6.0 Pollutants of Concern Monitoring (C.8.f)

Pollutants of Concern (POC) load monitoring is required by the MRP and Central Valley Permit. Loads monitoring is intended to assess inputs of POCs to the Bay from local tributaries and urban runoff, assess progress toward achieving wasteload allocations (WLAs) for total maximum daily loads (TMDLs), and help resolve uncertainties associated with loading estimates for these pollutants. In particular, there are five priority POC management information needs that must be addressed though POC loads monitoring:

1. Source Identification
2. Contributions to Bay Impairment
3. Management Action Effectiveness
4. Loads and Status
5. Trends

To assist Permittees in effectively and efficiently conducting POC loads monitoring required by the MRP and Central Valley Permit, an RMP Small Tributaries Loading Strategy (STLS) was developed in 2009 by the STLS Team, which included representatives from BASMAA, Water Board staff, RMP/SFEI, and technical advisors. The objective of the STLS was to develop a comprehensive planning framework to coordinate POC loads monitoring/modeling between the RMP and RMC participants.

Based on the consensus of the STLS Team, RMC representatives in coordination with SFEI staff created a STLS Multi-Year Plan intended to assist Permittees in complying with provision C.8.e (POC Monitoring) through an alternative POC monitoring program other than the one described in the MRP. The alternative STLS Multi-year Plan is designed to address the four core POC loads monitoring management questions, while integrating activities funded by BASMAA via the RMC with those funded by the RMP. The STLS Multi-year Plan provides a comprehensive description of activities that will be implemented over the next 5-10 years to provide information and comply with the MRP. The STLS Multi-year Plan provides rationale for the methods and locations of proposed activities to answer the four management questions listed above. Activities include modeling using the regional watershed spreadsheet model (RWSM) to estimate regional scale loads, and pollutant characterization and loads monitoring in local tributaries beginning WY 2011, continuing in WY 2012 and WY 2013, and largely completed in WY 2014.

The framework and a summary of activities and products to date are provided in the STLS Multi-Year Plan (SFEI 2013). With concurrence of participating Water Board Staff, the STLS Multi-Year Plan presents an alternative approach to the POC loads monitoring requirements described in MRP 1.0 Provision C.8.e.i, as allowed by Provision C.8.e.

MRP 1.0 contained provisions aimed at improving information on stormwater loads in selected watersheds (Provision C.8.) and piloting a number of management techniques to reduce PCB and Hg loading entering the Bay from smaller urbanized tributaries (Provisions C.11. and C.12.). MRP 2.0 places an increased focus on finding watersheds, sources areas, and source properties that are potentially more polluted and upstream from sensitive Bay margin areas (high leverage).

To support this focus, a stormwater characterization monitoring program was developed and implemented beginning in WY 2015 (**Appendix 5**). This same design is being implemented in the winter of WY 2016 by the RMP and the Santa Clara and San Mateo countywide stormwater programs. This design will also be implemented for Contra Costa when appropriate sites are identified. In addition, the RMP is piloting an effort and exploring the use of alternative un-

manned "remote" suspended sediment samplers. During WY 2015, samples were collected from 20 watersheds. At three of these locations, data were also collected using two remote suspended sediment samplers.

Total PCBs concentrations measured in the composite water samples varied by 27-fold between 2,033-55,503 pg/L. When normalized by suspended sediment concentrations (SSC) to generate particle ratios, the three highest ranking sites were the Outfall to Lower Silver Creek in San Jose (783 ng/g), Ritter Park Drive Storm Drain in San Jose (488 ng/g) and Alameda County (AC)-Line-3A-M at 3A-D in Union City (337 ng/g). Particle ratios of this magnitude are relatively elevated but lower than some of the previous highest observations (Santa Fe Channel (1,403 ng/g), Pulgas Creek – North (1,050 ng/g), Pulgas Creek – South (906 ng/g), Ettie St. Pump Station (745 ng/g)).

Total Hg (HgT) concentrations in composite water samples ranged 6-fold between sites from 13.7-85.9 ng/L. The greatest HgT concentrations were observed in AC-Line-3A-M at 3A-D in Union City, East Gish Rd Storm Drain in San Jose, and Meeker Slough in Richmond. When the data were normalized by SSC, the three most highly ranked sites were Meeker Slough in Richmond (1.3 µg/g), AC-Line-3A-M at 3A-D in Union City (1.2 µg/g), and Rock Springs Drive Storm Drain in San Jose (0.93 µg/g). Particle ratios of this magnitude are similar to the upper range of those observed previously. The six highest ranking sites for PCBs based on particle ratios only ranked 12th, 16th, 2nd, 7th, 14th, and 8th respectively in relation to HgT.

Both of the remote suspended sediment sampler types appear to generally characterize sites similarly to the composite stormwater sampling methods (higher concentrations matching higher and lower matching lower), but further testing is needed to determine the overall reliability and practicality of deploying these instruments instead of or to augment manual sampling.

PCBs particle ratios appear to positively correlate with impervious cover, old industrial land use, and HgT. PCBs appear to inversely correlate with watershed area and the other trace metals analyzed (As, Cu, Cd, Pb, and Zn). Total mercury does not appear to correlate with any of the other trace metals and showed similar but weaker relationships to impervious cover, old industrial land use, and watershed area than did PCBs. In contrast, the trace metals all appear to correlate with each other more generally. Overall, the WY 2015 data do not support the use of any of the trace metals analyzed as a tracer for either PCBs or HgT pollution sources.

A total of 45 sites have been sampled for PCBs and HgT during various field sampling efforts since WY 2003. About 19.2% of the old industrial land use in the region has been sampled to date. Of the remaining older industrial land use yet to be sampled, 48% of it lies within 1 km of the Bay and 65% of it is within 2 km of the Bay. These areas are more likely to be tidal, likely to include heavy industrial areas that were historically serviced by rail and ship based transport, and are often very difficult to sample due to a lack of public right of ways. A different sampling strategy is needed to effectively determine what pollution might be associated with these areas.
Based on the WY 2015 results SFEI recommends:

- Continuing to select sites based on the four main selection rationales:
    - Identifying high leverage watersheds and subwatersheds
    - Sampling strategic large watersheds with USGS gauges to provide first order loading estimates and to support calibration of the RWSM
    - Validating unexpected low (potential false negative) concentrations (to address the possibility of a single storm composite poorly characterizing a sampling location)
    - Filling gaps along environmental gradients or source areas (to support the RWSM)

- The majority of the samples should be devoted to identifying areas of high leverage (indicated by high unit areas loads or particle ratios/ concentrations relative to other sites) with a small number of sites allocated to sampling potentially cleaner and variably-sized watersheds to help broaden the dataset for regional model calibration and to inform consideration of cleanup potential. The method of selection of sites of potentially higher leverage focusing on older industrial and highly impervious landscapes should continue.
- Continuing to use the composite water sampling design as developed and applied during WY 2015 with no further modifications. In the event of a higher rainfall wet season, greater success may even occur at sites influenced by tidal processes since, with more storms to choose from, there will be a greater likelihood that more storm events will fall within the needed tidal windows.
- Continuing to trial both the Hamlin and Walling remote suspended sediment samplers with the objective of amassing a full dataset of 12 side-by-side sample pairs for comparison to the composite water column sampling design with the objective of evaluating usefulness and comparability of the data obtained in relation to the management questions.

6.1 Sampling and Analysis Plan & Quality Assurance Project Plan

A Sampling and Analysis Plan (SAP), Quality Assurance Project Plan (QAPP), and Standard Operating Procedures (SOP) are being developed to implement the new requirements of MRP 2.0. The SAP is a living document that will be updated on an annual basis. Its primary intention is to memorialize field sampling (procedures, documentation and methods) and analytical methods that will be used to conduct analyses and testing in accordance with the MRP 2.0 Provision C.8.f and C.8.g requirements. The QAPP and SOPs will be updated as necessary to remain accurate with the SAP.

6.2 Alternative Monitoring

In July 2014, the CCCWP submitted a request and rationale for an additional Alternative Approach to POC and Long-Term Trends Monitoring (**Appendix 6**), which was accepted by both Regional Water Boards. The CCCWP proposed to:

1. Sample no more than two storms at the existing March Creek POC loads station for mercury, methylmercury, and suspended sediment concentrations. The sampling would be timed to capture upper watershed flow (i.e., flow from the March Creek Reservoir).
2. Conduct PCB source identification studies, following the approach proposed in the Integrated Monitoring Report, Part C, submitted in March 2014 (CCCWP 2014c).
3. Increase the number of Low-Impact Development (LID) effectiveness evaluation samples collected and analyzed as part of the approved methylmercury control study plan.

Updates on the methylmercury and PCB efforts are summarized in the following paragraphs.

Methylmercury Control Study

CCCWP began implementation of a Methylmercury Control Study in 2012 to fulfill requirements of the Central Valley Permit. A Methylmercury Control Study Work Plan (Amec, 2013) was prepared to 1) evaluate the effectiveness of existing Best Management Practices (BMPs) for the control of methylmercury; 2) evaluate additional or enhanced BMPs, as needed, to reduce mercury and methylmercury discharges to the Delta; and 3) determine the feasibility of meeting methylmercury waste load allocations.

The CVRWQCB has established a water column concentration goal of 0.06 ng/L total methylmercury. If the average total methylmercury concentration in a water body exceeds 0.06 ng/L, follow-up actions are required by the CVRWQCB to investigate causes within a water source, and to determine reasonable and foreseeable means of attaining 0.06 ng/L.

The progress report, submitted to the CVRWQCB on October 30, 2015, presents preliminary findings of the Methylmercury Control Study Work Plan from Spring 2012 through Spring 2015. Watershed characterization of methylmercury concentrations in eastern portions of the County is referred to as Phase 1 (Watershed Characterization); evaluation of potential control measures (e.g., structural BMPs) is referred to as Phase 2 (BMP Evaluation). A final report to the CVRWQCB is required by October 2018 and a brief summary of results to date are provided below.

Phase 1 – Watershed Characterization Summary Findings

- The watershed survey did not reveal significant watershed sources of elevated methylmercury during the wet and dry events sampled.
- The lowest methylmercury concentrations measured were in lower Marsh Creek, where flow is primarily highly treated effluent from the Brentwood Wastewater Treatment Plant.

Phase 1 – Watershed Characterization Data Gaps and Next Steps

- Future watershed monitoring for mercury will be limited to characterizing upper watershed flows from Marsh Creek where only a single sample has been collected thus far, owing to low rainfall amounts during much of the study period.
- As rainfalls allow, collect up to two additional sample sets at Site M2 (Lower Marsh Creek) during upper-watershed discharge (when the Marsh Creek reservoir is discharging to Lower Marsh Creek).

Phase 2 – BMP Evaluation Summary Findings

- Treating stormwater by low impact development (LID) to promote infiltration and reduce suspended sediments in discharged stormwater is the most reasonable and foreseeable means of reducing methylmercury loads from urban stormwater.
- The non-traditional LID application in Richmond that was assessed in this study is not designed for infiltration – it only passes water through the root zones of plants to reduce suspended sediment concentrations and may not provide as much treatment as traditional LID applications (i.e., detention and infiltration structures).
- Some features of the Richmond biofiltration cells assessed in this study increased methylmercury; currently evaluating why.
- No matter how much progress is made over the next two years, there will likely be additional uncertainties and unanswered questions about optimizing LID designs and upper Marsh Creek watershed processes.

Phase 2 – BMP Evaluation Data Gaps and Next Steps

- The remainder of the Phase 2 study will focus on evaluation of more traditional LID applications, as described in the Contra Costa County C.3 Design Guidance, that promote detention and infiltration. These types of BMPs have not yet been assessed in this study.
- The goal of the remaining Phase 2 Best Management Practice effectiveness evaluation effort is to characterize the methylmercury concentration in discharges from traditional LID devices.
- The final study report will also describe methylmercury load reduction benefits resulting from infiltration.

Pollutants of Concern Sediment Screening

In 2015, CCCWP and Permittee staff conducted source area screening to delineate High, Moderate, and Low/No Opportunity parcels for consideration in focused implementation planning. CCCWP prepared a guidance document and map files to assist the Permittees in identifying potential PCBs source properties through the refinement of the draft source area maps contained in the IMR and a preliminary source property database. Using multiple lines of evidence (e.g., institutional knowledge, records review, windshield surveys, facility inspections, and sampling results), the properties in the database were categorized as High, Moderate, or Low/No Opportunity for consideration of control measure implementation.

Sampling locations were selected in public right-of-ways, or on private property adjacent to public right of ways, known or suspected of having high opportunity for PCBs and/or mercury control. CCCWP permittees provided information on historic and present day land use, prior monitoring results, and other information to assist CCCWP in developing target sampling locations. Prior to sample collection, desktop reconnaissance and windshield surveys were conducted to inform the monitoring approach and assist in sampling logistics. Much of the sampling and analysis procedures of this present work originated from the BASMAA Clean Watersheds for a Clean Bay Task 3 study (AMS, 2012). Samples were screened for 1) total PCBs congeners using EPA Method 8082A; 2) total mercury; 3) total organic carbon; and 4) particle size distribution. For quality control/quality assurance purposes, blind field duplicate samples were collected and analyzed, and a selection of samples with PCBs congener results above 100 ppb were reanalyzed with a more rigorous test method (EPA Method 1668C).

Fifty-seven (57) sampling locations throughout Contra Costa County were sampled between April and September 2015 (**Appendix 7**). Action levels were set at total PCBs results exceeding 500 parts per billion (ppb) and/or total mercury results exceeding 750 ppb. Exceedances of these action levels indicates that a sampling location meets the concentration criterion of a high opportunity area for PCBs or mercury controls. Four PCBs samples and four mercury samples exceeded the action levels, while only one sample, exceeded the action level for both PCBs and mercury.

Pilot Stormwater Diversion Project: North Richmond Stormwater Pump Station

Provision C.12.f of MRP 1.0 required permittees to evaluate diversion of dry weather and wet weather urban runoff into sanitary sewage conveyance and treatment systems to determine if diversion to sanitary treatment is a useful tool for reducing PCBs loads from urban runoff. The North Richmond stormwater pump station project (**Appendix 8**) achieved the objective of installing and pilot testing urban runoff diversion infrastructure. Diversion of dry and wet weather urban runoff into the nearest water reclamation facility offers only incremental PCB load reduction benefits. Diversion is not a "silver bullet" that will make a significant difference to PCB loads; however, consideration of multiple water quality benefits, such as trash controls, water resource development, and reduction of bacteria, oil and grease, and other urban pollutants discharged to Wildcat Marsh and the Bay may motivate additional, expanded stormwater harvest and use projects in this watershed. Water resource needs may be the overall driver. The newly installed diversion infrastructure installed can harvest and re-use up to 50 million gallons per year of urban runoff, primarily as dry weather urban runoff, should WCWD choose to implement longer term diversions. Overall, the immediate benefit of extending the useful life of the NRSPS and having diversion capabilities, opens longer term planning opportunities that makes this project a success.

The results of the pilot project include both positive and negative findings.

Positive Findings:

- CCCWP permittees complied with provision C.12.f of MRP 1.0 by collaborating with several partners to complete a pump station stormwater diversion pilot with a permanent, "hard-piped" diversion system installed at the NRSPS.
- WCWD experienced no overflows, sewage treatment system upsets, or other disruptions to operations as a result of the pilot diversion project.
- In addition to rehabilitating existing infrastructure, the NRSPS diversion project offers new operational flexibility to the Pump Station owners.
- Project partners gained a new understanding of the incentives and opportunities that can potentially support co-management of urban runoff with water reclamation systems originally designed for sanitary sewage.
- There is now an established partnership and relationship between the County and WCWD, and with new infrastructure now in place and the pilot successfully completed, there is an opportunity to pursue grant funding to support stormwater harvest and use projects in the future.

Negative Findings:

- The wet and dry diversion pilot tests accomplished miniscule load reductions: e.g., about one milligram (0.001 grams) of PCBs, against a required Baywide PCB load reduction of 18,000 grams by the year 2028.
- Conveyance limitations of the sanitary sewage system prohibit substantial scale-up of the pilot to larger diversion flows. The diversion pump installed pumps 200 to 250 gallons per minute into the WCWD collection system. Larger flow rates risk sanitary sewer overflows. The design of the pump station provides 135,000 gallons per minute of stormwater pumping capacity, about 600 times more volume than the diversion. That might be comparable to a person sipping water from a gushing fire hydrant.
- Even if all of the stormwater from the 339 acre catchment served by the NRSPS could be captured and treated – which would require a substantial capital project - the total PCB load reduction possible is on the order of one to ten grams at best, still a tiny fraction of the overall load reduction mandate for the Bay.
- The total project cost was over $1.4 million which included some necessary upgrades to the existing Pump Station infrastructure. The cost for a "stand-alone" stormwater diversion project would be approximately $1 million.
- This is an example of opportunistically combining stormwater quality enhancement and municipal infrastructure restoration into one project. The project evolved and changed from its inception five years ago. Initially the project included substantial improvements to the Pump Station until the estimated costs approached $2 million. Then the project was changed to only include improvements to the extent needed to complete the stormwater diversion.

On February 25, 2016, the NRSPS Stormwater Diversion Project was awarded the honor of Environmental Project of the Year by the Northern California Chapter of the American Public Works Association. The award named CCCWP as "an essential partner in the development and construction of this innovative project."

Mt. Diablo Mercury Mine Project

The cleanup of the Mount Diablo Mercury Mine is one of the County's priority Projects (**Appendix 9**). On December 4, 2012, the Board of Supervisors accepted a comprehensive status report on the Army Corps of Engineers (Corps) planning process to clean up the mercury mine through their Remediation of Abandoned Mine Sites program.

The Central Valley Regional Water Quality Control Board (CVRWQCB) issued a Cleanup and Abatement Order to Sunoco to clean up the mercury mine. Sunoco, however, claims to not have performed active mining on the site but only conducted exploratory excavation for a short period of time and only at an isolated location within the mining complex. It will be a couple of years before this process is concluded and it becomes clear how much of the mine site will be cleaned up by Sunoco.

On October 20, 2011, the CVRWQCB approved a Total Maximum Daily Load (TMDL) allocation to control methylmercury and total mercury in the watershed and amended the Water Quality Control Plan for the Sacramento-San Joaquin River Delta. Marsh Creek drains into the Delta and is subject to this TMDL requirement. The Response Plan for the TMDL recognizes the Mount Diablo Mercury Mine as a point source of mercury contamination and its cleanup now takes on an additional degree of importance. Contra Costa County helps fund the Delta Mercury Exposure Reduction Program, through the County Clean Water Program, which works to reduce exposure to mercury among people who eat fish from the Delta. CCCWP is also implementing a Methylmercury Control Study to meet TMDL requirements and taking water quality samples for mercury below the Marsh Creek Reservoir. The CVRWQCB is currently working on a TMDL for both Marsh Creek and Dunn Creek. The information being gathered should help with the Corps planning work.

The mine represents an ongoing point source of Mercury in the watershed and must be cleaned up. At this time, it is still unknown if the identified responsible parties will be required to remediate the entire mine site or a portion of the site. The outcome of the State Water Resources Control Board enforcement action will be a key determinant of what the cleanup project will be. In correspondence to the CVRWQCB and others on the enforcement action, CCCWP has requested the responsible parties also contribute to mitigating impacts downstream of the mine site, including the Marsh Creek Reservoir. However, it appears the enforcement action is focusing solely on cleaning up the mine site.