IDENTIFYING CURRENT USE PESTICIDES (CUP) TO INCLUDE IN FUTURE RMP MONITORING

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ESTIMATED COST: $55,000
OVERSIGHT GROUP: Emerging Contaminants Work Group (ECWG)

PROPOSED DELIVERABLES AND TIMELINE

Deliverable	Due Date
Task 1. Project Management (write and manage sub-contracts, track budgets)	Fall 2014 – Dec 2015
Task 2. Desktop analysis of CUP application timing	Fall 2014
Task 3. Collection of first round of CUP water and sediment samples	Spring 2015
Task 2. Collection of second round of CUP water and sediment samples	Aug/Sept 2015
Task 3. Laboratory analysis	Spring/ Fall 2015
Task 4. QA/QC and data management	Dec 2015
Task 5. Presentation and report to ECWG	Spring 2016

Background

The RMP monitors legacy pesticides (e.g., DDT, chlordanes, dieldrin) as part of the Status and Trends (S&T) program. Use of these legacy pesticides ended between 40 and 50 years ago and the RMP has observed a slow decline in concentrations since 1993 (SFEI 2014). As many S&T contaminant concentrations begin to decline or stabilize, the RMP has begun focusing efforts on Contaminants of Emerging Concern (CECs), including current use pesticides (CUPs).

The RMP's CEC Strategy includes ranking the relative risk of CECs to the Bay based on a tiered risk framework. All CUPs are ranked in Tier I (Possible Concern), excluding Fipronil and Pyrethroids (Moderate Concern and Low Concern respectively). CUPs are included in Tier I because there is uncertainty in their predicted concentrations, the level of effect on Bay wildlife, and their environmental fate. The CEC Strategy suggests screening level monitoring efforts for Tier I contaminants to help determine their concentration in ambient Bay water and sediment, effluent, runoff, and biota (Sutton et al., 2013).

There are over 1,000 CUPs in existence; therefore, prioritizing which CUPs to monitor in the Bay is essential (SFEI 2013). The RMP developed a comprehensive monitoring priority list for agricultural CUPs. The list was created using spatially-explicit use data provided by the Department of Pesticide Regulation's California Pesticide Information Portal. Only agricultural pesticides, rather than both urban and agricultural, were included in the list because agricultural use data is reported to the township level. The RMP evaluated the top 50 highest use pesticides within the Region 2 Water Quality Control Board boundary and determined their risk ratio (total use/lowest aquatic life benchmark).

The 20 agricultural pesticides with the highest risk ratio were: Naled, Oxyfluorfen, Flumioxazin, Pyraclostrobin, Mancozeb, 1,3-dichloropropene, Dimethoate, Imidacloprid, Paraquat Dichloride,

Metam-Sodium, Thiophanate-Methyl, Cyprodinil, Trifloxystrobin, Methomyl, Pendimethalin, 2,4-Dichlorophenoxyacetic acid, Diquat Dibromide, Oryzalin, PCNB, and Triflumizole. The use data for all 20 pesticides was mapped to determine where pesticide use was concentrated. The majority of the pesticides were applied in Napa County, while some pesticide use was concentrated on the southern edge of Santa Clara County (e.g. Naled) or on the coast of San Mateo County (e.g. Metam-Sodium). Relatively high agricultural pesticide use indicates that agricultural pesticide concentrations are likely highest in the Napa River and subsequently San Pablo Bay.

Applicable RMP Objectives and Management Questions

This study will address the following RMP Objectives and Management Questions:

MQ.1 Are chemical concentrations in the Estuary at levels of potential concern and are associated impacts likely?

- A: Which chemicals have the potential to impact humans and aquatic life and should be monitored?

MQ.2 What are the concentrations and masses of contaminants in the Estuary and its segments?

- A: Do pollutant spatial patterns and long-term trends indicate particular regions of concern?

MQ.3 What are the sources, pathways, loadings, and processes leading to contaminant-related impacts in the Estuary?

- A: Which sources, pathways, and processes contribute most to impacts?

Approach

CUPs are Tier I chemicals; therefore, the CEC Strategy recommends a screening level monitoring study. We propose monitoring the following eight CUPs at three locations within the Napa River in this special study:

1. Oxyfluorfen
2. Pyraclostrobin
3. Mancozeb
4. 1,3-dichloropropene
5. Imidacloprid
6. Paraquat Dichloride
7. Pendimethalin
8. Diquat Dibromide

The above pesticides were chosen because they were either within the top 10 list with environmental fates that suggest they could enter the Napa River, or on another monitoring group's prioritization list, or the analysis of the pesticide was free. The three monitoring group list's that were compared to the RMP's were the Central Valley Water Board's high relative risk

list (Lu and Davis 2009), the DPR's monitoring priority list (Budd et al. 2013; Luo et al. 2013), and the Urban Pesticides Pollution Prevention Project watch list.
The monitoring plan is to time sampling in the Napa River with pesticide application. The first part of the study will focus on determining the timing of the various pesticide applications. Typically, pre-emergence pesticides are applied in the spring while post-emergence pesticides are applied in the late summer. Therefore, there will be two day-long sampling cruises in 2015 to sample sediment and water at the three locations after both sets of pesticide applications. RMP staff will work with Kelly Moran to determine the exact dates of the pesticide's application.

The sediment and water samples will be sent to North Coast Laboratories Ltd., a laboratory with expertise in pesticide analyses. The RMP will also likely send samples to the East Bay Municipality District's laboratory to determine if their results are comparable to that of North Coast Laboratories. If so, the RMP will use EBMUD for future CUP monitoring studies. Lastly, Dr. Lee Ferguson of Duke University has offered to run several of the samples pro bono using a broadscan method that may identify additional pesticides of interest.

This special study is a screening level effort to determine if agricultural CUPs that are applied in Napa and Sonoma County have the potential to enter the Bay. The concentrations of the eight CUPs will be compared concentrations from other monitoring studies and to the pesticide's lowest aquatic life benchmark.

Reporting

Results of the proposed screening level study will be reported to the Emerging Contaminants Workgroup during its Spring 2016 meeting. Comparisons will be made to screening efforts in other locations, as well as to the CUP's lowest aquatic life benchmarks.

Proposed Budget

Task	**Estimated Cost**
Desktop analysis, project management, reporting	$15,400
Sampling Cruise collection of CUPs in water and sediment in the Napa River (Spring and Summer 2015)	$7,000
Laboratory analysis of 2014 Napa River sediment and water for CUPs	$23,000
QA/QC, data management	$9,600
Total	**$55,000**

References

Budd R. et al. 2013. Method for Prioritizing Urban Pesticides for Monitoring California's Urban Surface Waters. Prepared by the California Department of Pesticide Regulation Environmental Monitoring Branch.

Luo Y. et al. 2013. Methodology for Prioritizing Pesticides for Surface Water Monitoring in Agricultural and Urban Areas. Prepared by the California Department of Pesticide Regulation Environmental Monitoring Branch.

Lu Z, Davis G. 2009. Relative-Risk Evaluation for Pesticides Used in the Central Valley Pesticides Basin Plan Amendment Project Area. Prepared by the Regional Water Quality Control Board, Central Valley Region.

SFEI. 2013. The Pulse of the Bay: Contaminants of Emerging Concern. Contribution #701. San Francisco Estuary Institute, Richmond, CA.

SFEI. 2014. 2012 Annual Monitoring Results. The Regional Monitoring Program for Water Quality in the San Francisco Bay (RMP). Contribution #170. San Francisco Estuary Institute, Richmond, CA.

Sutton R, Sedlak M, Yee D. 2013. Contaminants of Emerging Concern in San Francisco Bay: A Strategy for Future Investigations. Contribution #700. San Francisco Estuary Institute, Richmond, CA.