Toxicity Provisions Implementation Status Report

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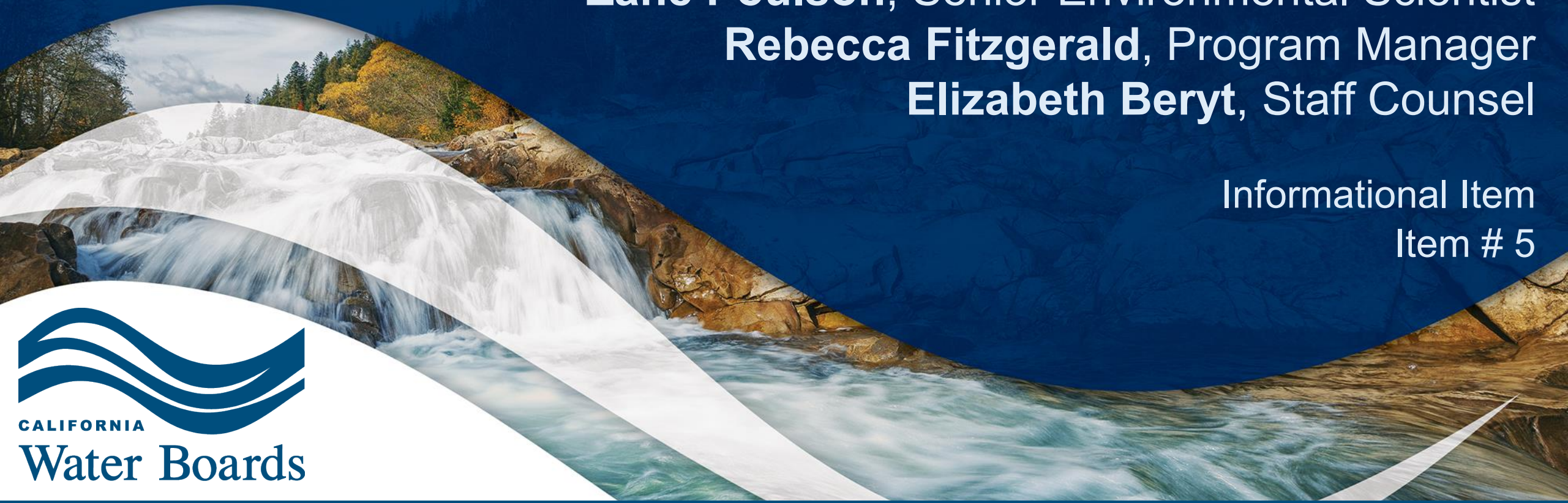
Informational Item
Item # 5



CALIFORNIA
Water Boards

State Water Board, Division of Water Quality | November 19, 2024

Purpose of This Item

- To provide the State Water Board (SWB) with a report on the status of implementation of the Toxicity Provisions
- To fulfill Resolve #11 of SWB Resolution Number 2020-0044

Today's Presentation

- History and Content of the Toxicity Provisions
- Status of Permit Implementation
- Permit Monitoring Frequency Changes
- Toxicity Test Results
- Laboratory and Discharger Experiences
- Addressing Challenges
- Toxicity Monitoring Efforts
- Conclusions

History and Content of the Toxicity Provisions

- The SWB adopted the Provisions on December 1, 2020
- Adopted revisions on October 5, 2021
- The Provisions included:
  - Numeric water quality objectives for acute and chronic toxicity
  - A statistical approach to analyze test results: the Test of Significant Toxicity (TST)
  - A program of implementation
- The Provisions provide:
  - Consistent protection of aquatic life beneficial uses in inland surface waters, enclosed bays, estuaries, and coastal lagoons
  - Protection of aquatic life from the effects of known and unknown toxicants

Status of Permit Implementation

Implementation in NPDES Permits

- As of August 2024, 55 National Pollutant Discharge Elimination System (NPDES) permits include the requirements specified in the Provisions

NPDES Permits with the Toxicity Provisions

Region	Individual POTWs*	General Permits	Other Individual Facilities
1 – North Coast	6		
2 – SF Bay	13		3 Refineries, 3 Exempted Facilities
3 – Central Coast	1	2	
4 – Los Angeles	3	3	
5 – Central Valley	10	1 for 20 POTWs	
6 – Lahontan	0		2 Fish Hatcheries
7 – Colorado River	2		2 Mobile Home Parks, 1 Prison
8 – Santa Ana River	2		
9 – San Diego	1		
STATEWIDE TOTAL (55)	**38**	**6**	**11**

*POTW = Publicly Owned Treatment Works

Permit Monitoring Frequency Changes

Changes in Chronic Monitoring Frequency in POTW Permits

Change In Chronic Monitoring Frequency	Number & Percent of Permits with Changes	Current Monitoring Frequency
Increase	21 (56%)	11 Semiannually 4 Quarterly 6 Monthly
Decrease	2 (5%)	2 Semiannually
No Change	15 (39%)	4 Semiannually 6 Quarterly 5 Monthly
TOTAL	**38**	

Changes in Acute Monitoring Frequency in POTW Permits

Change in Acute Monitoring Frequency	Number & Percent of Permits with Changes	Current Monitoring Frequency
Increase	0 (0)%	N/A
Decrease	4 (11%)	4 Annually
Removed	23 (60%)	None
No change	11 (29%)	1 Annually 1 Quarterly 9 None
TOTAL	**38**	

Toxicity Test Results

NPDES Permit Toxicity Monitoring Data

- Data were taken from the California Integrated Water Quality System (CIWQS) database, which contains electronic self monitoring report data submitted by dischargers
- 19 of 38 POTW facilities had TST data in CIWQS
- Facilities that have not yet submitted data to CIWQS have either:
  - Not yet begun monitoring for this permit cycle, or
  - Have not discharged effluent for more than 15 days consecutive days and are not required to test for toxicity

Most Sensitive Species Used

Chronic Methods	Type	Facilities
Ceriodaphnia Survival and Reproduction	Freshwater	5
Green Algal Growth Test	Freshwater	3
Fathead Minnow Survival and Growth	Freshwater	1
Mysid et al. Survival and Growth	Marine/Estuarine	4
Bivalve Larval Development	Marine/Estuarine	1
Giant Kelp Germination and Germ Tube Length	Marine/Estuarine	1
Red Abalone	Marine/Estuarine	1
Not reported	-	1
Total		**17**

Acute Methods		Facilities
Ceriodaphnia Survival	Freshwater	1
Topsmelt Survival	Marine/Estuarine	1
Mysid et al. survival	Marine/Estuarine	1
Not reported	-	1
Total		**4**

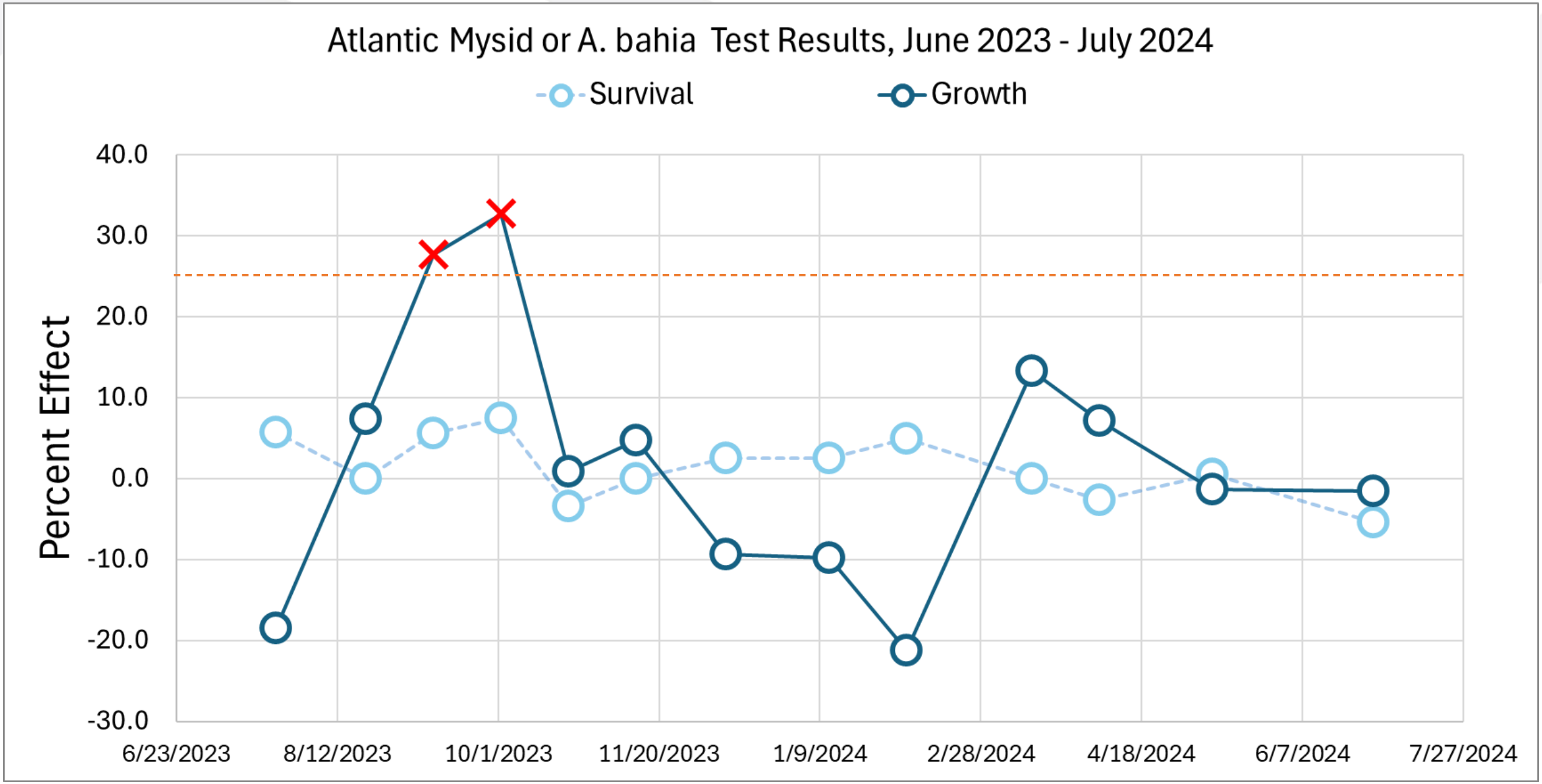
TST Passes and Fails

Chronic Methods	Number of Tests	Passes	Fails
Ceriodaphnia Survival and Reproduction	73	60 (82%)	13 (18%)
Green Algal Growth	21	14 (67%)	7 (33%)
Fathead Minnow Survival and Growth	21	20 (95%)	1 (5%)
Mysid et al. Survival and Growth	22	20 (91%)	2 (9%)
Bivalve Larval Development	1	1 (100%)	0 (0%)
Giant Kelp Germination and Germ Tube Length	11	9 (82%)	2 (18%)
Red Abalone	2	2 (100%)	0 (0%)
Not Reported	5	5 (100%)	0 (0%)
Subtotal	156	131 (84%)	25 (16%)

Acute Methods	Number of Tests	Passes	Fails
Ceriodaphnia Survival	45	45 (100%)	0 (0%)
Topsmelt Survival	1	1 (100%)	0 (0%)
Mysid et al. Survival	5	4 (80%)	1 (20%)
Not Reported	1	1 (100%)	0 (0%)
Subtotal	52	51 (98%)	1 (2%)
TOTAL	**208**	**182 (88%)**	**26 (12%)**

Apparent Violations

- There have been 4 instances that may constitute violations of Monthly Median Effluent Limitations (MMELs) or Maximum Daily Effluent Limitations (MDELs)
- 2 of the 19 facilities had successive fails that would result in such violations
- There have been no formal enforcement orders


Atlantic Mysid or A. bahia Test Results, June 2023 - July 2024
Survival
Growth
Percent Effect
40.0
30.0
20.0
10.0
0.0
-10.0
-20.0
-30.0
6/23/2023
8/12/2023
10/1/2023
11/20/2023
1/9/2024
2/28/2024
4/18/2024
6/7/2024
7/27/2024

Laboratory and Discharger Experiences

Surveys

- Staff sent surveys to labs accredited by the Environmental Laboratory Accreditation Program (ELAP) and Publicly Owned Treatment Works (POTW) dischargers
- Topics included:
  - Challenges associated with conducting toxicity tests in general
  - Challenges initiating three toxicity tests in a calendar month
  - Prices and volume of tests
  - Familiarity with the Toxicity Provisions and recommendations and training related to chronic *Ceriodaphnia dubia* tests

Challenges: Toxicity Testing

- 10 of 14 laboratories reported challenges, including:
  - Culture crashes and brood board health issues for *Ceriodaphnia*
  - Difficulty procuring certain test organisms, food, control water, or other laboratory supplies
  - Staff availability

Challenges: Sample Collection and Logistics

- 5 of 21 dischargers reported challenges with sample collection and shipping, including:
  - Collecting and shipping samples on weekends or holidays, or during tight turn-around times
  - Testing and shipping costs
  - Limited staff, especially for small or remote facilities

Challenges: Three Tests in a Calendar Month

- Laboratories
  - 10 of 14 labs have had to initiate three tests in a calendar month
  - 4 were able to initiate three 3 tests almost all of the time
  - 1 was able to initiate 3 tests between 50 – 89% of the time
  - 5 were unable to initiate 3 tests more than half the time
- Dischargers
  - 8 of 21 dischargers have had to initiate three tests
  - 4 of these were able to initiate 3 tests almost all of the time
  - 2 were able to initiate 3 tests between 50 – 89% of the time
  - 2 were unable to initiate 3 tests more than half the time

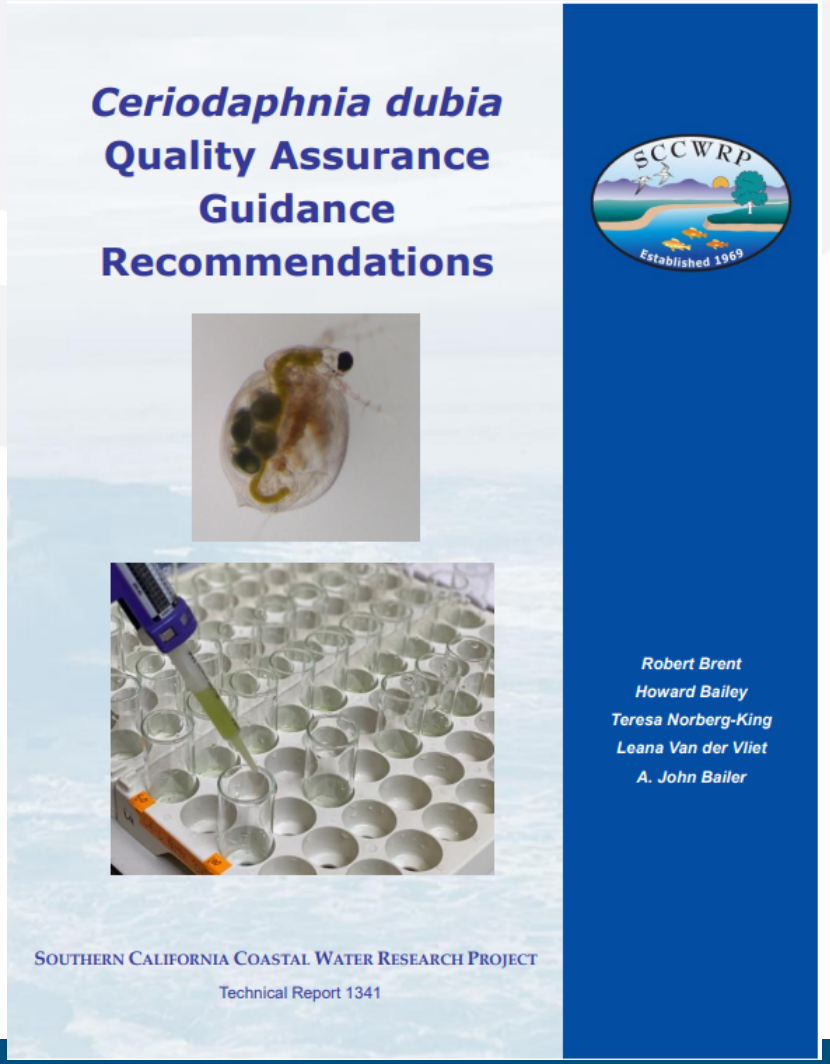
Addressing Challenges

Addressing Challenges: *Ceriodaphnia dubia* Toxicity Tests

- General *Ceriodaphnia dubia* toxicity tests
  - Be proactive in logistical planning efforts and organism procurement
  - Provide preliminary test results within 48 hours of test termination to allow sufficient time for additional testing
  - Implement a strong quality assurance system
- Culture crashes
  - Frequently renew cultures
  - Maintain good hygiene practices to avoid contamination
  - Use a microscope to make observations
  - Test different food vendors
- Brood board health issues
  - Frequently supplement the culture with new organisms from vendors
  - Increase the number of brood boards prior to a test

Addressing Challenges: *Ceriodaphnia* Study Recommendations

- 11 labs responded that they are aware of the study
- All of the labs that are providing Ceriodaphnia tests are currently implementing recommendations from the study, such as:
  - Analyzing brood board health prior to testing
  - Documenting split broods daily
  - Renewing test solutions within a 2-hour window of test initiation time
  - Improving documentation and training materials
  - Storing reagents properly
- Five labs were interested in additional training



Addressing Challenges: Others

- Control water
  - Use different combinations of control water sources to maintain hardness and alkalinity
- Sample Collection and Delivery
  - Staff encourages coordination amongst dischargers and to work with permit writers to explore approaches

Laboratory Costs of Toxicity Tests

- Most commercial laboratories reported that their prices for chronic freshwater toxicity tests are within these ranges of costs

Ceriodaphnia dubia	$1,436 - $1,943
Pimephales promelas	$1,608 - $1,675
Selenastrum Capricornutum	$939 - $1,675

- These ranges are from the 2020 Economic Analysis and are adjusted for inflation.

Toxicity Monitoring Efforts

Implementation for Storm Water

- The State and Regional Water Boards regulate storm water discharges through a variety of different permits, such as Municipal Separate Stormwater System (MS4) permits
- Under the Provisions, permitting authorities must use the TST when the permit requires toxicity monitoring using Table 1 test methods

Storm Water NPDES Permits

- Example: The San Francisco Bay Regional Board adopted a new Municipal Regional Stormwater NPDES permit in 2022
- Covers multiple municipalities throughout the Region
- Requires concurrent toxicity and pesticide monitoring of urban creeks, but requirements vary depending on season, location of municipality, and specific pesticides
- Requires that TST be used for water column tests for Table 1 species

Ambient Monitoring Efforts: Examples

- The Surface Water Ambient Monitoring Program (SWAMP) is the Water Boards' umbrella water quality monitoring program
- Monitoring efforts that include toxicity sampling:
  - Stream Pollution Trends (SPoT) Program
  - Salton Sea Tributaries Monitoring Program
  - Central Coast Ambient Monitoring Program (CCAMP)

The Integrated Report

- Starting with the 2024 Integrated Report, staff used the TST statistical approach for assessment of some aquatic toxicity test data
- Staff also used other statistical approaches
- Many toxicity tests used in assessments are sediment toxicity tests, and the TST statistical approach is not required for test methods other than the water column tests in Table 1

Conclusions

Conclusions

- Implementation is still in the early stages, but is beginning to be used in permitting, monitoring, and assessment programs
- TST is being used consistently in all of these regulatory programs
- In the NPDES permit program, there have been four apparent violations of toxicity MDELs or MMELs
- Initiating three tests within a calendar month, when required, has been challenging
  - There are several ways labs can work address this issue

Questions?

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