

MCSTOPPP Attachment G Work Plan

INTRODUCTION

The Marin County Stormwater Pollution Prevention Program (MCSTOPPP) consists of the individual cities within Marin County and the unincorporated County areas that work collaboratively to implement stormwater management programs and comply with the Municipal Separate Stormwater Sewer System (MS4) Phase 2 General Permit¹. The Permit requires MCSTOPPP agencies to perform monitoring described in Attachment G to support Total Maximum Daily Load (TMDL) implementation requirements. This Work Plan describes the planned MCSTOPPP regional efforts to satisfy these requirements for all member agencies.

Phase 2 Permit and Attachment G Requirements

Of the TMDLs in Marin County, only the Diazinon and Pesticide-Related Toxicity in Urban Creeks TMDL requires additional monitoring by MCSTOPPP:

Monitor water and sediment for pesticides and associated toxicity in urban creeks via an individual or regional program designed to answer the following questions:

- 1) Are the TMDL toxicity targets being met? Is toxicity observed in urban creeks caused by a pesticide?*
- 2) Is urban runoff the source of any observed toxicity in urban creeks?*
- 3) How does observed pesticide-related toxicity in urban creeks (or pesticide concentrations contributing to such toxicity) vary in time and magnitude across urban creek watersheds, and what types of pest control practices contribute to such toxicity?*
- 4) Are actions already being taken to reduce pesticide discharges sufficient to meet the targets, and if not, what should be done differently?*

This Work Plan and work performed by others throughout the San Francisco Bay Area and California will be used to satisfy the Permit Attachment G requirements.

MCSTOPP Historical Monitoring and Statewide Monitoring

MCSTOPP and its member agencies perform or collaborate in a number of monitoring programs. Between 1999 and 2009 MCSTOPP performed an extensive and robust bioassessment monitoring program of creeks in Marin County. MCSTOPP is a long-term MS4 funding partner in the San Francisco Bay Regional Monitoring Program (RMP). As part of the permit and to receive an exemption to the Ocean Plan prohibition, the County of Marin is also required to perform Area of Special Biological Significance (ASBS) monitoring. The County of Marin provides funding and technical resources to this collaborative group.

¹ http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/phsii2012_5th/order_final.pdf

Description of Data Needs

Pesticide concentrations in urban runoff throughout California are similar as their availability is regulated by Federal and State agencies.² An assessment of local conditions can then be used to compare against data from other regions to confirm these findings, identify any localized areas of high concentrations, and respond to the Attachment G requirements. While the Attachment G requirements are broad, a targeted, phased, and adaptive program can efficiently address these requirements and provide useful information to MCSTOPPP. MCSTOPPP will collect characterization data in Years 1 and 2 to identify localized elevated pesticide concentrations and probably areas of aquatic toxicity and then use this information to perform a targeted watershed and source assessment in Year 3, if indicated.

URBAN CREEK MONITORING PROGRAM

In order to meet the Permit requirements and efficiently collect useful data, MCSTOPPP will collect water quality samples for up to two years in the downstream reach of four watersheds at locations not influenced by tides. After two years of data collection, the data will be evaluated to determine compliance with the pesticide and toxicity TMDL and to develop a prioritized follow-up monitoring program for Year 3. If TMDL targets are exceeded, MCSTOPPP would perform follow-up monitoring in at least one of the watersheds to evaluate the influence of urban runoff, the spatial and time variability of pesticide toxicity impacts, and whether additional actions would be useful or necessary in meeting TMDL targets.

Urban Creek Watersheds

Only eastern Marin County is highly urbanized with four larger urban watersheds that drain to creeks that flow to San Pablo Bay. Characteristics of these watersheds are shown in Table 1.

Table 1. Urban Watersheds of Marin County

Watershed	Watershed Area (acres) [1]	Urban Area in Watershed (acres) [1, 3]	Watershed Area Upstream of Sample Collection (acres) [2]	Urban Area Upstream of Sample Collection (acres) [2,3]	Cities in Watershed
Novato Creek	31,594	9,920	13,087	2,206	Novato
Miller Creek	7,722	1,408	NA	NA	None
Gallinas Creek	6,700	3,147	NA	NA	None
San Rafael	7,157	5,109	874	766	San Rafael
Ross Valley	18,274	8,634	11,443	3,688	Fairfax, San Anselmo, Ross, Larkspur, Corte Madera
Mill Valley	7,572	4,160	2,990	1,545	Mill Valley

[1] MarinMap.org (<http://www.marinmap.org/dnn/Data/GISDataDownload.aspx>)

[2] Calculated from United States Geological Survey's (USGS) 30 meter elevation data.

[3] Farmland Mapping and Monitoring Program (FMMP) 2010 urban data

² Armand Ruby Consulting (in preparation). *Review of Pyrethroid and Fipronil Monitoring Data from California Urban Watersheds, 2013*. Prepared for CASQA.

Monitoring Locations

In years 1 and 2 of the study MCSTOPPP will collect water quality samples at locations in the Novato Creek, San Rafael, Ross Valley, and Mill Valley watersheds. Each of these areas drains an urbanized part of the County to the San Francisco Bay. MCSTOPPP will collect samples at a downstream location that can be safely accessed during storm runoff events. Sites were also located to align with aquatic macroinvertebrate sampling previously performed. If it is not possible or safe to access these locations another location (upstream) would be considered. A map of the proposed site locations are provided as Figure 1 and Table 2 shows the expected locations and naming conventions.

Table 2. Proposed MCSTOPPP Pesticide Monitoring Locations

Creek	Station Name	Location ID	Latitude	Longitude
Novato Creek	Lee Gerner Park	206NOV160	38.10700	-122.57863
Arroyo Corte Madera Del Presidio	La Goma Bridge	203ACM070	37.897639	-122.535017
Corte Madera Creek	Lagunitas Road Bridge	203COR060	37.96321	-122.55710
San Rafael Creek	D Street Overcrossing	203SNR180	37.970569	-122.532507

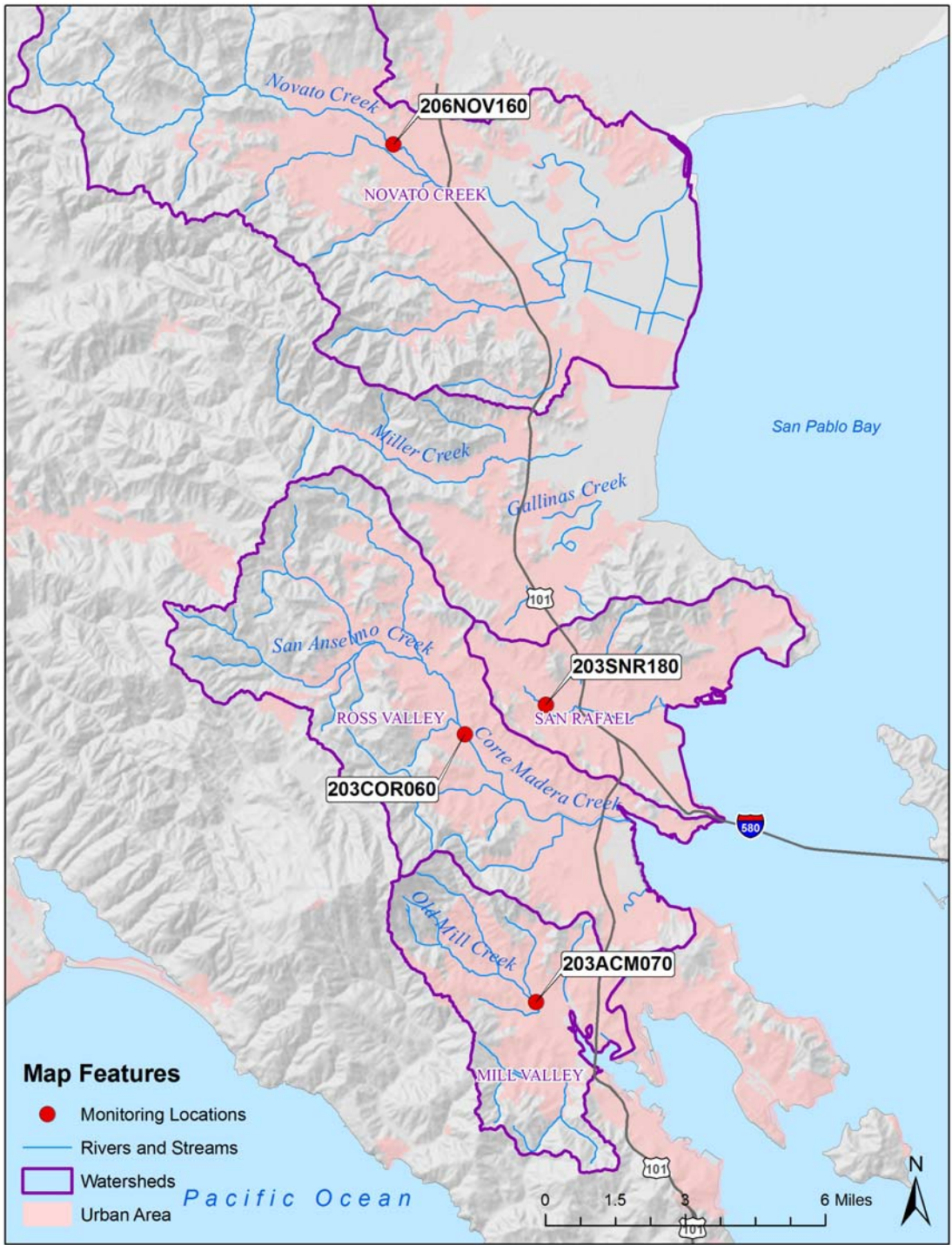


Figure 1. Proposed Monitoring Locations for Year 1 and Year 2

Event Targeting

Three wet weather events and one dry weather event at four downstream locations will be targeted for Year 1 and Year 2. The seasonal first flush will be targeted along with longer antecedent dry periods, the second large storm of the season, and the historical dormant spray season (January-February). If necessary to complete the sample collection other events will be considered. While a total of eight events are expected in the first two years, the number of events may be reduced at a location if conditions are unsafe or additional sample collection is not necessary to perform the Year 3 follow-up. For example, if one watershed has much higher concentrations of pesticides and occurrences of expected aquatic toxicity in Year 1, MCSTOPP may elect to terminate the assessment monitoring and develop a more intensive follow-up program in the identified watershed(s).

Sample Collection

Water quality samples will be collected as grab samples during a period of daylight wet weather flow for storm events, and during a period of no wet weather flow for dry events. Samples will be collected directly into bottles using a sample collection pole from a safe location on the side bank or bridge. Samples should be immediately stored in a cooler at a temperature $<4^{\circ}\text{C}$ and delivered to the analytical laboratory by the next business day. Alternatively, some passive samplers may be used during the study to collect longer period composite samples.

Water Quality Sample Constituents

Grab samples will be used to collect water quality samples in Year 1 and Year 2 locations for the constituents listed in Table 3 and Table 4. If passive samplers are used for pesticides, the Table 3 list may be modified to match available analytical methods. Passive sampling would be paired with grab sample collection of Table 4 constituents at the start, end, or during the passive sampling period.

Table 3. Pesticides Analyzed in Year 1 and Year 2 by NCI-GCMS-SIM

CAS	Constituent	Units	MDL	PQL	RDL
584-79-2	Allethrin	ng/L	0.1	0.5	1.5
82657-04-3	Bifenthrin	ng/L	0.1	0.5	1.5
68359-37-5	Cyfluthrin	ng/L	0.2	0.5	1.5
91465-08-6	Lambda-Cyhalothrin	ng/L	0.2	0.5	1.5
52315-07-8	Cypermethrin	ng/L	0.2	0.5	1.5
66841-25-6	Deltamethrin:Tralomethrin	ng/L	0.2	1	3
51630-58-1	Esfenvalerate:Fenvalerate	ng/L	0.2	1	3
39515-41-8	Fenpropathrin	ng/L	0.2	0.5	1.5
120068-37-3	Fipronil	ng/L	0.5	1	1.5
205650-65-3	Fipronil Desulfinyl	ng/L	0.5	1	1.5
120067-83-6	Fipronil Sulfide	ng/L	0.5	1	1.5
120068-36-2	Fipronil Sulfone	ng/L	0.5	1	1.5
102851-06-9	Tau-Fluvalinate	ng/L	0.2	0.5	1.5
52645-53-1	Permethrin	ng/L	2	10	15
7696-12-0	Tetramethrin	ng/L	0.2	0.5	1.5
2921-88-2	Chlorpyrifos	ng/L	0.5	1	2
333-41-5	Diazinon	ng/L	0.1	0.5	1.5

Table 4. Additional Water Quality Constituents Sampled or Measures

CAS	Constituent	Units	Reporting Limit	Method
NA	Suspended Sediment Concentration (SSC)	mg/L	2	ASTMD 3977-97
NA	Total Suspended Solids	mg/L	2	SM 2540 D
NA	Turbidity	NTU	0.1	EPA 180.1
NA	Temperature	°C	0.1	Field
NA	Electrical Conductivity	µs/cm	1	Field
NA	pH	std. unit	0.01	Field

DATA ASSESSMENT AND FOLLOW-UP PRIORITIZATION

Following collection of Year 1 and 2 water quality samples, MCSTOPPP will perform an assessment to identify watersheds with potential downstream toxicity due to pesticides. The assessment approach is outlined in Figure 2 and can be described in the following steps:

- Review and compile data to compare against known toxicity thresholds and consideration of other mitigating factors (e.g., duration of exposure, presence of other known toxicants, etc.)
- Identify watersheds with the most frequent occurrence of probable toxicity and assess possible sources in the local vicinity as well as higher in the watershed, as appropriate
- Select at least one higher priority watershed for follow-up, if toxicity is indicated by water column chemistry for more than one event at any of the locations.

From the selected priority watershed:

- If necessary confirm sources through additional sample collection (upstream, sources, etc.),
- Assess spatial variability using sediment toxicity and concentrations at multiple locations
- Assess time variability using grabs paired with passive samplers, if sites can be secured, at downstream or other identified locations
- Perform assessment of possible benefit of source controls and whether they would allow TMDL compliance.

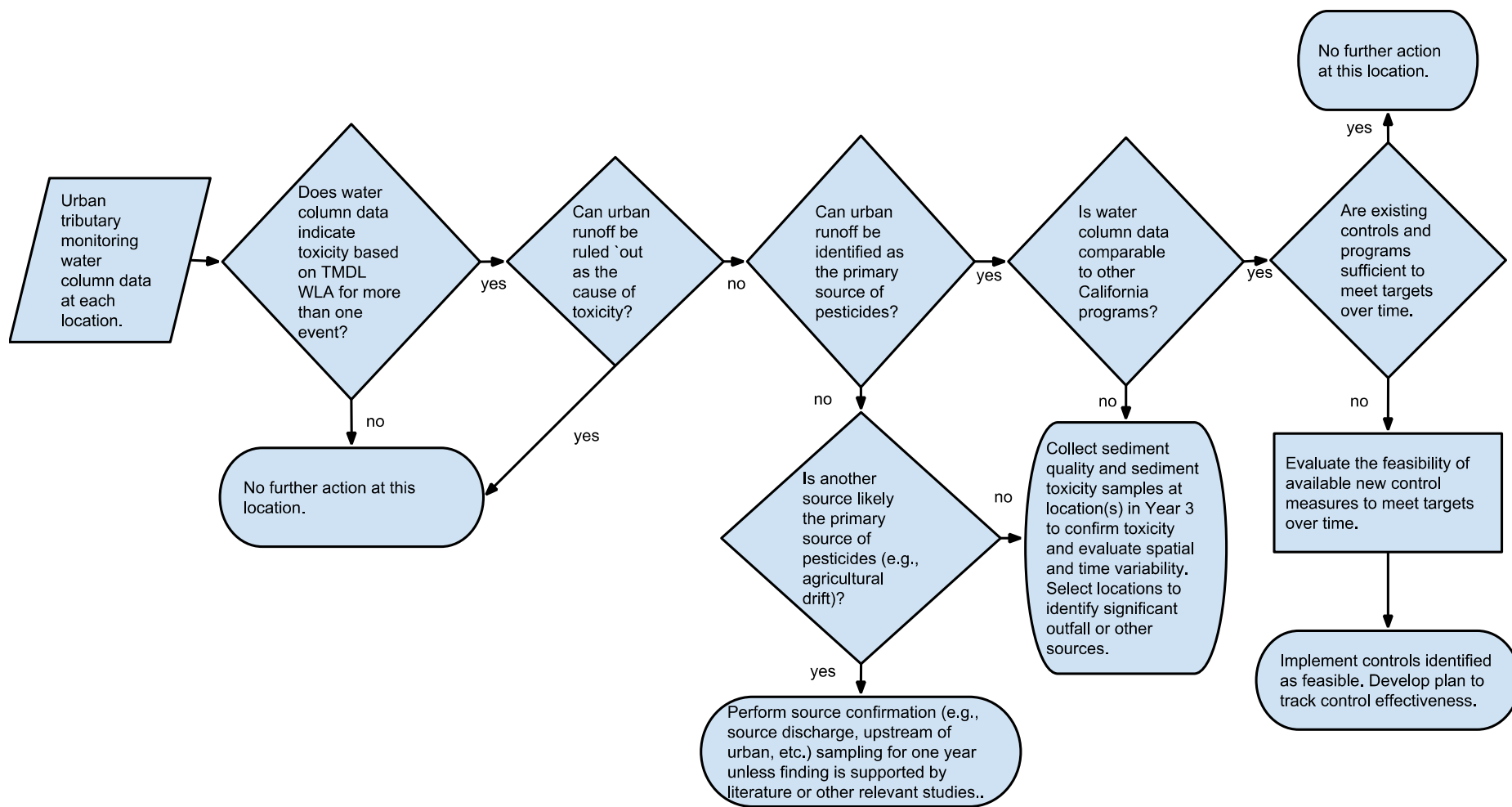


Figure 2. MCSTOPP Data Assessment Process

SCHEDULE

The proposed schedule is shown in Table 5 and is based on previous communication with the Regional Board,³ but may be modified in consultation with the Regional Board if indicated in the data assessment.

Table 5. Schedule of MCSTOPPP Monitoring Activities and Reporting

Action	Start Date	Complete Date
Prepare Quality Assurance Project Plan and Sampling and Analysis Plan	7/1/14	6/30/15
Year 1 Sample Collection	9/1/15	6/30/16
Year 1 Progress Report and Year 2 Work Plan	7/1/16	9/1/16
Year 2 Sample Collection, if necessary	9/1/16	6/30/17
Year 2 Progress Report and Year 3 Work Plan	7/1/17	9/1/17
Year 3 Sample Collection, if necessary	9/1/17	6/30/18
Final Study Report	6/30/18	10/1/18

PROJECT CONTACTS

Table 6 provides an initial list of expected project roles and contact information. These may be changed in future documentation, as necessary.

Table 7. Project Roles and Contact Information

Roles	Name	Phone
Field Coordinator and Technical Lead	Robert Carson	415-473-2745
Project Manager and Contact Point	Terri Fashing	415-473-6583
Project Advisor	Brian Laurensen	530-753-6400
Regional Board Contact	Fred Hetzel	510-622-2357

³ Email communication from Xavier Fernandez, San Francisco Bay Regional Water Quality Control Board to Terri Fashing, MCSTOPPP. April 29, 2014 2:21 PM