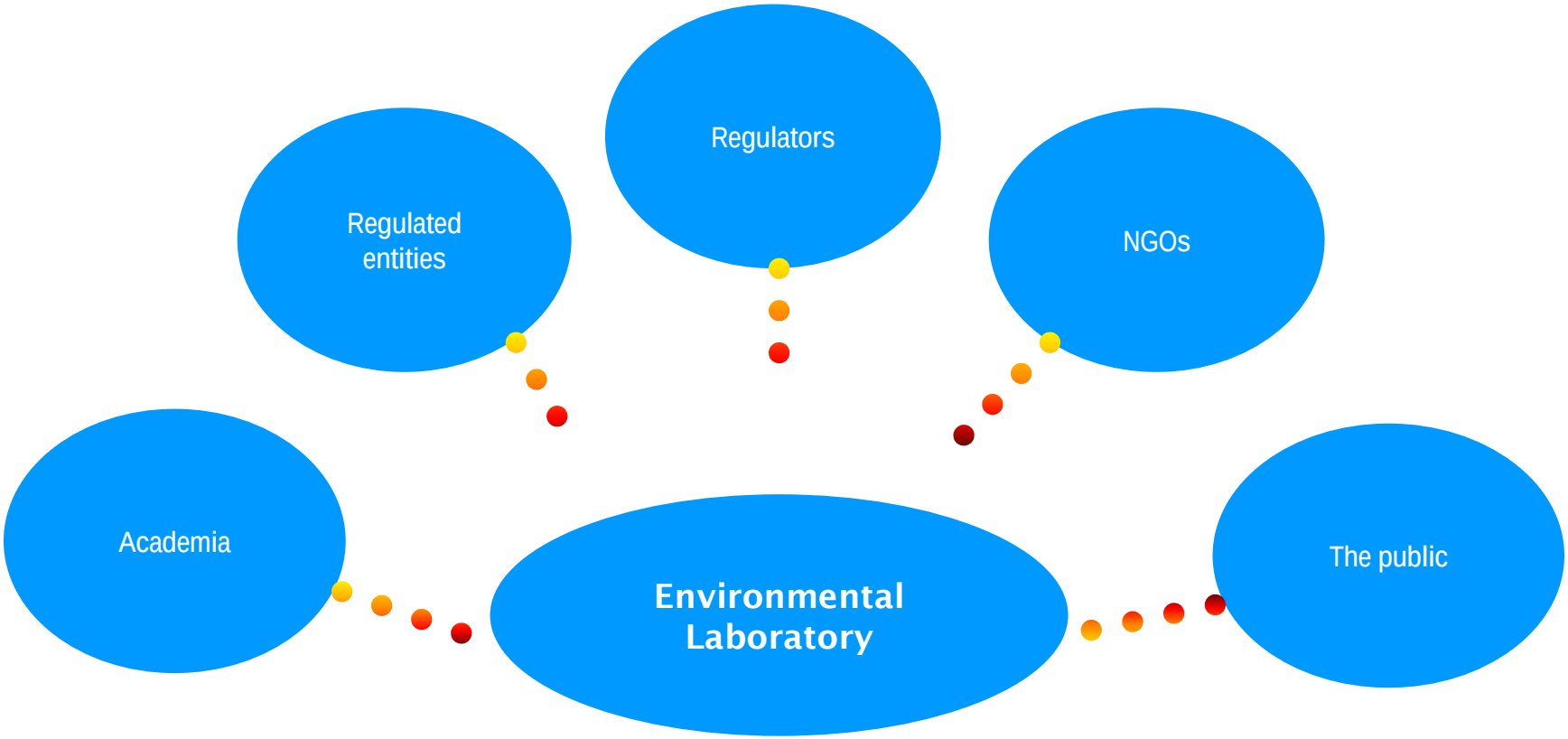
EAST BAY MUNICIPAL UTILITY DISTRICT

Future-Relevant Environmental Laboratory

06 August 2018

Protecting Public Health & the Environment



Questions this presentation attempts to answer

1. What is needed to be a successful environmental laboratory in the near future?

2. Why don't environmental laboratory professionals get the credit they deserve?

Three examples to illustrate:

1. Where the regulatory interest is moving
2. Need for environmental labs to participate in academic research
3. Environmental labs brining reasonable solution for a regional problem

The SF Bay experience

Examples from San Francisco Bay region

Many trends start in this region and become the norm

Have data & information to make the case

Working definition for environmental lab

- Operate under regulatory guidelines, using promulgated methods – mostly EPA
- Typical matrices: water, wastewater, hazardous waste, air
- By this definition, environmental labs came into existence in early 1970s

Since 1970s to 2018

Water is safer to drink

Wastewater is cleaner – Direct Potable Reuse is becoming a reality

Contaminated sites are being put back to use

Fewer ‘Spare the Air’ warnings

Fuel is not leaking from underground tanks

The path for environmental labs had a few bumps

Environmental data needs since the mid-1990s

- Less need for environmental monitoring
- Peace dividend
- Built in reductions in programs – NPDES permit – through better operating treatment works
- Data sharing made possible through IT reducing overall sampling and analysis
- More data collected, but through field instruments and on-site monitoring

How is the environmental labs responding to the change?

- Consolidations, closures
- Reducing focus on environmental analysis and bringing other tests
- Standardization, requirements, and science
- Method vs matrix
- Still the need to refine BOD, while technology is moving forward

Example 1 – NPDES

As the WWTP operations mature, frequency of monitoring is reduced

Future monitoring requirement based on past performance – reasonable potential analysis

Special studies and modeling drive the monitoring

Legacy pollutants vs emerging contaminants

Cumulative effective of pollutants rather than single pollutant

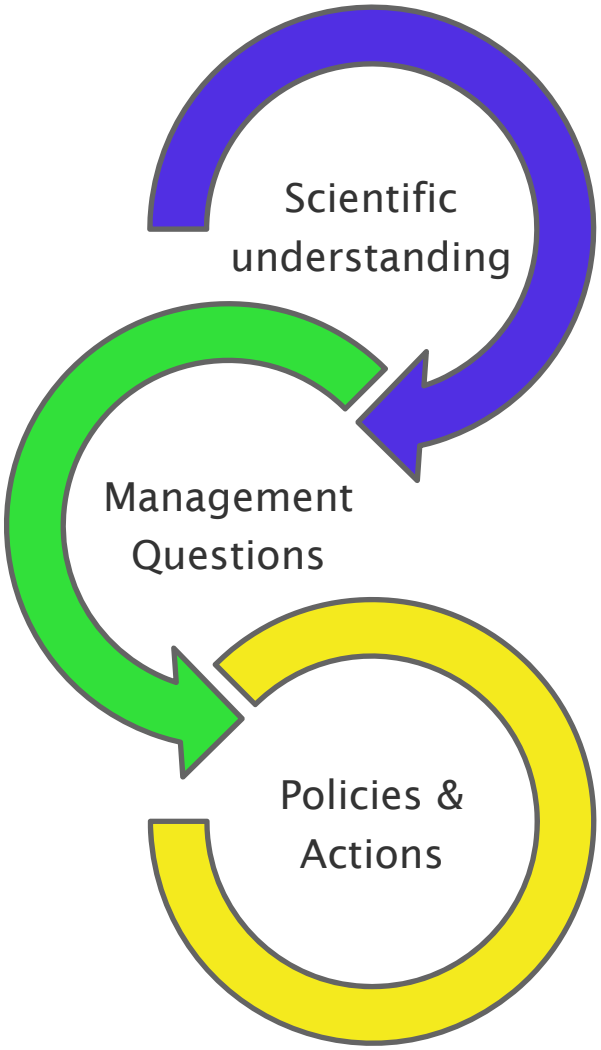
SF Bay Case Study

BACWA
BAY AREA CLEAN WATER AGENCIES

SFEI | AQUATIC SCIENCE CENTER
SAN FRANCISCO ESTUARY INSTITUTE & THE AQUATIC SCIENCE CENTER

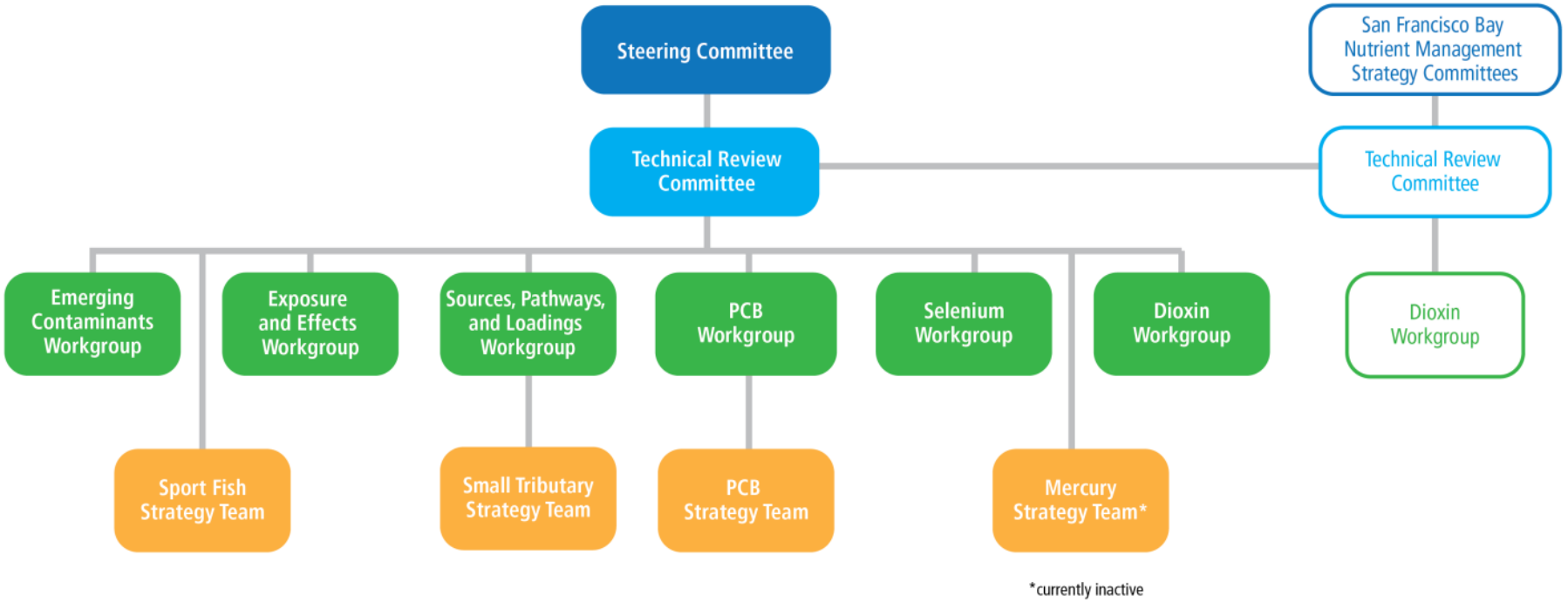
RMP

RMP Objective – Clean Bay



RMP - Structure

Governance Structure for the Regional Monitoring Program for Water Quality in San Francisco Bay



Cost reduction evaluation

Test	Limiting Permitting rationale	Current Frequency each agency	Cost per analytical test, Low	Cost per analytical test, high range*	No. Agencies affected	Current Frequency /year - all	Proposed frequency /year - all agencies	Total Cost savings (low)/yr	Total Cost savings (high)/yr
Sensitive Species Screening	By reference in Basin Plan	1/permit cycle	$24,000	$35,000	38	7.6	As needed	**$182,400**	**$266,000**
EPA 1613 for dioxins	Once per permit cycle	1-2x per year	$600	$1,000	37	67.2	0	**$40,320**	**$67,200**
Acute toxicity	Basin Plan limits	4-12x per year	$2,000	$3,000	39	374	374	**$0**	**$0**
EPA 624 VOCs	Once per permit cycle	0.2 – 2x/year	$143	$295	47	67.5	9.4	**$8,308**	**$17,140**
EPA 625 Base/Neutrals and Acids	Once per permit cycle	0.2 – 2x/year	$361	$545	47	67.5	9.4	**$20,974**	**$31,665**
EPA 608 for Pesticides and PCBs	Once per permit cycle	2x per year (major) 1x per year (minor)	$143	$230	37	69	37	**$4,576**	**$9,440**
Tests sent to contract labs by all agencies								**$222,720**	**$333,200**
All test total								**$256,578**	**$391,444**

Alternate monitoring requirement

San Francisco Bay Regional Water Quality Control Board

Order No. R2-2016-0008

ALTERNATE MONITORING AND REPORTING REQUIREMENTS FOR
MUNICIPAL WASTEWATER DISCHARGERS
FOR THE PURPOSE OF ADDING SUPPORT TO THE
SAN FRANCISCO BAY REGIONAL MONITORING PROGRAM (RMP)

- Funds awarded to SFEI in 2018 for special studies $270,000
- Used to support research work, project management
  - Ethoxylated surfactants in ambient water, margin sediment and wastewater
  - Sunscreen wastewater
  - Contaminants of concern in urban storm water
  - Microplastics in SF Bay sport fish

Example 2: microplastic vs. micro-particles

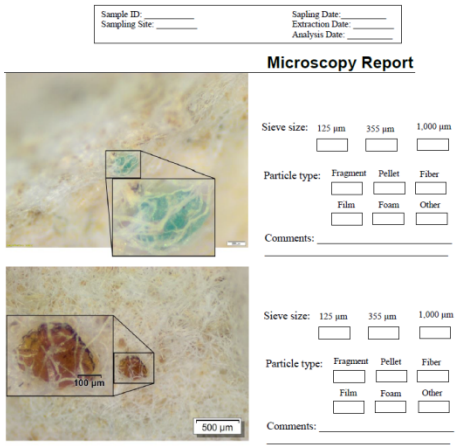
SFEI scientists collected particles from wastewater at eight Bay Area wastewater treatment plants using sieves. The eight plants discharged an average of 0.33 particles of microplastic per gallon, **four times more than the average of 0.08 particles per gallon observed in a study of three small facilities in upstate New York** [8]. Bay Area facilities released an estimated **6,900,000 particles of microplastic per day to San Francisco Bay.**

A larger study of US municipal wastewater treatment facilities that Dr. Sherri A. Mason is completing now also **suggests Bay Area facilities tend to release higher than average levels of microplastic.**

QUALITY

Recommendations

- Sampling method influences results
- Written SOP/method
- Visual ID not enough, verify if its plastics using spectroscopic methods
- Background contribution
- Documentation

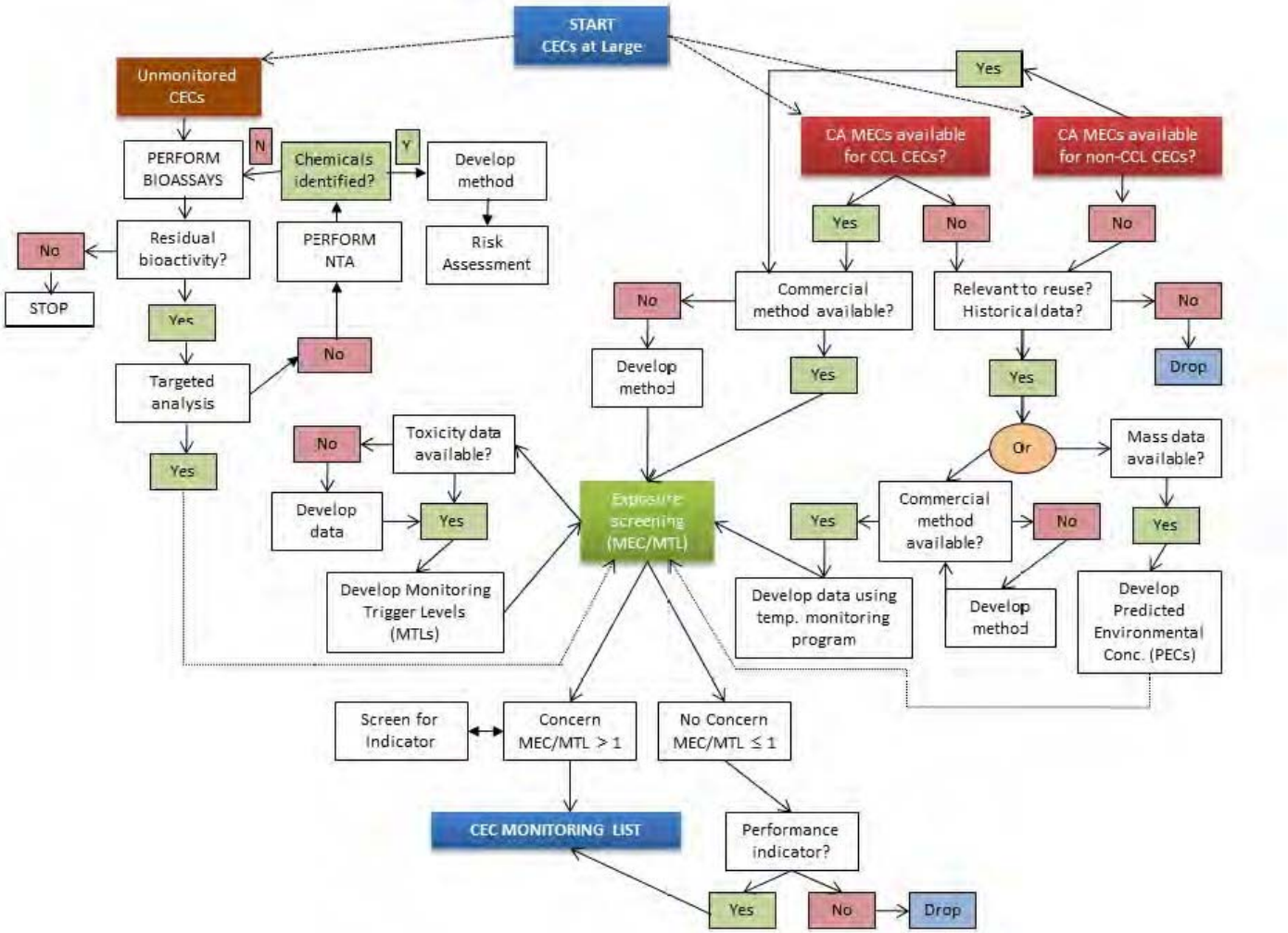


Example 3, EPA Method 1668C

- SF Bay TMDL for PCBs
- Workgroup decided for 1668C, a method yet to be promulgated
- Technical difficulties of many kind, from analysis to reporting to State database
- Understanding data qualifiers
- Specialty labs moderated the discussion between regulators and the regulated and brought solutions
- From 209 to 40 congeners monitoring

CECs in recycled water – Science advisory panel report

(Risk based CEC development framework)



Science Advisory Panel

Monitoring Strategies for Constituents of Emerging Concern (CECs) in Recycled Water
Recommendations of a Science Advisory Panel

Jörg E. Drewes1, Paul Anderson2, Nancy Denslow3, Walter Jakubowski4, Adam Olivieri5, Daniel Schlenk6, and Shane Snyder7

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Science Advisory Panel Convened by the State Water Resources Control Board, **April 2018** SCCWRP Technical

Where are the needs?

- Waste to energy and other resources
- Biosolids reuse
- Emerging contaminants
- Large volume sampling on site
- Non-target screening
- Cumulative effective of total pollutants vs single pollutant
- Recycled water, moving to DPR

Take away

- Question 1
  - Your expertise is needed for meaningful environmental data and decisions
  - Research can learn from the rigors of a regulated industry
  - Be the influencer, be part of the decision making process
  - Stay for the data analysis
- Question 2
  - Demonstrate & demand your worth

You played an important role to improve the environment – continue the role

Thank you
Questions?

- *Trowbridge, P.R., Davis, J.A.,Mumley, T., Taberski, K., Feger, N., Valeiela, L., Ervi, J., Arsem, N., Olivieri, A., Carroll, P., Coleman, J., Salop, P., Sutton, R., Yee, D., McKee, L.J., Sedlak, M., Grosso,C., Kelly, J., 2016.The Regional monitoring program for water quality in San Francisco Bay, California, USA: Science in support of managing water quality, Regional Studies in Marine Science, Volume 4, 21–33*
- *Dyachenko, A., Mitchell, J., Arsem, N., 2017. Analytical methods extraction and identification of microplastic particles from secondary wastewater treatment plant (WWTP) effluent. Anal. Methods 9, 1412–1418. ttp://dx.doi.org/10.1039/C6AY02397E*
- *Sutton, R., Mason, S.A., Stanek, S.K., Willis-Norton, E., Wren, I.F., Box, C., 2016. Microplastic contamination in the San Francisco Bay, California, USA. MPB 109, 230–235. http://dx.doi.org/10.1016/j.marpolbul.2016.05.077*