:
  - Chronic Testing - at least one vertebrate, one invertebrate and one aquatic plant species
  - Acute Testing – at least a vertebrate and invertebrate species
- Four sets of tests must be conducted over one year (or applicable discharge season)
- Required either prior to issuance of permit or within 18 months after first issuance
- No less than once every 10 years
- Species with highest percent effect at the Instream Waste Concentration is generally selected as most sensitive

# Reasonable Potential Analysis

- Reasonable potential exists if:
  - Any toxicity test results in a “fail” of the TST or
  - If the percent effect is greater than 10% at the instream waste concentration
- All data generated in the previous 5 years must be evaluated
- Older data may also be used
- A minimum of four test must be evaluated using the TST
- If reasonable potential exists, the permit must include numeric effluent limitations and routine monitoring for toxicity
- POTW dischargers authorized to discharge greater than 5 MGD:
  - Do not have to conduct a reasonable potential analysis
  - Will have numeric effluent limitations and toxicity monitoring requirements in their permit

# Routine Monitoring Frequency

	POTWs $\geq 5$ MGD	Other NPDES Dischargers $\geq 5$ MGD w/ RP	POTWs $< 5$ MGD w/ RP	Other NPDES Dischargers $< 5$ MGD w/ RP
Chronic Toxicity Frequency	Monthly	Monthly	Quarterly	Quarterly

	POTWs $\geq 5$ MGD w/ RP	Other NPDES Dischargers $\geq 5$ MGD w/ RP	POTWs $< 5$ MGD w/ RP	Other NPDES Dischargers $< 5$ MGD w/ RP
Acute Toxicity Frequency	Determined by Regional Water Board but at least annually	Determined by Regional Water Board but at least annually	Determined by Regional Water Board but at least annually	Determined by Regional Water Board but at least annually

# Chronic Toxicity Numeric Effluent Limitations

## Chronic Toxicity Maximum Daily Effluent Limitation

*No Chronic Toxicity Test\* shall result in a "fail" at the IWC for the sub-lethal endpoint measured in the test and a Percent Effect for the survival endpoint greater than or equal to 50%*

Or if no survival endpoint can be measured, then:

*No Chronic Toxicity Test\* shall result in a "fail" at the IWC for the sub-lethal endpoint measured in the test and a Percent Effect for the sub-lethal endpoint greater than or equal to 50%*

## Chronic Toxicity Monthly Median Effluent Limitation

*No more than one Chronic Toxicity Test\* initiated in a Calendar Month may result in a "fail" at the IWC for any endpoint*

*\* Using the most sensitive species*

# Acute Toxicity Numeric Effluent Limitations

## Acute Toxicity Maximum Daily Effluent Limitation

*No Acute Toxicity Test\* may result in a "fail" at the IWC for the survival endpoint and a Percent Effect for the survival endpoint greater than or equal to 50%*

## Acute Toxicity Monthly Median Effluent Limitation

*No more than one Acute Toxicity Test\* initiated in a Calendar Month may result in a "fail" at the IWC for the survival endpoint*

*\* Using the most sensitive species*



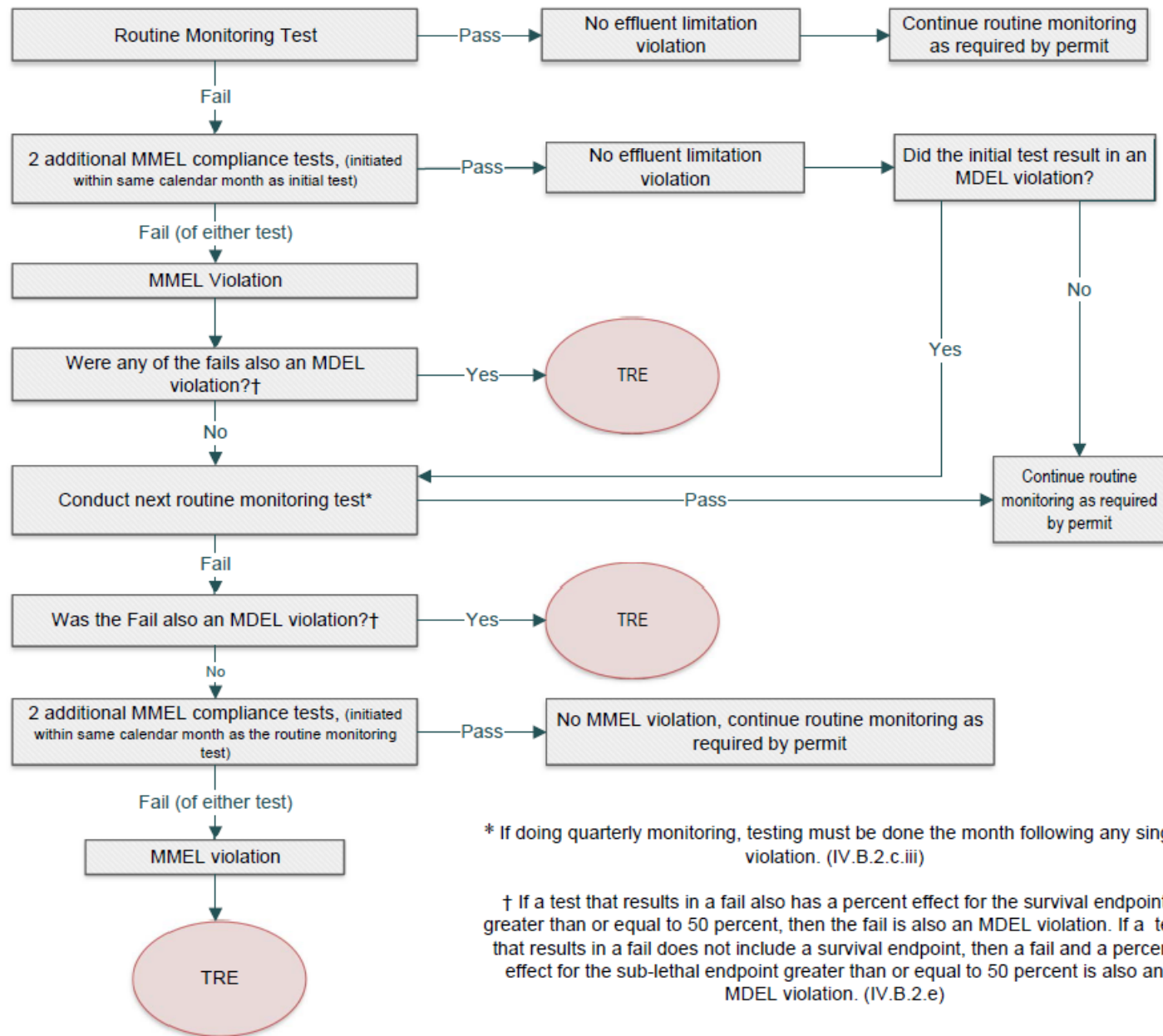
# MMEL Compliance

Routine Monitoring Test	Compliance Test 1	Compliance Test 2	MMEL Violation?
Pass	NA	NA	No
Fail	Pass	Pass	No
Fail	Pass	Fail	Yes
Fail	Fail	NA	Yes

# Toxicity Reduction Evaluation

- Toxicity Reduction Evaluation (TRE) is required when two violations of either effluent limitation occurs within a Calendar Month or in consecutive Calendar Months
- Routine monitoring shall continue during a TRE\*
- Regional Water Boards have discretion to require a TRE if other information (i.e., fish kills) indicates toxicity

\* The Permitting Authority may reduce the routine monitoring frequency



## Other Considerations

- Mixing zones and dilution credits
- Flow-through acute toxicity testing systems
- Additional monitoring
- Violation reporting
- Exceptions for small disadvantaged communities and insignificant dischargers

# Storm Water & Nonpoint Source Dischargers

- Water Boards have discretion to require toxicity testing using any species
- Storm Water or Nonpoint source dischargers with existing chronic or acute toxicity monitoring requirements using the testing species in Table 1 of the Toxicity Provisions will be required to use the TST statistical approach to analyze the data
- Any future requirements for testing with the species in Table 1 also will be required to use the TST statistical approach

## 6. Timeline

Item	Projected Dates
Public Comment Period	Release on 10/19/2018 Close on 12/7/18
Staff-Hosted Public Workshop	10/29/2018 – So Cal (SCCWRP) 10/31/2018 - Sacramento
Board Hearing for Public Comment	11/28/2018
Board Consideration of Adoption	April 2019

## 7. Contacts

Zane Poulson, Supervisor, Inland Planning, Standards, and Implementation Unit

Division of Water Quality, State Water Resources Control Board

[Zane.Poulson@waterboards.ca.gov](mailto:Zane.Poulson@waterboards.ca.gov), (916) 341-5488

Rebecca Fitzgerald, Manager, Water Quality Standards and Assessment Section

Division of Water Quality, State Water Resources Control Board

[Rebecca.Fitzgerald@waterboards.ca.gov](mailto:Rebecca.Fitzgerald@waterboards.ca.gov), (916) 341-5775

Documents & Additional Information Available at:

[https://www.waterboards.ca.gov/water\\_issues/programs/state\\_implementation\\_policy/tx\\_ass\\_cntrl.html](https://www.waterboards.ca.gov/water_issues/programs/state_implementation_policy/tx_ass_cntrl.html)