SFEI AQUATIC SCIENCE CENTER 4911 Central Ave Richmond, CA 94804	**RMP Microplastic Workgroup** June 29th, 2016 10:00 AM – 4:00 PM

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AGENDA

1.	**Introductions and Goals for Today's Meeting** The goals for today: ● Agree on Management Questions ● Identify Data Gaps ● Develop a Strategy for Monitoring Microplastic in the Bay	10:00 Philip Trowbridge
2.	**Elements of the Strategy, Conceptual Model and RMP Management Questions** Review of the RMP work to date, impetus for strategy development, and presentation of draft Management Questions Meeting Materials: ● Factsheet ● Conceptual Model ● Draft Management Questions <u>Desired Outcome</u>: Provide an overview, and frame the discussion for the day.	10:10 Rebecca Sutton
3a.	**MQ1: How much microplastic pollution is there in the Bay?** **Development of Microplastic Analytical Techniques - BACWA** Wastewater treatment plant effluent presents unique challenges to developing a reliable analytical method for microplastics. This presentation discusses results of BACWA's effort to develop a method that can characterize and quantify microplastic in wastewater treatment plant effluent at a reasonable cost.	10:40 Nirmela Arsem, EBMUD

3b.	**MQ1: How much microplastic pollution is there in the Bay?** **Development of Microplastic Analytical Techniques- USEPA** USEPA is working on method development for analysis of fish tissues and sediment.	11:05 Anna-Marie Cook, USEPA
3c.	**MQ1: How much microplastic pollution is there in the Bay?** **Discussion of Analytical Techniques** Are there readily available techniques that can be used to characterize microplastic in the Bay? If not, what will it take to develop robust methods? How will we validate the methods such that there is confidence in the results? Desired Outcome: Identification of appropriate methods or next steps to develop robust methods to monitoring microplastic in the Bay.	11:25 Group
4.	**MQ2: What are the health risks?** Microplastics may present a risk as a result of physical blockages or the impact associated with chemical exposures from the plastics or contaminants sorbed to the plastic. In addition, microplastics may bioaccumulate. Desired Outcome: Better understanding of risks to human health and aquatic life. Identification of the information gaps for the San Francisco Bay.	11:45 Chelsea Rochman, UC-Davis
	Lunch Break	12:30
5.	**MQ3: What are the sources, pathways, loadings, and processes leading to microplastic pollution in the Bay?** An evaluation of potential sources of microplastic may aid in the identification of potential management actions. With this management question, the RMP hopes to answer questions such as: Are there different loads from different pathways? Are sediments a potential source of microplastic? Desired Outcome: Better understanding of sources and pathways. Identification of information gaps associated with San Francisco Bay.	1:10 Sherri Mason; SUNY; Stephanie Karba, Bren School, UC-Santa Barbara

6.	**Identification of Data Gaps and Discussion of Monitoring Strategy** Currently, there are many data gaps regarding microplastics in the Bay. A draft list of monitoring and special studies to address these information needs has been developed. The group will discuss priorities and phasing of the activities (and any new suggested activities) to develop a multi-year strategy for answering the management questions about microplastics in the Bay. Meeting Materials: ● List of Potential Microplastic Monitoring and Studies for SF Bay <u>Desired Outcome:</u> Multi-year strategy to address information needs related to microplastics in San Francisco Bay	1:55 Phil Trowbridge, Meg Sedlak, and Becky Sutton
7.	**Identification of Next Steps and Action Items**	3:20 Phil Trowbridge
8.	**Adjourn**	3:45

Agenda Item 2a

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DATE: June 8, 2016

TO: RMP Microplastic Workgroup

FROM: Rebecca Sutton, SFEI Senior Scientist

RE: Microplastic Management Questions

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The Regional Monitoring Program for Water Quality in San Francisco Bay (RMP) conducts special studies and status and trends monitoring to address management needs. Management questions developed through stakeholder input guide the RMP in selecting scientific projects that will be of greatest value to Bay water quality managers and stakeholders.

Provided below are draft microplastic management questions, accompanied by descriptive text that gives a more detailed explanation of the intent of each question. Also provided are RMP management questions that apply to the whole program, for context.

MQ1) How much microplastic pollution is there in the Bay?

> With this question, we address two issues: a) selection or development of appropriate methods for characterizing microplastic pollution, and b) presence and abundance of microplastic within the abiotic and biotic Bay environment. As an emerging contaminant, microplastic sample collection and analysis methods for matrices of interest are still in being developed. Selection or development of methods specifically validated to the matrix of interest is a key consideration for future monitoring studies. Also relevant is the fact that microplastic is a complex mixture of different polymers, particles types, and sizes. Through development of standardized methods, we will be able articulate a clear and consistent definition of microplastic, in terms of both size range and composition, which can be used across matrices.
>
> Microplastic has been identified in Bay surface water as part of an initial, screening study. Other matrices not yet monitored include the Bay water column at depth, ambient and margin sediment, and tissue from wildlife making up different parts of the Bay food web. An evaluation of microplastic in different Bay matrices would develop information on the presence and fate of this contaminant in the Bay environment. Assessments may identify regional or seasonal variation in contamination. Levels of Bay contamination relative to other ecosystems studied using comparable methods can inform prioritization of further monitoring and management actions in the Bay.

MQ2) What are the health risks?

With this question, we address risks to humans and wildlife from microplastic. Risks to wildlife include physical impacts such as blockages in the digestive tract, as well as impacts associated with chemical exposures from the plastic or from contaminants adsorbed to the plastic. Risks will vary among species, and may also vary with plastic particle shape, size, and composition. The potential for bioaccumulation of microplastic and associated contaminants in wildlife may exacerbate risk. Potential human risks may result from exposure to microplastic-associated contaminants via sport fish and shellfish consumption.

At this time, studies linking microplastic exposure to adverse impacts in wildlife via controlled laboratory settings have not resulted in development of specific aquatic or tissue-based toxicity thresholds. Evaluating the developing body of work on this subject can inform prioritization of monitoring and management actions.

MQ3) What are the sources, pathways, loadings, and processes leading to microplastic pollution in the Bay?

With this question, we consider how microplastic ends up in the Bay. Different sources of plastic produce microplastic particles of characteristic composition and shape or type. An evaluation of potential sources of microplastic may aid in identifying potential management actions. An evaluation of pathways of microplastic pollution, such as wastewater and stormwater, necessarily involves selection or development of sample collection and analysis methods validated for the matrix, as noted for Bay matrices (MQ1). Loadings of microplastic via these pathways must be evaluated alongside other identified pathways, including spills and illegal dumping as well as wind transport, and with the *in situ* Bay process of fragmentation of larger plastic debris to form microplastic.

MQ4) Have the concentrations of microplastic in the Bay increased or decreased?

With this question, we address long-term temporal trends, with the specific goal of understanding the forces that lead to any identified trends, including changes in sources (e.g., urban/consumer use of plastic), implementation of management actions relating directly or indirectly to control of plastic or microplastic, and other, larger variables such as climate change and drought. Pollution trends may vary with particle size and shape, potentially reflecting different trends relative to sources or pathways.

MQ5) Which management actions may be effective in reducing microplastic pollution?

With this question, we explore alternatives for reducing contamination. Source control is typically found to be the most effective and least expensive pollution prevention option, and may be the primary tool applied to reduce microplastic pollution. The federal ban on plastic microbeads in rinse-off personal care products is one example of microplastic-specific source control that will soon take effect. However, the sources of microplastic to the environment are diverse, and different sources or particle types may be more amenable to source control than others.

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Current wastewater treatment technologies may be assessed for their existing ability to reduce microplastic loads to the Bay. Treatment technologies for both wastewater and stormwater that are likely to be implemented in the future for other reasons may also be assessed for the potential co-benefit of reducing microplastic pollution.

Management actions can be evaluated based on projected impacts and cost to help prioritize options for implementation. Measured impacts of current management actions may be assessed over time via MQ4.

Next Page: For reference, core RMP Management Questions (see RMP 2014 Update, pg 14)

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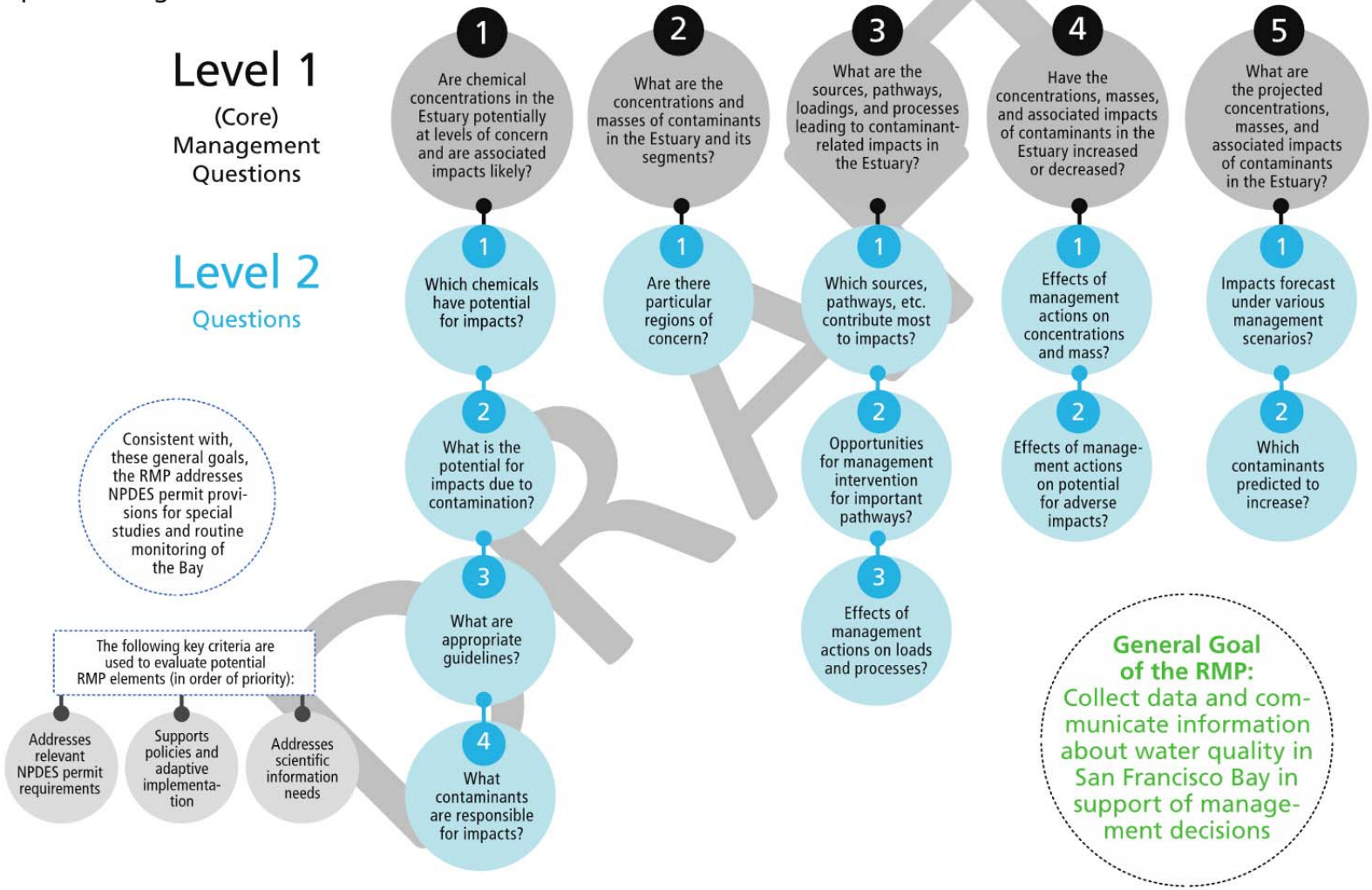
RMP GOAL AND MANAGEMENT QUESTIONS

RMP stakeholders have articulated an overarching goal and a tiered framework of management questions that organize and guide RMP studies. The management questions are closely linked to existing and planned regulations.



Legend: Green dot indicates the project provides significant information to answer MQ. Yellow dot indicates that the information from the study partially answers the MQ.

Project Name	Project Description	Year	MQ1: How much microplastics is there?	MQ2: What are the health risks?	MQ3: What are sources, pathways, loadings & processes?	MQ4: Have the concentrations of microplastic in the Bay increas./decreas.?	MQ5: Which management actions may be effective in reducing microplastic pollution?	Priority & Comments
Synthesis	Scope would need to be defined; could include synthesis of information on: analytical methods, fate, risks, trends, and current/potential management actions.	2017	Green	Green	Yellow		Green	
Development of robust analytical methods	Focused on matrices lacking robust methods, such as stormwater. Could include method development via an RFP, or facilitation of an interlaboratory comparison. Characterization may lead to source identification.	2017	Green		Yellow		Yellow	
Monitor stormwater	Collect and analyze stormwater from multiple urban creeks during several storms.		Green		Green		Yellow	
Monitor effluent	Collect and analyze effluent from multiple wastewater treatment facilities		Green		Green		Yellow	
Monitor water and sediment	Collect and analyze water and sediment samples to develop better spatial understanding of distribution. Collect and analyze water and sediment samples to develop better spatial understanding of distribution. Water samples may include surface water or water column; sediment samples may include ambient or margin sediment.	Initiating sooner will be helpful for a baseline.	Green	Yellow	Yellow	Yellow	Yellow	
Monitor sportfish and prey fish	Collect and analyze sportfish and prey fish		Green	Green		Yellow	Yellow	
Monitor bivalves	Collect and analyze bivalves			Yellow		Yellow		
Quantify persistent pollutants sorbed to microplastics	Determine levels of PCBs, PBDEs, or other persistent compounds on particles.			Yellow				
Quantify plastic additives in microplastic particles	Determine levels of phthalates, bisphenols, organophosphates or other common components of plastic that pose potential risks to wildlife and/or people.			Green				

Outline of the Microplastic Strategy Report

1. Background on Microplastic
    a. Definition of types of microplastic and sources/uses
    b. Conceptual model of microplastic transport to the Bay
    c. Fate of microplastic in the environment (e.g., water, sediment, and biota)
    d. Monitoring of San Francisco Bay

2.Methods for Sample Collection and Identification of Microplastic
    a. Methods for sample collection
    b. Methods for analysis of microplastic

3.Toxicity of microplastic
    a. Human health
    b. Bay biota

4. Identifying Monitoring Data Gaps
    a. Ambient Bay
    b. Stormwater
    c. Effluent
    d. Sediment
    e. Fish

5. Monitoring Strategy: Multi-Year Plan

6. Current and Potential Future Management Actions
    a. Source Control
    b. Pathway Control

7. Partners and Funding Strategy

8.Appendix: Decision Matrix