

Member Agencies:

Alameda

Albany

Berkeley

Dublin

Emeryville

Fremont

Hayward

Livermore

Newark

Oakland

Piedmont

Pleasanton

San Leandro

Union City

Alameda County

Alameda County
Flood Control and
Water Conservation
District (District)

Zone 7 of the
District

Multi-Year Plan for Monitoring and Assessment



Alameda Countywide Clean Water Program

A Consortium of Local Agencies

Prepared by:
The Alameda County
Public Works Agency

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CONTENTS

	Page
I. Introduction	
<i>I.A Overview and scope</i>	I-1
<i>I.B General Objectives for Watershed Assessment and Monitoring/Special Studies</i>	I-2
<i>I.C The Alameda County setting</i>	I-3
II Overview of the Multi-Year Plan Elements	
<i>II.A Summary of past monitoring and assessment activities</i>	II-2
<i>II.B Rationale and adaptive approach</i>	II-3
<i>II.C Watershed Assessment</i>	II-13
II.C.1 Watershed classification and physical indicators of condition	II-16
II.C.2 Biological indicators of creek health	II-18
II.C.3 Water quality screening in watersheds	II-20
II.C.4 Indicators of human health risk	II-22
II.C.5 Data integration and interpretation	II-24
<i>II.D Pollutants of Concern</i>	II-27
II.D.1 Pollutant impacts to San Francisco Bay	II-29
II.D.2 Spatial distribution, loadings and sources of Pollutants of Concern in watersheds	II-31
II.D.3 Pollutants of Concern-long-term trends in watersheds	II-34
<i>II.E Review of Best Management Practices and their effectiveness</i>	II-37
III Planned activities FY03-08	
<i>III.A Planned Activities listed by Component Task</i>	III-1
III.A.1 Watershed Assessment	III-1
III.A.2 Monitoring and Special Studies	III-4
<i>III.B Planned activities tabulated by WAU</i>	III-6
IV Status & accomplishments	
<i>IV.A Watershed Assessment and Focused Watershed Management</i>	IV-1
<i>IV.B Monitoring Pollutants of Concern</i>	IV-2
<i>IV.C Evaluating Urban Runoff BMPs</i>	IV-3
V Detailed workplans	
<i>V.A FY02-03</i>	V-1
<i>V.B FY03-04</i>	V-6
VI Reference	
<i>VI.A Literature cited</i>	VI-1
<i>VI.B Acronyms and abbreviations</i>	VI-4

TABLES AND FIGURES

List of Tables		Page
Table I-1a	Watershed Assessment 6-year objectives and FY03 Workplan	I-6
Table I-1b	Monitoring and Special Studies 6-year objectives and FY03 Workplan	I-7
Table II-1a	Watershed Assessment Units in western Alameda County	II-6
Table II-1b	Watershed Assessment Units in eastern Alameda County	II-7
Table II-2a	Status of Monitoring and Assessments organized by Watershed Assessment Units in western Alameda County	II-8
Table II-2b	Status of Monitoring and Assessments organized by Watershed Assessment Units in eastern Alameda County	II-10
Table III-1a	ACCWP Planned Monitoring and Assessment activities in western Alameda County, FY02/03-FY03/04	III-7
Table III-1b	ACCWP Planned Monitoring and Assessment activities in eastern Alameda County, FY02/03-FY03/04	III-8
Table IV-1	Selected BMP Studies	IV-4
List of Figures		
Figure II-1	Relation of Monitoring and Assessment to management activities	II-1
Figure II-2	Watershed Assessment Units	II-5
Figure II-3	Generalized framework for watershed assessment	II-15

I. INTRODUCTION*I.A Overview and scope*

The mission and vision of the Alameda Countywide Clean Water Program (ACCWP or Program) is to manage urban stormwater and protect natural aquatic resources of Alameda County and San Francisco Bay (ACCWP 2003). As a joint holder of a discharge permit under the National Pollutant Discharge Elimination System (NPDES), ACCWP's responsibilities include collecting information on stormwater pollution, the condition of receiving waters, and other data necessary to address problems caused by urban runoff. This Multi-Year Plan (MYP) provides an overview of the Program's long-term plan for monitoring and assessment activities, as required by Section C.8 of its third five-year NPDES permit for stormwater discharge (RWQCB, 2003) issued by the San Francisco Bay Regional Water Quality Control Board (Regional Board or RWQCB)

The MYP has several functions:

- 1) Document the status of knowledge about Alameda County watersheds and the occurrence of stormwater related pollution and other impacts to beneficial uses.
- 2) Outline ACCWP's proposed approach to improving this knowledge base and its usefulness for managers of stormwater discharges and watershed resources.
- 3) Guide further investigation and discussion, primarily by ACCWP and its member agencies, but also by other watershed stakeholders such as resource agencies, creek groups, and regulators.
- 4) Improve and clarify the MYP itself through regular updates incorporating lessons learned and new information in an adaptive management process.

The core of the MYP addresses functions 1 and 2 by describing the main elements, or types of information-gathering activities, to be conducted through the ACCWP Watershed Assessment and Monitoring components from Fiscal Year 2002-03 through FY 2007-08. Details and background for each element will be provided by reference to one or more subplans, stand-alone planning documents that can continue to develop during the period of the MYP. Functions 3 and 4 will be addressed by annual updates and refined workplans for successive Fiscal Years to be incorporated into Sections IV and V

The Introduction reviews basic terminology, the relation between the Program's organizational framework and the Regional Board's guidance, and provides basic information on the physical context of Alameda County and the Bay Area.

The Overview or Planning Rationale in Part II describes the elements included in the MYP, with a brief explanation of how each will contribute to the information base needed for effective management of local creeks, lakes and the Bay. Each element section will propose annual objectives for the period through June 2008, subject to availability of funds. This section also provides summary tables of the Program's current and planned activities towards assessing the conditions of individual watersheds, or of groups of similar watersheds.

Part III, Planned Activities, tabulates the objectives and scope of individual tasks or activities planned for the period through June 2008.

Part IV describes highlights of past monitoring and assessment activities, and the lessons learned. This part of the MYP is a working document that will be updated annually as new results, management issues and external sources of information become available.

Part V includes detailed workplans for the near-term period, with outlines of annual workplans for each FY in the MYP, with increased detail to be added for later years in annual updates.

Part VI lists applicable planning documents, along with other references and background material.

I.B General objectives for Watershed Assessment and Monitoring/Special Studies

ACCWP's Stormwater Quality Management Plan (ACCWP 2003) distributes data and information gathering activities among two program components:

- **Watershed Assessment** focuses on landscape-level attributes of watersheds and streams, and beneficial uses or management issues that are more specifically tied to the physical, biological or social conditions in individual watersheds
- **Monitoring and Special Studies** focus on pollutants and problems that are more uniformly distributed in urbanized areas, or for which the most relevant geographical scale for study and management is larger than individual watersheds.

These components are closely interconnected and their relative roles will continue to evolve within the framework of the Plan and this strategy. General Program activities for these components are directed by the Program's Watershed Assessment and Monitoring Subcommittee, and are implemented by technical consultants working under the supervision of Program staff provided by agreement with the Alameda County Flood Control and Water Conservation District (District, ACFCWCD). Although individual member agencies (co-permittees) of the Program perform some environmental inspection and testing as part of their management activities, the NPDES permit does not include Performance Standards for monitoring by co-permittees.

Relation to objectives in BASMAA Regional Monitoring Strategy and RWQCB guidance

The Regional Board has requested that ACCWP and other members of the Bay Area Stormwater Management Agencies Association (BASMAA) conduct "monitoring" in a broad sense that includes both of the above components. The scope and objectives of monitoring and assessment activities have been refined through a number of initiatives including the BASMAA Regional Monitoring Strategy (BMRS) and the Regional Monitoring and Assessment Strategy (RMAS; RWQCB 1999). The Regional Board's most recent conceptual strategy is based on the design of its Surface Water Ambient Monitoring Program (SWAMP; RWQCB 2001) efforts and uses several categories depending on the spatial extent, type of pollutant or stressor and level of detail and data quality required. Table I-1 outlines the objectives for the two ACCWP components and relates them to the terminology used by the Regional Board concept.

In general,

- **Watershed Assessment** includes many basic screening activities in the SWAMP Tier 1, which identify the presence or extent of potential problems. It also includes some of the more detailed Tier 2 assessments and studies involved in hypothesis testing or investigations of local problems in specific watersheds. It also encompasses GIS-based data management and interpretation
- **Monitoring/Special Studies** primarily addresses loadings to San Francisco Bay, Pollutants of Concern, and evaluation and design of BMPs. Regional priorities may be increasingly addressed through participation in the Clean Estuary Partnership (CEP). Most of the data management and adaptive development of workplans is currently in this component, although increased integration with watershed assessment data will occur over time.

I.C The Alameda County setting.

Physical setting:

- Located on the eastern shore of San Francisco Bay, Alameda County has two main physiographic areas, lying east and west of the East Bay Hills. The hills trend from north-northwest to south-southeast and reach elevations of 1600 ft in the north, increasing to 2500 ft at Mission Peak in the south. Geology is complex, including rocks and soils of sedimentary, metamorphic and igneous origin. The East Bay Hills include areas of active uplift in the northern part of the County (Figuers, 1998). Annual rainfall varies with region and topography, ranging from less than 12 inches in the extreme eastern part of the County to 34 inches in parts of the Oakland hills.
- The western slope of the hills is divided into a series of relatively small watersheds (<10 sq. miles) drained by simple stream systems (order 3 or less). The Hayward Fault system provides a fairly well-defined break in slope at the base of the hills, offsetting stream channels and also generating springs and sag ponds, particularly in the south. Below the hills, alluvial deposition has formed the East Bay plain and the adjacent tidally-influenced baylands. In the northern part of the County a steeper shoreline gradient and past alterations limit the tidally influenced baylands to a narrow coastal strip, but south of the San Mateo Bridge a band of salt ponds and sloughs extends up to 1 mile in width from the edge of filled or reclaimed shoreline.
- East of the hills, the Alameda Creek watershed drains a 700 square-mile portion of the inner Coast Ranges between Mt. Diablo in Contra Costa County to the north and Mount Hamilton in Santa Clara County to the south. Alameda County borders have been artificially drawn to enclose the central portion of this basin, including the Livermore-Amador Valley, which occupies the former site of a seasonal lake. Alameda Creek penetrates the hills through a narrow canyon at Niles; its former channel system west of the hills was replaced by a Federally funded flood control channel in the early 1960's. The extreme northeastern corner of the county drains to the San Joaquin River in the Central Valley. Most of the large tributaries flowing to Alameda Creek from the south

are impounded behind large reservoirs operated by the San Francisco Public Utilities Commission or state Department of Water Resources.

- Historically, two moderate sized stream systems drained intermediate valleys within the East Bay Hills. The 49 sq. mile San Leandro Creek watershed is now divided into upper and lower sections by two storage reservoirs (SLCWAC 1999). The 50-sq mile San Lorenzo Creek watershed includes Cull and Don Castro reservoirs on separate tributaries, and a major flood control channel replacing the original creek across the Bay plain.

Ecological conditions:

General historical patterns are known, although local details are not complete for individual sites. The baylands and San Francisco Bay itself are the result of rising sea levels during the last 10,000 years (Goals Project, 1999). Before European development, hills and moister canyons were oak-bay woodlands with areas of redwood in the fog drip zone in the north, while drier sunnier slopes were covered with chaparral. Foothills and alluvial slopes were mixtures of oak savannah & perennial grassland. Riparian corridors supported trees along larger streams or in the hills and willow groves occurred on the lower alluvial plains, where many smaller creeks may have disappeared or ended in sag ponds without reaching the Bay. Many smaller creeks were intermittent or seasonal, at least for some reaches.

Management history:

The following general characterization of land uses during different periods is derived from Goals Project (1999), Richard (1995), and Figuers (1998):

- Native American, ~8,000 BC- late 1700's: Practices included controlled burning of upland areas to manage structure of plant communities and facilitate game hunting. Use of riparian areas involved management of willows and harvesting of steelhead, salmon and shellfish. The human population was dispersed and relatively small, most intensive on the Bay slope west of the hills. Large mammal herds were extensive but did not browse intensively in individual locations.
- Spanish period, late 1700's to mid 1800's: The establishment of Mission San Jose, followed by secular land grant ranchos, introduced cattle which denuded perennial grasslands and replaced large areas of native vegetation with annual exotics. Probable major impacts on stream processes throughout the area included increased runoff and sedimentation, downcutting and widening of channels.
- Initial Euro-American development, 1850-early 1900's: During the Gold Rush era hydraulic mining caused massive deposition of sediments bearing legacy mercury in Sacramento River and Bay-Delta system. Town centers and farming were developed in the East Bay to support San Francisco and other centers of California commerce. Extensive filling of baylands for towns and infrastructure occurred in the north, and diking for farms and salt ponds in the south. Roads and bridges were constructed to transport products and goods to boat "landings" by the Bay, but were replaced by railroads in the late 1860's. Well pumping for irrigation and drinking water led to recurrent water quality problems and changes to the water table. Construction of dams and reservoirs began in canyons. Lumber mills were located throughout the northern

hills, involving construction of logging roads, clearcutting of redwoods and other impacts on streams. Draining of Tulare Lake in the Livermore-Amador Valley east of the hills was begun.

- Urban growth, 1900's: Urbanization in the Berkeley/Oakland area was accelerated after the 1906 earthquake. Consolidation of drinking water suppliers and increased reliance on aqueducts and reservoirs led to protection of some watershed lands behind the Berkeley Hills and in southern tributaries to Alameda Creek. The 1930's establishment of the East Bay Regional Parks District provided protection for many ridgeline areas from development. A post-World War II building boom developed the San Leandro/Hayward portion of the Bay Plain and increased town sizes in the southern Tri-city area. Environmental activism in the 1960's led to upgrading of wastewater plants and redirection of their discharges to the Bay, and also increased regulatory protection for water quality and wetland areas. The economic growth of the 1980's and 90's led to major growth in the southern and eastern county; countering trends included voter approval of urban growth limits through Measure D in 2000, and an increasing NPDES permit focus on stormwater treatment and hydromodification controls for new development.
- Channel alterations: Local culvert projects began around the 1870's on creeks in town areas; drainage and levees enclosing the Lake Merritt estuary also began. Creeks were initially used as sewers and later as sites for sanitary sewer pipes. Local filling and bank alterations by private owners were also common. Major flooding in 1949 stimulated the formation of the ACFCWCD with extensive channelization and culverting continuing from the late 1950's through the 1970's. Federally funded Flood Control channels were constructed in lower San Lorenzo and Alameda Creeks in early 1960's.

ACCWP Multi-Year Plan for Monitoring And Assessment

I. Introduction

Table I-1a Watershed Assessment 6-year objectives and FY03 Workplan

Task Number and objectives for FY2002-FY2008	FY2002-2003 Tasks	Regional Board conceptual monitoring elements
<p>WA-1. Develop and maintain a GIS resource for watershed information:</p> <ul style="list-style-type: none"> Provide basic delineation and mapping of all watersheds and significant waterbodies, including land cover types, impervious cover, channel condition and riparian corridor condition. Integrate existing data for rainfall and surface/ground hydrology Map sensitive areas for wildlife, fisheries and erosion/sediment processes Coordinate data sharing with Regional Board, copermittees and other resource management agencies 	<ul style="list-style-type: none"> Continue mapping support for characterization & management planning in pilot watersheds improve coverages on channel condition and recommend priorities for field confirmation Identify other high-priority data needs to support long-term watershed assessment and planning for New Development requirements Improve data sharing & coordination with Regional Board and Alameda County 	<p>Background and support for:</p> <p>Watershed Assessment for Tier 1, Tier 2 detailed assessment information for selected watersheds</p> <p>Sources and Loadings</p> <p>Data analysis and hypothesis development for further assessment and monitoring</p> <p>Source identification</p>
<p>WA-2. Use a variety of indicators to assess the condition of streams and watersheds:</p> <ul style="list-style-type: none"> Establish expected range of macroinvertebrate indices consistent with maintaining beneficial uses, and apply as screening tool Select & test additional indicators for local use, including photodocumentation. Provide on-call resources and training to citizen monitoring groups and local watershed partners, promoting improved and consistent approaches to watershed assessment 	<ul style="list-style-type: none"> Conduct 2nd year of CSBP sampling in 4 target creeks; work with regional partners on standards for protocols, data analysis and reference condition development. Coordinate development of creek indicators with Stream Protection Policy and other regional initiatives. Provide on-call resources and training to copermittees, citizen monitoring groups and other watershed partners. Review ways to expand photodocumentation beyond trash assessment (see also MS-3) 	<p>Watershed Assessment Tier 1</p> <p>Rapid Biological Assessment</p> <p>Visual Physical Assessment</p> <p>Photodocumentation</p> <p>(Some water quality screening)</p>
<p>WA-3. Provide useful watershed information to the Program and other watershed stakeholders:</p> <ul style="list-style-type: none"> Provide guidance on use of contact recreation indicators Assist/participate in local watershed pilot projects and assessments Develop ACCWP website resources for watershed maps and creek information, and 	<ul style="list-style-type: none"> Develop strategy for assessment of human health risks for light contact recreation, using pathogen testing and other available tools Support local pilot projects or member agencies' activities for monitoring, watershed assessment and planning. Prepare watershed maps and other creek information for display on ACCWP website. 	<p>Support management actions</p> <p>Support further studies to test hypotheses and suggest actions</p> <p>Identify sources</p>

Table I-1b Monitoring and Special Studies 6-year objectives and FY03 Workplan

Task Number and objectives for FY2002-FY2008	FY2002-2003 Tasks	Regional Board conceptual monitoring elements
<p>MS-1. Characterize and track pollutants of concern in urban runoff:</p> <ul style="list-style-type: none"> ● Contribution to Regional Monitoring Program ● Contribution for Water Quality Attainment Strategies Program ● Sediment monitoring to characterize and track mercury, PCBs, organochlorine pesticides & other sediment pollutants at watershed sites. Continue annual sediment monitoring at 1 or 2 selected index sites per draft "Monitoring Program 2002-2006" ● Develop and implement a screening program for ambient water quality characterization ● Stormwater sampling for metals, diazinon, toxicity at Castro Valley Creek per draft "Monitoring Program 2002-2006" ● Continue additions/refinements to fixed-station database, coordinate data sharing with Reg. Board and SWAMP 	<ul style="list-style-type: none"> ● Support RMP and WQASP ● Conduct sediment monitoring in watersheds ● Sample storm events with antecedent dry weather ● Develop a pilot semiannual screening point monitoring design for general water quality parameters, supplemented by data on selected contaminants and physical indicators. ● Review past temperature logging datasets and explore appropriate sites/applications for other continuous monitoring ● Add diazinon data to database; develop protocol for incorporation of incidental grab samples in to database. 	<p>Support RMP for SF Bay water quality</p> <p>Sources and Loadings issues</p> <p>Water Quality screening</p> <p>Data analysis and hypothesis development for further monitoring and management actions</p> <p>Identify sources</p> <p>Coordinate with Tier 2 assessments in a few representative watersheds</p>
<p>MS-2. Evaluate the effectiveness of urban runoff BMPs:</p> <ul style="list-style-type: none"> ● Conduct special studies focusing on TMDL priority pollutants or "threat" pollutants and their sources. ● Support New and Redevelopment requirements 	<ul style="list-style-type: none"> ● Review local BMPs for leaf & litter, identify potential areas for pilot applications of new BMPs ● Support design guidance and HMP development 	<p>Evaluate BMP effectiveness</p> <p>Develop hypotheses for further work</p>
<p>MS-3. Provide technical information on management issues involving urban runoff:</p> <ul style="list-style-type: none"> ● Conduct special studies to address data gaps or management issues concerning pollutants of concern and urban runoff impacts. May include: Bay toxicity, trash and sedimentation problems, human health risks ● Provide miscellaneous technical on-call support as needed. 	<ul style="list-style-type: none"> ● Develop and test trash assessment strategy 	<p>Tier 2 assessments-relate management issues to detailed physical, chemical or biological evaluations</p> <p>Detailed source identifications for POCs</p>
<p>MS-4. Coordinate with RMP, BASMAA and WQASP:</p> <ul style="list-style-type: none"> ● Participate in BASMAA Monitoring Committee, RMP technical review, WQASP MOU committees, other regional stakeholder discussions. 	<p>Ongoing</p>	<p>Develop hypotheses</p> <p>Adapt annual monitoring plans</p>

I. Introduction

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II. OVERVIEW OF THE MULTI-YEAR PLAN ELEMENTS

Objective and Scope: Each of the numbered task areas within the Watershed Assessment and Monitoring/Special Studies components may include one or more elements, or systematic methods for gathering watershed or pollutant information. Section II describes each element in turn and the rationale for including it in the MYP. The type and amount of effort planned for an element will vary from year to year, and not all elements may be active in any given year. The introductory paragraphs explore the regional and conceptual context for the MYP, followed by a summary of past monitoring and assessment activities in Section IIA (see Section IV for additional background). Section IIB provides a general rationale and overview for integration of MYP activities, followed by discussion of watershed assessment elements in Section IIC and monitoring for Pollutants of Concern in Section IID. Section IIE reviews ACCWP's efforts to evaluate the effectiveness of Best Management Practices.

Context for ACCWP's monitoring and assessment:

Watershed assessment and monitoring are parts of an iterative cycle of information gathering and management action (Figure II-1). These cycles may occur simultaneously at different spatial and temporal scales, and vary in their independence from each other. Localized, acute effects are often more apparent than large-scale or long-term processes that may be causing or contributing to the problem. In the absence of local data, initial characterization efforts often rely heavily on general patterns and data from similar geographical regions. After general surveys suggest that certain specific issues are local priorities, focused studies are required to test these hypotheses. Initial study systems are selected that are relatively simple and well understood so that sources and transport of pollutants, or actions of other causes of impairment, are easier to distinguish. Results of these local studies may then provide useful recommendations for immediate management action in these systems. As similar information accumulates, another important outcome may be the development of a more refined conceptual model that can be applied to a wide range of waterbodies or to other pollutants with similar characteristics, which in turn stimulates a new generation of studies to address more complex problems and processes.

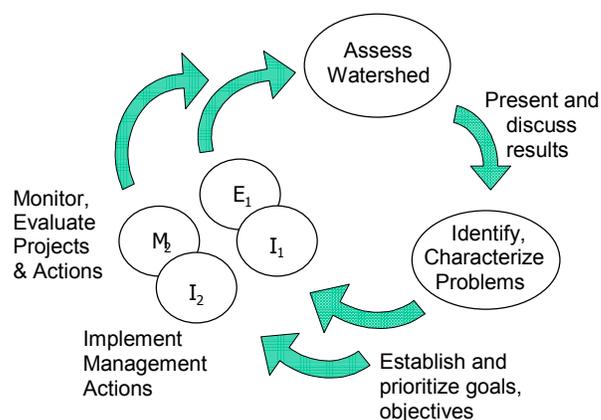


Figure II-1. Relation of Monitoring and Assessment to management activities

As knowledge about problems and potential solutions is refined, lines of investigation multiply, with some concentrating more on the regional scale and others on the details at smaller scales. Monitoring pollutants of concern in San Francisco Bay has involved extensive regional coordination, but the implementation of TMDLs may require increasing focus on case studies and monitoring in local watersheds.

Availability of more specific information lets management questions become more articulated and detailed, engaging larger numbers of stakeholders and other interested parties in the discussion. Information management and dissemination have become correspondingly more important in linking the elements and translating between scales where appropriate. An important function of the Program is connecting regional monitoring data and regulatory information with the implementation of source controls and restoration projects in local communities

Because of technical advancement and the changing context of monitoring and assessment activities, later studies often use different methods or combinations of methods. Older tools and datasets may need to be redesigned or augmented as part of the adaptive approach.

II.A Summary of past monitoring and assessment activities

The Program's monitoring component was initiated in 1988 by an Alameda County Task Force that was a precursor of the formal creation of the ACCWP. Wet and dry weather monitoring were conducted at 16 fixed stations to estimate nonpoint source loads of a wide range of pollutants from Alameda County to San Francisco Bay, in an effort to evaluate the effect of urban runoff on the receiving waters of the Bay (WCC, 1990 and 1991). Fixed station monitoring was continued after this initial characterization period, as part of efforts to improve a regional stormwater database. Initial assessment activities focused on stormwater conveyance systems as the first priority for management improvements directly affecting discharges. During its first 5-year permit in 1991-1996, the Program also conducted special studies to characterize pollutant occurrence and reduction in the Demonstration Urban Stormwater Treatment (DUST) Marsh and evaluated other BMPs. The Program also continued previous toxicity testing and conducted a Toxicity Identification Evaluation (TIE) in the San Lorenzo Creek watershed (Hanson 1995). During the second permit period (1996-2001) the Program conducted extensive studies of the insecticide diazinon (e.g. Scanlin and Feng 1997), which TIE evidence suggested as the likely cause of toxicity in urban creeks. The Program also began regular contributions the Regional Monitoring Program for Trace Substances (RMP) to support monitoring in San Francisco Bay.

In August 1996 the Regional Board staff requested that the Program redirect monitoring resources away from fixed-station, wet-weather monitoring and towards increased watershed assessment and long-term monitoring plans for creeks and other waterbodies. A focused Watershed Management component was included in the second Storm Water Management Plan, and pilot activities included training and supervision of volunteer monitors in San Leandro Creek. Based on Program experiences that stakeholder involvement and partnership are critical to the success watershed management, the Program's Stormwater Plan Coordinating committee

recommended in 1999 that promotion of partnerships be incorporated into the Planning and Regulatory Compliance component. Technical activities related to watersheds were retained in a reorganized Watershed Assessment component. In 1999 a pilot watershed assessment project was begun in the San Lorenzo Creek watershed by the District. The Program also provided technical assistance to city watershed managers for monitoring and assessment in the Lake Merritt (Oakland) and Laguna Creek (Fremont) watersheds

In 2000 the Program initiated a GIS-based Watershed Inventory to support mapping and data management needs for improved assessment data from all watersheds. Because of topographic and development patterns in Alameda County, the assessment strategy will be organized by Watershed Assessment Units (WAUs). The rationale for WAUs is to use natural boundaries to define areas that are relatively homogeneous in character and of a manageable size for study. ACCWP's WAUs are similar (though not identical) to the Planning Watersheds used for the Region 2 SWAMP, and are also able to nest within the CALWATER hydrological units commonly used for larger geographical divisions. WAUs either contain groups of similar small Bay Plain watersheds or are subdivisions of the large Alameda Creek watershed (Figure II-2). Within each WAU, individual focus watersheds represent typical conditions and/or areas of special interest (Table II-1). Past monitoring and assessment information by the Program and related agencies are summarized for WAUs in Table II-2. Past Program activities are described in more detail in Section IV.

II.B Rationale and adaptive approach for the Multi-Year Plan

This document presents ACCWP's plan for studies supporting its mission to minimize the impact of stormwater discharge on the beneficial uses of the waters of Alameda County and San Francisco Bay. A frequent pitfall for environmental monitoring is to make measurements based upon technical capability, without considering the objectives for use of the data. To prevent this, Gunther et, al (2000) worked with the Program and co-permittees to identify five key management questions to guide monitoring and assessment:

- 1) Is urban runoff a significant contributor of pollution to San Francisco Bay?
- 2) Are our creeks healthy?
- 3) How can we restore creeks?
- 4) Are program actions making a difference?
- 5) Is it safe to play in the creeks?

Each of these questions is associated with particular values and beneficial uses of one or more waterbodies. The physical and social features of the surrounding watersheds determine the specific objectives and challenges for the design of appropriate studies to answer the questions. To deliver meaningful information for management decisions, this Multi Year Plan is based on a general strategy involving four concepts:

- a) assess Alameda County watersheds for a range of meaningful attributes and continue to track these over time,
- b) link existing beneficial uses or management priorities with indicators that can be measured,

- c) develop target values or ranges for these indicators that allow identification of different levels of support or impairment of these uses, and
- d) Communicate and interpret this information to managers, decision-makers and the public.

With this approach, management concerns were used to generate program objectives and will therefore be reflected in each element. The elements are grouped into 3 subsections:

Section IIC Watershed Assessment aims to clarify the conditions that are relatively specific to individual watersheds, and the underlying ecological processes that determine those conditions (Management Questions 2, 3, 4 and 5)

Section IID Pollutants of Concern focuses on pollutants or impacts that can be generalized based on land use or on runoff characteristics shared by multiple watersheds (Management Questions 1 and 4)

Section IIE Effectiveness Of Best Management Practices (Management Question 4)

This organization reflects the component structure of the new Stormwater Quality Management Plan for FY02-FY08. In reality these two components are closely linked and are managed through a single Watershed Assessment and Monitoring Subcommittee (WAMS) of the ACCWP Management Committee. The Program anticipates that the following changes may evolve in WAMS workplans during the next Plan period:

An increase in the scope and emphasis on Watershed Assessment, related to:

- Increasing regulatory focus on functional assessment, reflected in Regional Board documents such as the RMAS and Stream and River Protection primer (Riley, 2003).
- Increasing need to tailor the pollution prevention activities of individual co-permittees
- ACCWP's strategic objective to increase partnership activity at multiple levels
- Increasing need by a wide range of audiences for improved watershed information

A decrease in the proportion of Monitoring and Special Studies activities that are designed or initiated solely by the Program, due to:

- Inclusion of many pollutant-focused studies in the Clean Estuary Partnership (CEP)
- Increasing involvement of the RMP's Sources, Pathways and Loadings Workgroup in monitoring or modeling local tributaries and watersheds
- Increasing emphasis on partnership formation for solving complex problems, and to obtain funding.

Ongoing dialogue between the Regional Board and the BASMAA Monitoring Committee has been crucial in shaping the evolution of ACCWP's monitoring and assessment program. This dialogue is further complicated by overlap with many other stakeholder groups and workgroups with intersecting objectives and membership, such as the CEP, Urban Pesticide Committee, RMP committees and various ad hoc workgroups. Many individuals both within the Program and outside it have contributed to the development of ACCWP's Multi-Year Plan as part of this larger community of scientists, managers, regulators and concerned residents. The MYP is designed as a "living document" that will be adapted as needed to address changes in management questions, priorities, and the status of Alameda County watersheds.

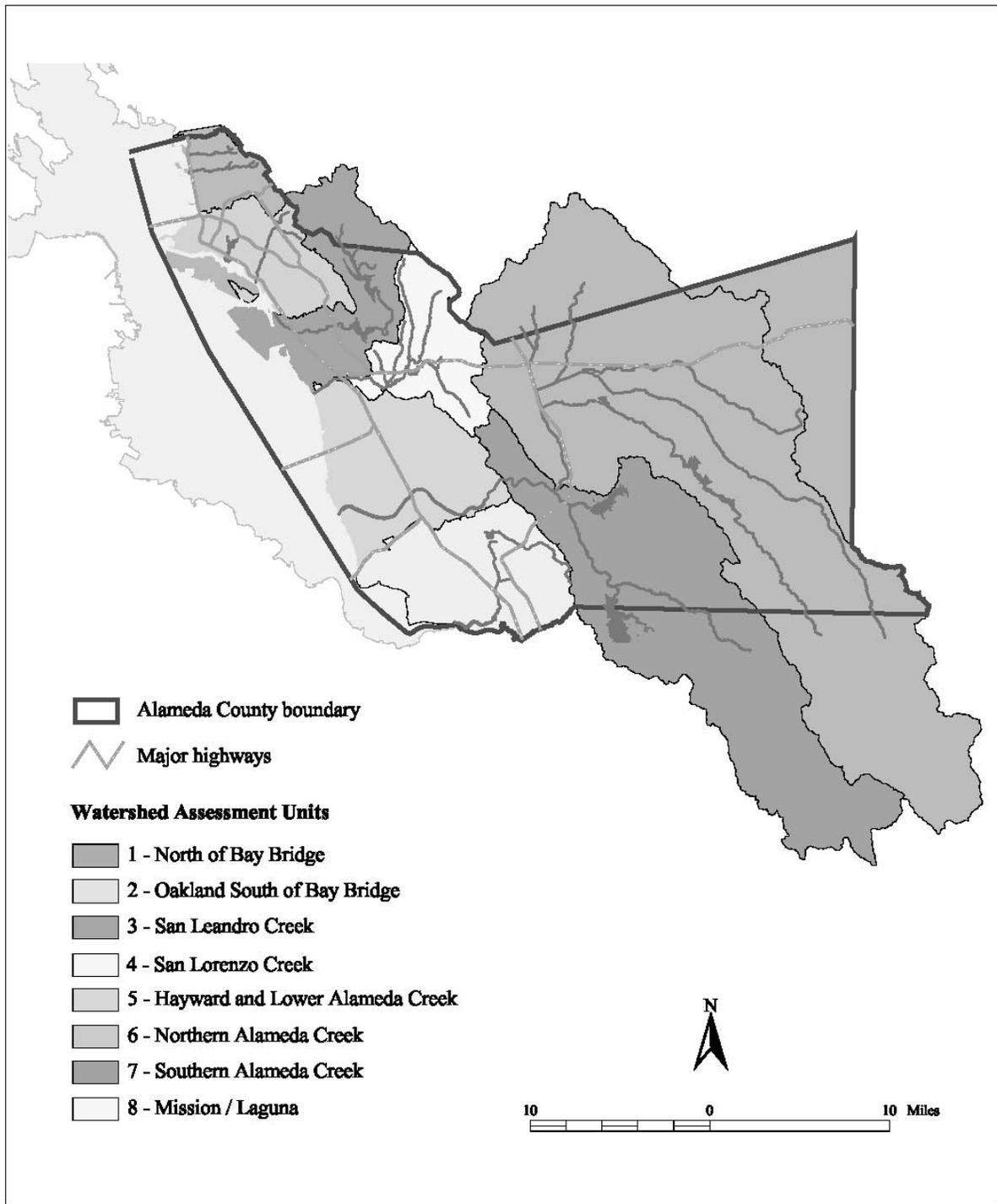


Figure II-2. Watershed Assessment Units

Table II-1a. Watershed Assessment Units in western Alameda County.

Watershed Assess. Unit	1	2	3	4	5	8	Notes
WAU name	north of Bay Bridge	Oakland, south of Bay Bridge	San Leandro Creek	San Lorenzo Creek	Hayward to Lower Alameda	Mission-Laguna	
focus watersheds or representative waterbodies	Codomices Strawberry (L. Temescal)	Sausal Creek Lake Merritt (Arroyo Viejo)	San Leandro Creek	Castro Valley (urban) Crow Creek (mixed) San Lorenzo Crk, Don Castro Res.	Old Alameda Creek, Crandall Creek, Lower Alameda Creek	Laguna Creek, Mission Creek Lake Elizabeth	focus creeks have mostly open channels
Characteristics							
Size (sq mi)	22	42	69*	48	81	73	*not all within County
Dominant Land Uses	urban pre-1950	urban pre-1950	urban mostly pre-1950 (lower portion)	mixed urban-rural (grazing)	mixed urban	mixed urban	Remote Sensing for impervious estimates, 2001-02
Dominant Channel Type (in Bay plain or valley floor; hill reaches typically more open/ natural, esp. to south)	culverts; small catchments direct to Bay (<10 sq. mi)	culverts; small catchments direct to Bay (<10 sq. mi)	Earth channel	concrete channel (fragmented natural in upper valleys)	earth channel	earth channel	Preliminary estimates via GIS/ photo analysis 2003
Beneficial Uses (existing or potential)	COLD, REC-1-2, SPWN, WARM, WILD (L. Temescal); COLD, REC-2, SPWN, WARM, WILD (creeks)	REC-1-2, SPWN, WARM, WILD (Lake Merritt); COLD, REC-2, SPWN, WARM, WILD (creeks)	FRSH, MIGR, REC-1-2, SPWN, WARM, WILD (includes Lake Chabot)	COLD, FRSH, GWR, MIGR, MUN, REC-1-2, SPWN, WARM, WILD (includes reservoirs)	COLD?, GWR, MIGR, MUN, REC-2, SPWN, WARM, WILD	COLD, REC-1-2, SPWN, WARM, WILD (Lake Elizabeth); COLD, REC-2, SPWN, WARM, WILD (creeks)	<i>Italics</i> = not listed in 1995 Basin Plan, hypothetical
Main issues (tentative list)	urban runoff, recreation, community involvement in restoration	urban runoff, recreation, community involvement in restoration (creeks); also nutrients, pathogens (LM)	urban runoff, dam, community involvement in restoration	urban runoff, erosion/ sedimentation, animal facilities, reservoirs/dams, steelhead habitat, other fisheries	urban runoff, new development, erosion/ sedimentation, recreation, community involvement at Lower Alameda	urban runoff, new development, erosion/ sedimentation, recreation, community involvement in restoration	
Developable open land index (tentative)	low	low	low	medium-high	Medium	medium	verify in 2002 using GIS & planning data

Table II-1b. Watershed Assessment Units in eastern Alameda County.

Watershed Assessment Unit	6	7	Notes
WAU name	Alameda Creek-northern	Alameda Creek-southern	
focus watersheds or representative waterbodies	Arroyo Mocho, Arroyo La Laguna (Arr. Las Positas, Lake Del Valle)	Alameda Creek (San Antonio Reservoir)	focus creeks have mostly open channels
Characteristics			
Size (sq mi)	490*	210*	*not all within County
Dominant Land Uses	rural (ranch, farming), and urban	rural	Remote Sensing for impervious estimates, 2001-02
Dominant Channel Type (in Bay plain or valley floor; hill reaches typically more open/natural, esp. to south)	earth channel	natural	Preliminary estimates via GIS/ photo analysis 2002
Beneficial Uses (existing or potential)	AGR, COLD, GWR, MIGR, MUN, REC-1-2, SPWN, WARM, WILD	AGR?, COLD, FRSH, GWR, MIGR, MUN, REC-1-2, SPWN, WARM, WILD (includes reservoirs)	
Main issues (tentative list)	urban runoff, new development, erosion/sedimentation, grazing, mines, groundwater recharge, drinking water, other fisheries	erosion, reservoirs/dams, grazing, steelhead habitat, other fisheries	
Developable open land index (tentative)	high	medium-high	verify in 2002 using GIS & planning data

Table II-2a. Status of Monitoring and Assessments organized by Watershed Assessment Units in western Alameda County.

Watershed Assess. Unit	1		2		3		4		5		8	
	north of Bay Bridge	Oakland, south of Bay Bridge	San Leandro	San Lorenzo	Hayward to Lower Alameda	Mission-Laguna	Notes					
Tier 1 -Screening Level												
Chemical-Physical Parameters	Codornices-Friends of 5 Creeks continuous monitoring 2001	Lake Merritt- Monthly grabs (FCD, 1996-97); continuous monitoring (FCD 199x)	(RWQCB-lead pilot 2000-02)	Monthly WQ grabs (FCD, 1995-98); continuous temperature logging (FCD, 2000-02)		City 2001	Also fixed station monitoring in all WAU's 1989-1995					
Chemical-Physical, basic screening by volunteers	(Friends of 5 Creeks*)	(Friends of Sausal Creek, 1998-2001*; LM by Oakland Tech HS 2002?)	WCC and Friends of SLC1995-97, continuing			(Math-Science Nucleus, 2000-01)	*volunteer/educational protocols for grabs					
Bioassessment-macroinvertebrate		1 site 2001; FOSausal, 2 sites bimonthly screening 1998-2001	(RWQCB-lead pilot, 2 sites 2000-01;)	5 sites 2001; FCD 2-3 sites 1998-2000		4 sites 2001	ACCWP and FCD use CSBP in spring; FOSausal (Friends) = modified biosurvey					
Biological-Physical: Fish community and habitat	Resource assessment 2002*	Oakland creeks resource inventory, 1998	WCC 1996, Resource assessment 2002*	Population surveys and habitat mapping (FCD, 2001)		Resource assessment 2002*	Resource assessment includes review of Leidy data					
Geophysical												
Stream morphology												
Vegetation												
Flow	(Friends of 5 Creeks, 2001)			(USGS, Castro Valley & San Lorenzo)	(USGS historical)							

Notes: a) Data collection by ACCWP unless otherwise noted in parentheses (). b) FCD = Alameda County Flood Control and Water Conservation District

Table II-2a. continued

Watershed Assess. Unit WAU name	1 north of Bay Bridge	2 Oakland, south of Bay Bridge	3 San Leandro	4 San Lorenzo	5 Hayward to Lower Alameda	8 Mission- Laguna	Notes
Tier 2-More Focused							
Contaminant Chemistry	Fixed* (2 sites)	Fixed* (5 sites)	Fixed* (2 sites)	Fixed* (2 sites)	Fixed* (3 sites), Crandall Creek 1994-96	Fixed* (1 site)	*Fixed stations 1989-95
Nutrients	Fixed* (2 sites)	Fixed* (5 sites)	Fixed*(2 sites)	Fixed* (2 sites)	Fixed* (3 sites)	Fixed* (1 site)	*1989-95
Pathogens		LM 1994-97 (4 sites, 2x/month continued by city)					
Toxicity	Fixed* (1 site)	Fixed* (3 sites)	Fixed* (2 sites)	Fixed* (2 sites); Castro Valley, San Lorenzo 1995	Fixed* (2 sites)	Fixed* (1 site)	*Fixed stations 1989-90
Geomorphic and Sediment Source Analysis				(SFEI channel morphology and landslide mapping in Crow, for FCD)	(USGS Alameda Cr. sediment study for FCD)		
Tier 3-TMDL/Pollutants of Concern sampling							
Hg/PCB sediment survey	3 sites 2000; 2 sites 2001	6 sites 2000-01	1 site 2000-01	3 sites 2000-01	3 sites 2000; 2 sites 2001; Dry Creek replaced by Decoto industrial site, 2001		
Hg/PCB Source investigation	Codornices-Hg, 8 sites 2000	Ettie St drains-PCBs, 5 drains/ 9 inlet composites, 2001; Glen Echo Creek PCBs, 2 sites 2001					
PAH sediment survey	2 sites 2000; 2 sites 2001	6 sites 2000-01	1 site 2000-01	3 sites 2000-01	3 sites 2000; 2 sites 2001		
Chlorinated pesticides sediment	2 sites 2001	6 sites 2001	1 site 2001	3 sites 2001	2 sites 2000; 2 sites 2001		
Copper in stormwater	Fixed* (2 sites)	Fixed* (5 sites)	Fixed*(2 sites)	Fixed* (2 sites); Castro Valley Creek-2000-02, time interval composites	Fixed* (3 sites)	Fixed* (1 site)	*Fixed stations 1989-95
Diazinon in stormwater				Castro Valley Creek- 1995-2000, 21 events			

Table II-2b. Status of Monitoring and Assessments organized by Watershed Assessment Units in eastern Alameda County.

Watershed Assessment Unit	6		7	Notes
	Alameda Creek-northern	Alameda Creek-southern	Alameda Creek-southern	
Tier 1 -Screening Level				
Chemical-Physical Parameters	(RWQCB-lead pilot 2000-02 in Arroyo Las Positas)			Also fixed station monitoring in all WAU's 1989-1995
Chemical-Physical, basic screening by volunteers	(Amador Valley HS*)			*volunteer/educational protocols for grabs
Bioassessment-macroinvertebrate				ACCWP and FCD use CSBP in spring; FOSausal (Friends) = modified biosurvey
Biological-Physical: Fish community and habitat	Resource assessment 2002*		Resource assessment 2002* (also SFPUC)	Resource assessment includes review of Leidy data
Geophysical				
Stream morphology				
Vegetation				
Flow	(USGS at Niles)		(USGS)	

Notes: a) Data collection by ACCWP unless otherwise noted in parentheses (). b) FCD = Alameda County Flood Control and Water Conservation District

Table II-2b. continued

Watershed Assessment Unit WAU name	6 Alameda Creek- northern	7 Alameda Creek- southern	Notes
Tier 2-More Focused			
Contaminant Chemistry		Niles*	*Fixed station 1989-95
Nutrients		Niles*	*Fixed station 1989-95
Pathogens			
Toxicity		Niles*	*Fixed station 1989-90
Geomorphic and Sediment Source Analysis	USGS Alameda Cr. sediment study for FCD)		
Tier 3-TMDL/Pollutants of Concern sampling			
Hg/PCB sediment survey	integrated in Niles site	1 site 2000-01 (Niles)	
Hg/PCB Source investigation			
PAH sediment survey	integrated in Niles site	1 site 2000-01 (Niles)	
Chlorinated pesticides sediment	integrated in Niles site	1 site 2000-01 (Niles)	
Copper in stormwater			*Fixed station 1989-95
Diazinon in stormwater			

II. MYP Elements

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II.C Watershed Assessment

Objective: Support watershed-based management efforts through characterization of existing resource values and beneficial uses, and through exploration of a variety of indicators to identify critical areas and functions to be addressed by management actions for protecting and restoring creeks and watersheds in Alameda County.

Basic concepts

A stream, lake or other waterbody is part of a system that involves the surrounding upland area or watershed that drains to it, as well as the entire drainage network of channels and pipes that carry the water from headwaters to mouth. Changes to either upland areas or channel network may involve physical, chemical or biological characteristics, and these changes interact to produce cumulative effects on the system. These effects may be most visible in a part of the stream far removed from the area where changes occurred. The response of the system may also continue to evolve for many years after the initial impact. In both urbanized and non-urban parts of Alameda County, many streams show cumulative effects of past landuse changes and alterations to the channel network.

A watershed system involves many complex processes, with inputs and outputs interacting at many scales. Indicators are individual measurable parameters that express or summarize different aspects of these processes. Ecological indicators can be physical, chemical or biological; while all three types should be integrated for a comprehensive watershed assessment, individual indicators can be useful for answering specific management questions.

Watershed assessment is conducted to help make informed decisions about future management activities and help clarify and resolve issues within a watershed (Figure II-1). The details of the watershed assessment process will vary for individual watersheds (FISRWG 1998, WPN, 1999) but are typically incorporated into a common framework (see Figure II-3). In all cases a preliminary overview includes mapping of main features, listing of assessment participants and identification of the main stakeholder interests and resource concerns. From this base, a process of goal-setting and issue identification must be used to focus the objectives of assessment so that appropriate indicator selection and data gathering techniques can follow.

ACCWP approach

ACCWP is not a primary resource management entity. Its main role in watershed assessment is to inform and facilitate watershed management by co-permittees and their local partners. A secondary objective is to assist the Regional Board in assembling improved watershed information for its Clean Water Act reporting and assessment of the condition of beneficial uses.

The Watershed Assessment component has three main objectives:

- Develop a cost-effective system for managing and presenting watershed data, using a Geographical Information System (GIS).
- Develop and refine a suite of indicators for evaluating the physical, chemical and biological functioning of watersheds, and identify effective ways to apply them in urban streams.
- provide guidance and support for application of improved watershed understanding to protection and restoration of watershed resources.

The MYP groups watershed assessment activities under five elements:

- II.C.1 Watershed classification and mapping leading to refinement of physical indicators
- II.C.2 Biological indicators of creek health and ability to support aquatic life.
- II.C.3 Basic screening indicators of water quality and absence of human-caused toxicity
- II.C.4 Indicators of human health risk from light contact with natural waters. (Heavy water contact recreation is mostly limited to a few heavily managed lakes and is not a primary management focus)
- II.C.5 Integration and interpretation of watershed data for specific management and educational purposes.

The Program will develop a detailed workplan for watershed assessment as part of a report on watershed management to be submitted in accordance with permit section C.11. The workplan will incorporate Tier 1 screening approaches for the first four of these elements. These indicators and any additional ones will be refined and adapted in response to issues and needs identified through comparison with additional assessment information from selected pilot watersheds. Details of assessment implementation will depend on the participation of local managers and other stakeholders.

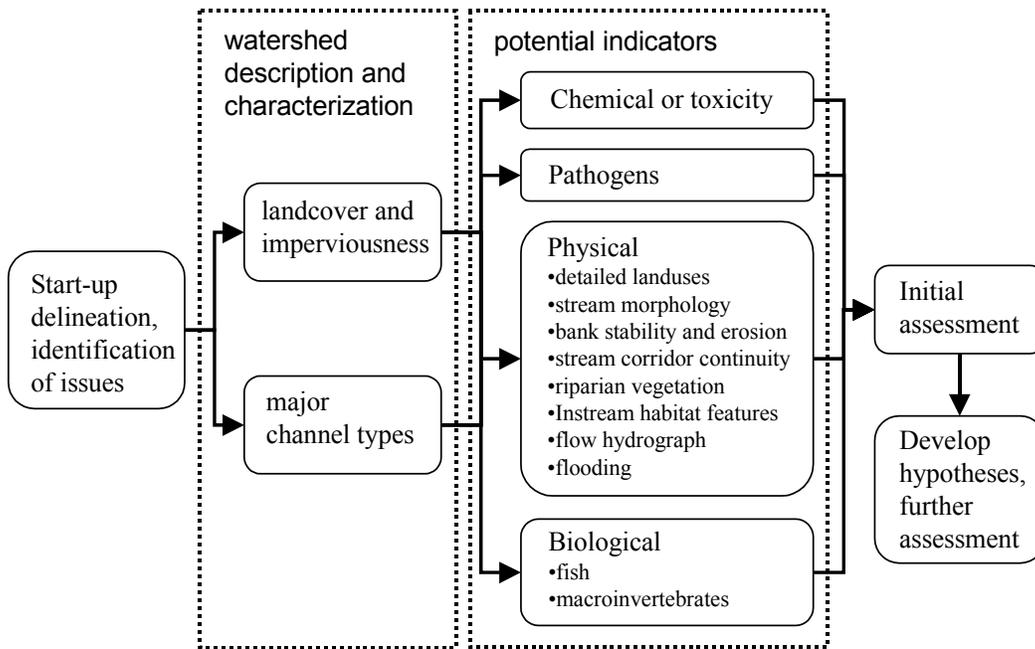


Figure II-3. Generalized framework for watershed assessment
 adapted from the Oregon Watershed Assessment Manual (WPN 1999)

II.C.1 Watershed classification and physical indicators of creek health:

Objective and scope: Use analysis of landscape-level similarities and differences in watersheds or sections of watersheds, to help interpret indicator data and make useful distinctions among these watersheds. Refine selected physical parameters as indicators to complement chemical and biological indicators.

Background:

An important objective for watershed classification and physical indicator development is the identification of priority areas for management action. In the context of urban and urbanizing watersheds, examples of such areas are

- a) sensitive areas or special resources valued by stakeholders and requiring protection
- b) areas being degraded or at risk of degradation without active intervention
- c) areas with potential for upgrading existing uses through rehabilitation or restoration activities.

The proportion of impervious surface in the watershed is one of the strongest indicators of initial urbanization impacts on stream function (Zielinski, 2002). While most of Alameda County's urban watersheds exceed the 25% imperviousness suggested by the Center for Watershed Protection as a threshold for a "non-supporting" classification, many streams still provide some support for biological or other community resources. Additional physical indicators can be used to distinguish varying levels of habitat quality. Channel alterations and fragmentation of the riparian zone may also be useful landscape-scale indicators of watershed condition (Roni et al 2002), with a varying relationship to impervious area depending on development history and geologic conditions.

Approach

ACCWP's watershed delineation is based on available topographical and drainage information, which has been refined for most urban areas in the Creek and Watershed maps produced by William Lettis and Associates (Sowers 1997, 1999, 2000, 2003). Initial classification of stream reaches will be based on two major indicators of urban alteration: percentage of impervious area and channel modification by channelization or culverting (Fig. II-3). ACCWP is using Landsat Thematic Mapper remote sensing data as a base for determining density of development, with overlays of available municipal data for roads and other surface construction to improve accuracy. ACFCWCD data and the Creek and Watershed maps provide basic channel information for the western Bay slope portion of the county. Mapping efforts by Zone 7 and William Lettis Associates will also develop channel and watershed data for portions of the Alameda Creek watershed.

The Program will map zones with different combinations of these primary indicators to produce a preliminary classification based on a hypothetical relationship of their cumulative effects to conditions in the creeks. This relationship will be initially checked against detailed habitat

studies (ACFCWCD and HES, 2002) and other information gathered in the District's pilot assessment of the San Lorenzo Creek watershed. More limited biological indicator information from other watersheds will also be used for verification.

The watershed assessment workplan will address data gaps and other work needed to refine this classification model. Subject to availability of data and priorities set by local management objectives, additional indicators of watershed function and their measurable assessment parameters could be selected, and a strategy for rating or scoring each parameter and the potential causative factors may be developed.

Activities

No.	Description	Approx dates	Task ID, Status May2003
1.	Draft detailed subplan	Draft Dec 2003	WA-1.2 Planned
2.	Develop long-term workplan	February 2004	WA-1.2 Planned
3.	Review data from initial pilot watersheds	FY2003/04 and FY04/05	WA-3.2 Proposed
4.	Review indicators used and identify additional candidates	FY04/05- FY07/08	WA-2.1 Proposed

WAUs and/or watersheds

WAU	Current status	Planned activities
1	Landcover and Channel data available, partially checked	
2	Landcover and Channel data available, partially checked	Lake Merritt and Sausal pilot watershed verification FY 2004-05
3	Landcover and Channel data available, partially checked	
4	Landcover and Channel data available, partially checked	San Lorenzo watershed pilot review FY 2003-04
5	Landcover and Channel data available, partially checked	
6	Landcover data to be checked; Channel data refinement needed	
7	Landcover data to be checked; Channel data refinement needed	
8	Landcover and Channel data available, partially checked	Laguna Creek pilot watershed verification FY 2004-05 or FY05-06

Related tasks and activities:

- Watershed delineation and basic characteristics to be included in report on integration of watershed management activities as specified in permit section C.11.
- Coordinate the refinement of biological indicators and classification approaches with Bay Area Macroinvertebrate Bioassessment Information network (BAMBI).
- Obtain other detailed assessment information from local watershed partners or stakeholders.

II.C.2 Biological Indicators of Creek Health

Objective and Scope: Use biological indicators to describe the functional condition of streams, and relate these indicator values to support for management objectives and beneficial uses related to aquatic and riparian organisms and their habitats..

Background: Useful biological indicators are those that display a range of variation that can be associated with gradients or variations in stream condition. Because of the wide range in size and anthropogenic change in Alameda County streams and watersheds, a single indicator may not effectively characterize all support conditions. Fish, particularly salmonids, are species of interest in natural systems but are sometimes difficult to sample and are excluded from many streams by flow regime or local barriers. Benthic macroinvertebrates (BMIs), the insects and other small animals that live in the bottom substrate of a stream, are an important indicator of biological and ecological health because they recycle nutrients and are a major component of the riparian food web. BMI communities are found in practically all streams and their makeup changes in response to pollution and habitat changes. Extensive guidance on development and use of BMI indicators has been supported at the national and state levels (e.g. Barbour, et al 1997), and a number of agencies and volunteer groups have begun to sample BMIs in Bay Area creeks using the California Stream Bioassessment Procedure (CSBP, 1999)

Approach: Initial screening and classification will be based on community composition of two taxonomic groups:

- fish for larger perennial streams or where there are populations of special interest
- BMI assemblages for streams with predominantly natural bottom substrate.

ACCWP has reviewed available data and professional knowledge about fishery resources in Alameda County creeks.(SFEI 1999, HES 1999, ACFCWCD and HES 2002). After 2-3 years of BMI data have been collected, a summary report and detailed workplan will be developed for further sampling. Benchmarks for data interpretation will be developed in regional collaboration through the Bay Area Macroinvertebrate Bioassessment Information Network (BAMBI), along with BASMAA members, RWQCB and other agencies or groups.

Activities

No.	Description	Approx dates	Task ID, Status May2003
1.	Inventory of fishery resources in Oakland creeks	FY97-98	complete (WCC and HES, 1998)
2.	Inventory of available fisheries data	FY00/1 – FY02/3	4.2.6 Phase 1 complete 2001 (URS);
3.	Preliminary mapping of areas where fish community data may be useful	FY01/2 – FY02/3	WA-1.1 Version 1 map completed 2002
4.	Pilot BMI community surveys in San Lorenzo watershed (ACFCWCD)	FY 97/98 – FY99/00	Sampling completed; data review to be integrated with Activity #7

5.	Conduct ACCWP BMI sampling program	FY00/01 - FY07/08	WA-2.1 Initiated April 2001 (BAS 2002); further review in Activity #7
6.	Promote regional development of biocriteria (benchmarks and application methodology) for BMI indicators	FY00/01 - FY07/08	WA-2.1 Issue papers drafted on regional needs, concept proposal submitted for funding to conduct regional data analyses.
7.	Prepare 3-year summary report and detailed workplan	FY03/04	WA-2.1 Planned
8.	Develop and test preliminary classification based on biological indicators in focus watersheds	FY04/05 – FY06/07	Proposed at regional level via BAMBI
9.	Coordinate and acquire additional Alameda County data from other agencies and sources	FY04/05- - FY05/06	WA-2.1 Planned
10	Plan refinements to use of fish/BMI indicators, and consider other groups e.g. vegetation/algae	FY 04/05 - FY07/08	WA-2.1 Proposed

WAUs and/or watersheds

WAU	Current status	Planned activities
1	Codornices Creek fish surveys by watershed group; BMI sampling 2003 by ACCWP (1 site)	Codornices BMI sampling 2004 by RWQCB
2	BMI surveys with Friends of Sausal Creek 1997-2001. BMI sampling 2001-03 ACCWP (1-3 sites)	Continue Sausal creek professional sampling as restoration project follow-up
3	BMI sampling 2001-2003 by RWQCB	
4	Multi-year, multi-site dataset by ACFCWCD	Continue sampling
5		
6	Arroyo Las Positas BMI sampling 2001 by RWQCB	Arroyo Mocho BMI sampling 2004 by RWQCB
7		
8	Laguna and Mission Creek sampling 2001-03 by ACCWP (4-5 sites)	

Related tasks and activities:

- Spatial and temporal patterns in biological indicator data will be integrated with physical indicators, developed through GIS mapping and also more detailed assessment strategy
- More qualitative interpretations of data will be explored through support for local watershed efforts, including volunteer monitoring workshops and work with city staff.

II.C.3 Water Quality Screening in Watersheds

Objective and Scope: Use basic water quality parameters and selected chemical indicators to screen conditions at representative watershed sites.

Background: Water quality objectives are established in the Basin Plan for basic parameters including temperature, pH and dissolved oxygen. These data are routinely collected along with benthic macroinvertebrate samples in creeks. However screening for selected parameters at additional sites and at other times of year can provide complementary information about urban stream conditions.

Approach: ACCWP will screen approximately 10 selected sites semiannually in spring and fall during dry weather. Sites will be selected to represent a range of urban stream conditions and different WAUs. For the initial pilot screening in FY2002/03, screening parameters will include the basic water quality parameters listed above and also turbidity, conductivity, ammonia and free and total chlorine. Grab samples will be collected for diazinon, hardness and total copper and zinc. Sites with elevated values of one or more pollutants may be flagged for follow-up or other action. The site list will be revised each fall to extend the coverage to new watersheds.

Activities

No.	Description	Approx dates	Task ID, Status May2003
1.	Develop SOPs and sampling plan	FY02/03	MS-1.4 In progress
2.	Pilot sampling	FY02/03	MS-1.4 Sep 2002 completed (13 sites); May 2003 planned
3.	Pilot test of Rapid Trash Assessment Protocol by RWQCB	FY02/03	MS-2.1 Initial field test completed August 2002; ACCWP pilots September 2002
4.	Refine and continue sampling	FY03/04- FY07/08	MS-1.4 Proposed

WAUs and/or watersheds

WAU	Current status	Planned activities
1	3 sites screened September 2002	Repeat screening May 2003
2	2 sites for trash pilot assessment, 1 site screened September 2002;	Repeat screening May 2003
3		Screen FY2003/04
4	2 sites for trash pilot assessment, 3 sites screened September 2002	Repeat screening May 2003
5	2 sites for trash pilot assessment, 2 sites screened September 2002	Repeat screening May 2003
6		
7		
8	Laguna Creek dry season sampling at 3 sites (2002); 4 sites screened 9/02	Salop (in prep); repeat screening in May 2003

Related tasks and activities:

- Screening stations may include sites used in long-term trends monitoring for pollutants of concern.
- Support for local watershed efforts, including volunteer monitoring workshops and work with city staff.
- Coordinate with Zone 7 and the Alameda County Water District for screening data in the Alameda Creek watershed.

II.C.4 Indicators of Human Health Risk

Objective and Scope: Use a variety of indicators and strategies to assist watershed managers in evaluating risks to humans from non-immersion water contact in creeks and lakes.

Background: Alameda County is home to a wide variety of creek types, ranging from fairly natural in stretches, to hardened above-ground channels, to completely culverted conveyances. It follows that all creeks are not able to support the same types of uses; some creeks allow relatively easy public access and are popular recreation sites, while others are inaccessible except to the property owner.

The ability of creeks to support a variety of water contact recreation activities is an important concern ACCWP member agencies. Elected officials, managers, and citizen groups would like to ensure that creeks are safe to work and play in. Because of small watersheds and a history of heavy urbanization, relatively few County creeks support recreational activities associated with heavy water contact (e.g., swimming, fishing); therefore these should not be compared with water quality objectives developed for intensive water contact activities. The resource objectives for the County's urbanized creeks depend on their current condition and the degree of modification/restoration that the local community in the watershed wants that can reasonably be accomplished given available resources and existing physical constraints.

Coliform bacteria have traditionally been used as the standard indicator of sewage contamination in receiving waters. However, there are well-known problems with the interpretation of coliform data. Coliforms are not themselves pathogens, and can be introduced to stormwaters from sources other than sewage (e.g., mammals other than humans). Because coliforms do not provide a reliable signal of human sewage contamination, they are not always useful in identifying and tracking sewage inputs to creeks and streams. The primary objective for many water quality managers is to identify alternative indicators that more reliably indicate human sources and provide more accurate measures of pathogen concentrations in stormwater.

Approach: Initial efforts will focus on developing information that can be used to assist in interpretation of existing indicators and monitoring data. Because there is no perfect indicator for all situations, emphasis will be on identifying useful strategies for selecting appropriate indicators and interpretations of available data. ACCWP will also explore specific water contact recreation issues in individual watersheds as interest in particular areas (e.g., Lake Merritt) and issues (e.g., homeless encampments, suspected sanitary sewer infiltration) dictate.

Activities

No.	Description	Approx dates	Task ID, Status May2003
1.	Literature review of potential contact recreation indicators	FY00/01 – FY02/03	4.2.3 Final draft (URS, in prep)
2.	Analysis of existing Alameda County data	FY00/01 – FY02/03	MS-3.1 Draft memo (URS, in prep)
3.	Develop guidance for interpretation of contact recreation indicators	FY02/03 – FY03/04	MS-3.1 Initiated Mar 2003
4.	Review of Lake Merritt coliform testing program	FY02/03 - FY03/04	WA-3.1 Initiated Apr 2003
5.	Development of summary document, GIS layer outlining existing water contact recreation activities supported within the north county	FY02/03 – FY04/05	WA-3.1 Initiated Mar 2003
6.	Identify priorities for further activities	Fy04/05 – FY07/08	WA-3.1 Proposed

WAUs and/or watersheds

WAU	Current status	Planned activities
1		
2	Lake Merritt bacteria monitoring (ongoing); City of Piedmont storm sewer monitoring (2000)	Review of Lake Merritt monitoring program.
3		
4		
5		
6		
7		
8	Laguna Creek dry season sampling at three sites (2002)	Salop (in prep)

Related tasks and activities:

- Coordinate with SCCWRP five-year study targeting development of a rapid indicator for microbial contamination.
- Coordinate with Stanford / SFEI monitoring project in Bay and tributary watersheds
- Coordinate with City of Fremont Laguna Creek Monitoring Program or other local agencies as appropriate.

II.C.5 Data Integration and Interpretation

Objective and Scope: Provide useful information and support to assist watershed approaches to stormwater management activities.

Background: Local municipalities and other watershed managers need useful data and effective presentations to support their activities and engage the involvement of various stakeholders including public officials, other agencies and community groups.

Approach: The Program will maintain a GIS inventory of information about Alameda County watersheds and data that can inform watershed management decisions. Basic characteristics of watersheds and ACCWP co-permittees will be included in a report to be submitted in compliance with Section C.11 of the permit. Watershed information will also be presented and updated regularly on the ACCWP website (www.cleanwaterprogram.com). Watershed information, GIS and other technical resources will also be used on an on-call basis to support specific watershed monitoring or outreach activities by the Program, its member agencies and partners.

Activities

No.	Description	Approx dates	Task ID, Status May2003
1.	Incorporate watershed maps and basic information on website, with regular updates	FY02/03 – FY07/08	WA-3.3 In progress
2.	Provide watershed characterization and issues information for watershed management report	FY03/04	WA-3.2 Planned
3.	Integrate watershed assessment planning with local management priorities and available data	FY03/04 – FY07/08	WA-3.2 Planned
4.	Update watershed assessment plans as needed	FY04/05 – FY07/08	WA-3.2 Proposed

WAUs and/or watersheds

WAU	Current status	Planned activities
1		
2	Lake Merritt monitoring program by City of Oakland	Review of Lake Merritt bacteriological datasets FY03/04
3		
4	San Lorenzo Pilot watershed assessment by ACFCWCD	Integrate with BMI data and WQ review by Program FY2003/04
5		
6		
7		
8	Laguna Creek Watershed Monitoring Program, 2001-02 by city of Fremont	Review of summary report FY03/04

Related tasks and activities:

- ACCWP's Policy Level Work Group will coordinate reporting of watershed management activities by Program co-permittees and facilitate further collaborations to address watershed issues.

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II.D Pollutants of Concern

Pollutants of Concern (POCs) are substances that enter the environment as a result of human activities in quantities large enough to cause harm to aquatic ecosystems or human uses of these systems. Several pollutants have been found to be widespread in the environment and are suspected of causing impairment to San Francisco Bay. In some cases these pollutants also have the potential to impair creeks and lakes in the watersheds that drain into the Bay. Several MYP elements address local and regional needs for technical information to address POCs in these different environments.

Past ACCWP Monitoring

In the late 1980s, review of progress under the Clean Water Act suggested that sources of pollutants other than traditional point sources were contributing “significant” discharges of POCs to the San Francisco Estuary. In response to this, the Program implemented studies to evaluate the effect of urban runoff on the receiving waters of the Bay. Some of the findings of this initial Loads Assessment (WCC, 1991) included:

- Intermittent exceedances of water quality objectives for a few of large suite of metals analyzed, including cadmium, copper, lead, and zinc
- Regular aquatic toxicity from stormwater samples in urbanized areas of the County
- Detectable concentrations of polycyclic aromatic hydrocarbons (PAHs) in most of the stormwater samples
- Infrequent detections of organochlorine (OC) pesticides in dry weather samples
- Elevated concentrations of sediment-associated POCs
- Initial estimates of loadings to the Bay suggest that nonpoint source loads from Alameda County form a much higher percentage of the total loads to the Bay than point source loads.

ACCWP continued monitoring runoff and sediment at some of its fixed monitoring stations through the 1996-97 sampling season. The Program also instituted a number of special studies investigating individual pollutants. These studies included a characterization of pollutant occurrence and reduction in the Demonstration Urban Stormwater Treatment (DUST) Marsh, continued toxicity testing at multiple locations, and extensive studies of the insecticide diazinon (e.g. Scanlin and Feng 1997).

Ongoing Regional Efforts

In 1993, the San Francisco Regional Water Quality Control Board created the Regional Monitoring Program for Trace Substances in the San Francisco Estuary (RMP) in collaboration with regulated dischargers and dredgers. Each year the RMP analyzes water, sediment, and biota from throughout the Estuary for a variety of trace organic compounds, trace metals, and ancillary water quality parameters. ACCWP and other dischargers provide funding and contribute to discussion and review of results.

As a result of its 1998 review of data from the RMP and other sources, the Regional Board listed San Francisco Bay as impaired due to the following pollutants:

- Diazinon, an organophosphate (OP) pesticide
- Metals including copper, nickel, mercury, and selenium
- polychlorinated biphenyls (PCBs),
- chlordane, DDT, and dieldrin, long-lived OC pesticides

The U.S. EPA subsequently added dioxins and dioxin-like compounds to causes of Bay impairment, and listed urban creeks throughout the Bay Area as impaired by diazinon. Under the provisions of the Clean Water Act, the Regional Board must develop strategies to meet water quality standards by drafting a Total Maximum Daily Load (TMDL) plan for each of the listed POCs. Each TMDL will identify sources of the impairing pollutant to the water body, determine the total input that the water body can safely “handle,” and allocate loadings of the contaminant among dischargers. The Regional Board is developing TMDLs for San Francisco Bay for mercury and PCBs, and a TMDL for diazinon in creeks; other TMDLs are scheduled for the near future. (TMDL documents available at <http://www.swrcb.ca.gov/~rwqcb2/tmdlmain.htm>).

To further assist the Regional Board in controlling POCs, the Bay Area Clean Water Agencies (BACWA) and Bay Area Stormwater Management Agencies Association (BASMAA) joined with the Regional Board to establish the Clean Estuary Partnership (CEP) in 2001. The purpose of the CEP is to work cooperatively to identify and fill data gaps to support development of scientifically valid TMDLs and other strategies for water quality attainment.

ACCWP Approach

As in the past, ACCWP will make use of an adaptive management strategy, allowing its stormwater management activities to evolve based upon findings and developments of these and other regional efforts and feedback from co-permittees regarding TMDL implementation.

The MYP includes three specific elements that will be used to focus stormwater monitoring and management efforts over the course of the permit:

- II.D.1 Continued participation in regional efforts to gain understanding of impacts of POCs upon the Bay and to work to mitigate negative impacts through implementation of water quality attainment strategies
- II.D.2 Characterization of the occurrence of POCs in Alameda County watersheds, and investigations to identify potential sources and information to support strategies for pollutant control
- II.D.3 Use of traditional water quality indicators to describe the impacts of POCs associated with stormwater runoff upon Alameda County creeks

Each of these elements is discussed below. Management actions to address priority POCs are described in Pollutant Reduction Plans (PRPs) that will be refined and updated regularly. The Plan (ACCWP, 2003) includes draft PRPs for copper, mercury, pesticides (diazinon, other OP pesticides, and OC pesticides), and PCBs and dioxin-like compounds. In addition to monitoring activities, PRPs include other activities mentioned in Section IIE.

II.D.1 Pollutant Impacts to San Francisco Bay

Objective and Scope: Participate in regional efforts to a) gain understanding of impacts of specific pollutants upon the Bay; and b) mitigate negative impacts through implementation of water quality attainment strategies.

Background: The development of Water Quality Attainment Strategies, including TMDLs, is required because the San Francisco Bay-Delta and its tributaries have been designated as impaired water bodies under Section 303(d) of the federal Clean Water Act. There are several regional efforts that are currently helping to address unknowns surrounding pollutants of concern and their impacts upon the Bay. The ACCWP is an active participant in and provides financial support to two of the most important of these efforts, the Regional Monitoring Program for Trace Substances in the San Francisco Estuary (RMP) and the Clean Estuary Partnership (CEP).

The RMP was developed in 1993 to provide data describing the concentration of trace elements and trace organic contaminants in the San Francisco Estuary. Its objective is to aid management of pollution in the Estuary by providing information on the status and trends of contamination, sources and pathways of contamination and their relative importance, and the potential effects of contamination upon organisms that live in or use the Estuary. As such, the RMP is providing baseline information necessary to understanding the functioning of the Bay as an ecosystem..

The CEP is a collaborative effort among the Regional Board, treatment plant dischargers (BACWA), and urban runoff programs (BASMAA) to support development and implementation of TMDLs and other water quality attainment strategies for specific pollutants of concern in San Francisco Bay. The CEP is currently developing and conducting special studies to provide defensible scientific data on which to base TMDLs for mercury, PCBs and pesticide-related toxicity, as well as site-specific objectives for copper and nickel in the northern and central portions of the Bay.

After studies in the South Bay indicated that automobile brake pads may be the most significant source of copper in urban runoff, the Brake Pad Partnership (BPP) was initiated in 1996 as a collaboration among regulators, stormwater programs, brake materials manufacturers, scientists and environmentalists to address environmental problems from brake wear debris. The BPP's work includes research and monitoring, and is an integral part of the TMDL implementation plan for copper in all parts of the Bay.

Approach: ACCWP attends annual meetings of the RMP and is represented through the BASMAA Monitoring Committee in other RMP committees and workgroups. In 2002, the RMP initiated changes in its water and sediment sampling programs based on changes recommend in a Five Year Review. The RMP will incorporate changes to its bioaccumulation monitoring program beginning in 2003. Details of these programs are available at <http://www.sfei.org/rmp/index.html>.

ACCWP provides representation for BASMAA on the CEP's Executive Management Board and Technical Committee. The CEP is in the process of developing and refining a Five Year Plan. Details of this program are available at <http://www.cleanestuary.com>. Although the Five-Year CEP budget is intended to cover most POC-related special studies that were formerly conducted by individual stormwater programs, ACCWP will to continue some monitoring activities involving:

- POCs that are not on the priority list for the CEP
- Studies of site conditions or source control issues that are particular to Alameda County
- Participation in CEP committees and workgroups

ACCWP has contributed support to the BPP directly and through BASMAA. ACCWP attends annual stakeholder meetings and is assisting the BPP with the watershed modeling portions of its action plan for evaluating fate and transport of copper originating from brake wear debris.

Activities:

No.	Description	Approx dates	Task ID, Status May 2003
1.	RMP participation	1993 - ongoing	MS-1.1 Ongoing
2.	CEP participation	FY02 - ongoing	MS-1.6 Ongoing, Five Year plan expected spring 2003

Related tasks and activities:

- Continue cooperation with Clean Estuary Partnership and other BASMAA programs in further characterizing spatial extent of loadings from watershed sources.
- Continue cooperation with Brake Pad Partnership in monitoring changes in brake pad manufacture and usage, and their expected impact upon receiving waters.

II.D.2 Spatial distribution, loadings and sources of Pollutants of Concern in watersheds

Objective and Scope: Characterize spatial occurrence and concentrations of priority POCs in Alameda County watersheds, and identify potential sources

Background: There are a number of POCs in the San Francisco Bay area that are long-lived in the environment and predominantly associated with sediments: polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), mercury, organochlorine (OC) insecticides, and dioxins. These pollutants primarily affect the beneficial uses of fishing, wildlife habitat, and preservation of rare and endangered species. Section C.10 of the permit requires the Program to collect information to assist the Regional Board in estimating loadings for several of these pollutants.

Defensible estimates of the loadings of these pollutants to the Bay are difficult to generate, as are assessments of the exact impacts of these loadings. The ACCWP has initiated a monitoring program to assess the spatial distribution of these pollutants as an indicator of loadings to the Bay from County watersheds (Gunther et al 2003). The underlying assumption of this project is that bedded sediments with substantially higher pollutant concentrations than Bay sediments may indicate upstream pollutant sources. If sediments at the base of a watershed are consistently found to have significantly higher pollutant concentrations, then follow-up source investigations can be conducted to ascertain whether there are current, controllable sources discharging pollutants into stormwater conveyances.

Approach: Initial analysis of pollutant distribution and loadings involves collection of watershed sediments and analysis for PCBs, mercury, OC pesticides, PAHs, and dioxins. Follow-on work will be subject to coordination with the CEP, RMP and other regional data sources., but may include the following approaches:

- incorporation of additional analytes per the needs of upcoming TMDLs
- focus on source investigations identified as part of initial sampling efforts

Activities:

No.	Description	Approx dates	Task ID, Status May2003
1.	Initial fixed station Loads Assessment	FY1988/9-90/1	Complete (WCC, 1991)
2.	Characterization of diazinon occurrence in watersheds, uses, and wash-off characteristics; development of reduction strategy	FY 1995/6-2001/2	Complete (Scanlin and Feng 1997, others listed in Section IV)
3.	Initial investigation of spatial distribution of pollutants of concern in County watershed sediments	FY00/01 through FY03/04	MS-1.2 Completed for Hg, PCBs (Salop et al 2002a) MS-1.2 Dioxins reanalysis initiated February 2003

4.	Synthesis of background data and scientific information on specific POCs	FY00/01 through FY02/03	4.2.1 Completed for PAHs (Salop, et al., 2001) MS-3.1 Dioxins synthesis initiated March 2003
5.	Pilot source investigation studies in Glen Echo and Ettie Street drainages	FY/02 through FY02/03	MS-2.1 Complete (Salop, et al., 2002b), follow-up to be supported by Prop 13 grant to City of Oakland
6.	Investigation of source identification and remediation strategies	FY03/04 through FY 04/05	MS 2.1 Control options for POCs in sediment, initiated January 2003. MS-3.1 Dioxins synthesis
7.	Continue source investigations, as required	FY03/04- FY07/08	MS-2.1 Watersheds and analytes TBD
8.	Initiate trend monitoring program following identification of appropriate long term sites for sediment-related POCs	FY03/04- FY07/08	MS-1.2 Awaiting completion of source investigations and determination of sampling sites (Gunther et. al 2003)

WAUs and/or watersheds

WAU	Current status	Planned activities
1	Strawberry Creek, Codornices Creek Loads Assessment (1989-91); Strawberry Creek (2000) Codornices Creek and Cerrito Creek sampling (2000-01)	Write up results of 2000 Codornices Creek detailed sediment sampling
2	24 th and Wood, 37 th and 8 th , 4 th and Alice, Elmhurst Creek, Ettie Street Loads Assessment (1989-91); Arroyo Viejo, Ettie Street Pump Station, Glen Echo Creek, Lion Creek, Sausal Creek, and Seminary Creek sampling, 2000-01; Ettie Street and Glen Echo Creek source investigations, 2001	Continued Ettie Street source investigation via Prop 13 grant, anticipated to begin in 2004. Analysis of sediment dioxins in Ettie Street, Glen Echo Creek, Lion Creek, (2003)
3	Merced and Wicks Streets Loads Assessment (1989-91); San Leandro Creek sampling, 2000-01	Analysis of sediment dioxins in San Leandro Creek (2003)
4	Cotter Way, San Lorenzo Creek, Castro Valley Creek Loads Assessment (1989-91); Castro Valley Creek (2 sites) and San Lorenzo Creek sampling, 2000-01	Analysis of sediment dioxins in San Lorenzo Creek (2003)

5	Cabot Blvd. Loads Assessment (1989-91); Crandall Creek (2000) and Cabot Blvd / Line 4-A sampling (2000-01); Dry Creek, Pacific Street Loads Assessment (1989-91); Alameda Creek (2000-01) and Dry Creek sampling (2000)	Analysis of sediment dioxins in Cabot Blvd. / Line 4-A (2003); Analysis of sediment dioxins in Alameda Creek (2003)
6		Integrated in Niles sample
7	Alameda Creek sampling, 2000-01 (at Niles)	Analysis of sediment dioxins in Alameda Creek (2003)
8	Balentine Drive Loads Assessment (1989-91); Agua Caliente (2000), Balentine Drive, and Laguna Creek (2000-01) sampling	Analysis of sediment dioxins at Balentine Drive site (2003)

Related tasks and activities:

- Continue cooperation with Clean Estuary Partnership and other BASMAA programs in further characterizing spatial extent of loadings of priority pollutants from watershed sources.
- Continue cooperation with City of Oakland in implementing Prop 13 project to identify and cleanup sources of PCBs in the Ettie Street watershed (2004-2005)
- Continue cooperation with BASMAA member agencies in refining source investigation techniques.
- Monitor developments in techniques that can be used to estimate loadings from local watersheds.
- Continue cooperation with Brake Pad Partnership in investigation of copper loadings from Castro Valley Creek watershed as part of Proposition 13 grant.

II.D.3 Pollutants of Concern-long term trends in watersheds

Objective and Scope: Use traditional water quality indicators to describe the impacts of stormwater runoff upon instream beneficial uses in Alameda County creeks.

Background: Several POCs have potential to cause impacts to streams in Alameda County. These pollutants include organophosphate (OP) insecticides, copper, lead, and zinc, and these and/or other pollutants causing aquatic toxicity. Toxicity studies in the Castro Valley Creek watershed (Hansen 1995) documented that storm runoff was frequently toxic to standard aquatic test organisms and that diazinon was the most likely cause of this toxicity. Since then, diazinon, an OP insecticide, has been widely detected in creeks throughout the San Francisco Bay area. This is a management concern because the frequency of toxicity found suggests that potentially widespread impacts on aquatic invertebrates might be occurring.

Since the leading OP insecticides (diazinon and chlorpyrifos) are being phased out, a key objective of the monitoring program is to verify that the concentration of these substances, and the toxicity associated with them, decline over the next few years. Due to substitution of other insecticides, it is possible that toxicity may remain after OP insecticide concentrations decline. Thus, another monitoring program objective is to detect toxicity due to alternative insecticides that will likely be used by some consumers.

Copper is a widely used industrial and building material and is toxic to aquatic organisms, particularly in the dissolved phase. However, its presence in stormwater is largely due to its use as an important component of motor vehicle brake pads. The primary question for copper is therefore whether and to what extent its concentrations will decrease over time as a result of efforts at the national level to redesign brake pads. Despite such efforts, average copper concentrations in brake pads have been increasing over the past several years (but are expected to begin to decline at some point in the future). Because there are also natural sources of copper in local watersheds, it will be important to track the overall level of copper enrichment above background concentrations to determine the extent to which management actions are reducing copper concentrations in stormwater.

Specific management questions to be addressed initially through the long-term trend monitoring program include:

- Will wet weather diazinon concentrations decrease as expected?
- Will wet weather toxicity levels decrease in concert with diazinon?
- Will new insecticides cause wet weather toxicity?
- Will wet weather copper concentrations decrease as expected as brake pads are redesigned?
- What are the trends in wet weather concentrations of lead and zinc?

Due to the variability in contaminant concentrations in stormwater, detecting a statistically significant trend requires extensive sampling. Rather than attempt to detect a trend of continually declining concentrations over a period of time, the monitoring approach proposed here is based

on a “before – after” design, in which pollutant concentrations (or impacts in the case of toxicity) from before usage began to decline will be compared to concentrations after usage has declined. In this way, sampling effort can be distributed throughout the County rather than focused on overly intensive sample collections at one site. Information generated by this monitoring program will be used to assess the effectiveness of stormwater BMPs, better define current and potential problems, and help in developing improved management strategies such as TMDLs.

Approach: Initial sampling efforts will focus on gathering baseline water quality data to assist in identification of peak concentrations for pollutants prior to their expected decline. Depending on the constituent monitoring, more intensive follow-on sampling will be initiated at an appropriate time to attempt to observe reductions in pollutant concentrations / impacts. Refer to Gunther et al (2003) for details.

Activities

No.	Description	Approx dates	Task ID, Status May 2003
1.	Develop trend monitoring program	FY02/03	Complete (Gunther et al., 2003)
2.	Gather baseline (“before”) data for OP pesticides, toxicity, copper, lead, and zinc	FY02/03 through FY07/08	Continuing
3.	Monitor trends in usage of OP pesticides and potential replacement pesticides	FY02/03 through FY07/08	Review & track project by TDC Environmental for “Trends in Pesticide Usage”
4.	Initiate “after” sampling following assessment that OP pesticide use has declined	Unknown	\contingent on statistical analyses per Gunther et al (2003)
5.	Initiate “after” sampling following assessment that copper concentrations in creek waters have declined	Unknown	

WAUs and/or watersheds (unfinished table)

WAU	Current status	Planned activities
1	Codornices Creek Loads Assessment (1988-90); Codornices Creek in-stream sampling (1991-92).	
2		
3		
4	Castro Valley Creek and San Lorenzo Creek Loads Assessment (1988-90); Castro Valley Creek in-stream sampling (1991-97); San Lorenzo Creek in-stream sampling (1991-93)	Collect baseline results for total copper concentrations, OP insecticides, and aquatic toxicity. Initiate long-term trend monitoring program.
5	Cabot Blvd / Line 4-A Loads Assessment (1988-1990)	

6	Alameda Creek Loads Assessment (1988-90); Alameda Creek in-stream sampling (1991-95)	
7	Alameda Creek Loads Assessment (1988-91); Alameda Creek in-stream sampling (1992-95)	
8	Balentine Drive Loads Assessment (1988-90); Laguna and Mission Creek toxicity sampling 2002 (2 sites)	

Related tasks and activities:

- Participation in Brake Pad Partnership, monitoring levels of copper in brake pad manufacturing.
- Continue cooperation with Brake Pad Partnership in investigation of loadings from Castro Valley Creek watershed as part of Proposition 13 grant.
- Participation in RMP Episodic Toxicity Monitoring Program. RMP has maintained an aquatic toxicity sampling station at San Lorenzo Creek from winter 2001-present.
- Copper concentrations in sediment will continue to be analyzed as part of the spatial distribution / loadings task currently in development by the ACCWP

II.E Review of Best Management Practices and their effectiveness

Objective: Evaluate the effectiveness of representative stormwater pollution prevention or control measures, as required in permit section C.8.a.

Background: Best Management Practices (BMPs) are measures that prevent or minimize pollutant discharges to the environment. Some are routine activities such as good housekeeping, spill prevention, or clean up of pollutants before they enter urban runoff. Others are structural treatment measures that are integrated with the stormwater conveyance system to remove pollutants from runoff before it enters creeks, lakes or other waterbodies. During its first two permit periods ACCWP member agencies established Performance Standards incorporating a variety of BMPs into several component areas: Public Information and Participation (PI/P); New Development and Post-Construction Controls; Illicit Discharge Control and Industrial Facilities Inspection; and Municipal Maintenance.

ACCWP's Monitoring component has conducted special studies to help refine the Performance Standards and assist co-permittees with effective application of BMPs (Table IV-1). In 2002 studies were initiated to provide technical support for extensive requirements in the third permit to provide treatment and hydromodification management for new development and significant redevelopment.

ACCWP's SQMP for FY2002-2008 (Plan) also includes Pollutant Reduction Plans (PRPs), aimed at controlling particular Pollutants of Concern in urban runoff. Some PRP activities represent new BMP approaches involving partnerships within the Program or with other agencies. PRPs will be updated at intervals as specified in Section C.10 of the new permit.

Approach: WAMS will review available information on BMP effectiveness from sources past studies by the Program or other agencies. ACCWP's Policy Level Workgroup (PLWG) will coordinate information gaps identified by various components and develop a strategy for addressing these needs. The Monitoring component will assist the PLWG by conducting technical studies where needed and communicating results and lessons learned.

Activities

No.	Description	Approx dates	Status May 2003
1.	Literature review and other support for Hydromodification Management Plan	FY2003-04	Planned
2.	Review available information on BMPs and their effectiveness.	FY2003-04	Proposed
3.	Identify information gaps in current knowledge	FY2004-05	Proposed
4.	Outline strategies for identifying and selecting representative BMPs for evaluation	FY2004-05	Proposed
5.	Prioritize information needs and develop strategy	FY2004-05	Proposed
6.	Develop studies or review procedures	FY2004-06	Proposed
7.	Conduct studies or implement procedures	FY2004-08	Proposed

Related tasks and activities:

- ACCWP's Policy Level Work Group will explore ways to improve the overall effectiveness of the Program; related technical studies may be included in future MYP updates..
- Other Program activities outside of the MYP include improvements to reports and identifying improved measures of effectiveness for individual components such as PI/P.

III. PLANNED ACTIVITIES FOR FY 2003-2008

This section summarizes the activities in the MYP. Detailed workplans for the next one or 2 years are presented in Section V, which will be updated annually.

III.A Listed by Component

III.A.1 Watershed Assessment

Task WA-1: Develop and maintain a GIS resource for watershed information

WA-1.1 Watershed Inventory: Provide base layers and basic map products for watershed assessment activities of Program, member agencies and interested public.
Long-term: Map base information (watersheds, landcover/landuse, creeks and channels) and assessment data (screening data, fisheries habitat and other biological indicators, watershed project areas) for all WAUs.
FY 02-04: Complete preliminary mapping of initial group of pilot watersheds (including Codornices, Sausal, San Lorenzo, Old Alameda and Laguna Creeks); refine existing information and fill data gaps for channel condition and riparian zone characterization. Identify additional priority watersheds for mapping.

WA-1.2 Watershed assessment planning: Develop a framework for ongoing coordination and planning of watershed assessment, prepare Multi-Year plan and annual updated workplans.
Long-term: Evaluate assessment status, interpret data at landscape level, adapt watershed assessment strategy as needed. Coordinate assessment planning and information with Regional Board staff and other agencies.
FY 02-04: Develop workplan for incorporating new data; Identify needs and priorities and consult with the local co-permittees or other watershed partners

Task WA-2: Use a variety of indicators to assess the condition of streams and watersheds

WA-2.1 Indicators of creek health: Develop and test indicators of general watershed condition.
Long-term: Rotate Rapid Bioassessment macroinvertebrate surveys through relatively natural stream reaches in all WAUs. Support regional coordination for protocol standards, data sharing and biocriteria development, subject to funding by BASMAA or other sources. Update fisheries resources maps for Alameda County.
FY 02-04: Continue macroinvertebrate community sampling in Sausal, San Lorenzo and Mission-Laguna watersheds; begin rotation to one new watershed. Coordinate annual meeting and other regional activities for Bay Area Macroinvertebrate Bioassessment Information Network (BASMAA Task of Regional Benefit). Outline a strategy for applying flow or other physical indicators of stream function, in coordination with SWAMP, Stream Protection Policy and other regional initiatives.

WA-2.2 Volunteer Monitoring: Increase the participation of community stakeholders in watershed stewardship and assessment, and improve coordination of volunteer groups with agencies and other stakeholders.

Long-term: Provide resources and training to citizen monitoring groups that are working with local watershed partners. Increase visibility and effectiveness by working with Watershed Assessment Resource Center (WARC) or other regional information sources.

FY02-04: Continue support of Talks in the Hallway to strengthen community involvement and interest in assessment issues; explore use of community volunteers to supplement macroinvertebrate field sampling or trash assessment.

Task WA-3: Provide useful watershed information to the Program and other watershed stakeholders

WA-3.1 Indicators of Contact Recreation: Improve ability to assess risks to human health from light (non-swimming) contact recreation or activity in creeks.

Long-term: Provide guidance and information on microbial risks to human health to assist watershed managers. Identify potential alternative indicators and explore strategies for monitoring pathogens or other indicators.

FY02/04 continuing tasks: Develop guidance document for watershed managers to assist with interpretation of bacterial monitoring results. The document may include discussion of the following issues:

- guidance for interpreting current indicators (what are the tests, how are the results reported, and what do the results actually tell us)
- how current State standards were developed and are intended to be used (what are the uses they were developed to monitor for, how does this relate to typical uses and use intensity in Alameda County)
- problems inherent in current indicators
- Review of appropriate previous studies and what they tell us about the links between pathogens and indicators
- Brief discussion of alternative indicators under development (what are they, what is their potential, and what are their drawbacks)
- Review of existing sources of County public health information on water-related illnesses

Examine two local issues of water contact recreation, a review of Lake Merritt monitoring data, and a water contact recreation site inventory along the Alameda County shoreline. The Lake Merritt project will include a review of historic monitoring data as it relates to recreational uses supported within the Lake and analysis of the existing monitoring program to determine if it can be altered in order to generate information more useful to watershed managers. The water contact recreation inventory will result in a summary of the common water contact recreational uses supported at the County shoreline. Specific tasks include identification of existing recreational uses, and development of a GIS data layer and supporting documentation.

FY04-08 tasks: Continue ACCWP participation in local watershed pilot projects and assessments. Based on information generated through the water contact recreation inventory or on arising local issues, assist in development of monitoring programs and special studies as needed.

- WA-3.2 On-call watershed support:** Support watershed management efforts led by Program member agencies.
Long-term: Conduct local pilot projects or assist member agencies in conducting watershed inventory and planning. Develop and test a strategy for use of screening-level flow and physical habitat indicators.
FY02-04: Draft Watershed Framework to provide guidance on watershed-based management to municipal staff and other local groups. Provide technical assistance in design and implementation of watershed-specific monitoring plans. Review local watershed assessment efforts and
FY04-08: Refine list of potential physical indicators. Pilot field tests of indicators and checks of preliminary classifications based on fisheries and macroinvertebrate assessments
- WA-3.3 Website support:** Disseminate information about Alameda County watersheds and background on local watershed issues.
Long-term: Provide local watershed atlas and information resource to the public, creek groups and watershed stakeholders. Improve interactive response and coordination with other regional resources such as Oakland Museum and Contra Costa Water Web.
FY02-04: Augment watershed maps and other creek information for new section of ACCWP website to be launched FY02/03.. Increase the accessibility of monitoring and assessment data.

III.A.2 Monitoring and Special Studies

Task MS-1: Characterize and track pollutants of concern which are found in urban runoff and have been identified as possible sources of impairment.

MS-1.1 RMP contribution: Contribution for required participation in Regional Monitoring Program.

MS-1.2 TMDL data collection: Continue sampling and reporting for Pollutants of Concern in sediment, including Mercury, PCB and organochlorine pesticides, as requested by Regional Board staff.

Long-term: Characterize watershed occurrences of pollutants of concern and support TMDL development, in coordination with contributions to the CEP.

FY02/03: Characterize occurrence of dioxins in ACCWP watershed sediments. In place of additional field sampling, archived sediments from the first two years of sampling will be analyzed for presence of dioxins and dioxin-like compounds. The laboratory results will be reviewed to gather information on spatial distribution and spatial and temporal variability.

FY04-08 tasks:

Implement sediment quality trend monitoring program: as outlined in the ACCWP Long-term Trend Monitoring Program, the Program will identify one to two target watersheds and begin trend monitoring in sediments. Initial analytes will include PCBs, mercury, copper, PAHs, and organochlorine pesticides, and may be adapted as management needs dictate.

Characterize County watersheds for other pollutants of concern, as required for TMDL development or as dictated by management concerns. Subject to available funds, collect and analyze watershed sediments for additional analytes.

MS-1.3 Baseline trend monitoring for Pollutants of Concern: Collect baseline stormwater monitoring data for Castro Valley Creek to assess long-term trends in selected Pollutants of Concern in County creeks.

FY02/04: Implement water quality trend monitoring program. As outlined in the ACCWP Long-term Trend Monitoring Program, the Program will begin collection of baseline data in the Castro Valley Creek watershed. Initial analytes will include toxicity, organophosphorous pesticides, copper, lead, and zinc, and may be adapted as management needs dictate.

MS-1.6 Clean Estuary Partnership: Contribution to CEP under terms of MOU between BASMAA, BACWA, Regional Board and any additional signatories.

Objective: Comply with MOU and the policies of CEP guidance committees to support CEP activities for controlling pollutants of concern including problem identification, characterization, linkage studies and development of implementation plans for source control and/or abatement.

Task MS-2: Evaluate the effectiveness of urban runoff BMPs

- MS-2.1 Target pollutant special studies:** characterize details of distribution and impacts for Pollutants of Concern, test hypotheses.
Long-term: Conduct studies of Pollutants of concern, including investigation of potential sources in high priority watersheds. Support implementation strategies for TMDLs, including identification or refinement of specific control measures, in coordination with CEP contribution.
FY02/03 tasks:
 Assessment of potential source control options. This project will be undertaken to assist with planning efforts for implementation of future water quality attainment strategies. The project will include tasks to identify tools that can be used for identification of potential source areas, to develop information on feasibility of cleanup of polluted upland sites, and to develop similar feasibility information on cleanup of sediments within the stormwater conveyance system (e.g., storm drain inlets, flood control channels, pump stations, etc.).
 Dioxins in Bay Area sediments synthesis document.. Prepare a report outlining important background information on dioxins, including chemical makeup, sources, loadings, and impacts. (BASMAA Task of Regional Benefit)
FY02/04 other potential tasks:
 Implement or facilitate source investigations in appropriate watersheds, following the models used in Ettie Street and Glen Echo watersheds. Determination of study watersheds will be based on concentrations of pollutants relative to ambient Bay conditions or on interim targets developed for specific pollutants as part of the TMDL development process.
 Visual and photo assessments of trash in waterbodies, supported by more detailed inventory at selected sites
 Review copper sources to stormwater in Alameda County.
- MS-2.2 Support effective implementation of BMPs:** provide technical information needed to support implementation of design standards for New/Re-development as required in new permit.
Long-term: Conduct studies as needed, such as hydrological/geomorphological analyses, prototype design scenarios, BMP evaluations
FY02-04: Provide technical information to support implementation of design standards for New/Re-development as required in new permit, including development of model design criteria and Hydromodification Management Plan (HMP).
- Task MS-3:** Provide technical information on management issues involving urban runoff
- MS-3.1 Special studies:** Address data gaps or management issues concerning pollutants of concern and urban runoff impacts.
Ongoing: as needed, including planning and needs assessment.

MS-3.2 On-call technical support: Miscellaneous technical support as needed.

Task MS-4: Coordinate planning and reporting with related monitoring efforts

MS-4.1 Coordinate with RMP, BASMAA and CEP: maximize effective use of monitoring resources through coordination of effort among BASMAA member agencies, the RMP and CEP.

Ongoing: Chair and attend BASMAA Monitoring Committee meetings, participate in CEP committee meetings, RMP technical review and other special purpose technical or stakeholder discussions.

III.B Listed by WAU

Table III-1 summarizes distribution of planned monitoring and assessment among Watershed Assessment Units.

Table III-1a. ACCWP Planned Monitoring and Assessment activities in western Alameda County, FY02/03-FY03/04

Watershed Assess. Unit	1	2	3	4	5	8	Fy02-04 Task ID
WAU name	north of Bay Bridge	Oakland, south of Bay Bridge	Lower San Leandro	San Lorenzo	Hayward - Lower Alameda	Mission-Laguna	
Tier 1 -Screening Level							
Chemical-Physical Parameters	pilot screening 2002-2004	pilot screening 2002-2004	Pilot 2003-2004	pilot screening 2002-2004	pilot screening 2002-2004	pilot screening 2002-2004	MS-1.4 sampling
Bioassessment-macroinvertebrate	1 site 2003, 3 sites 2004	1 site 2002, 3 sites 2003, 5 sites 2004		5 sites 2002	2 sites 2004	4 sites 2002, 5 sites 2003	WA-2.1 sampling
Biological-Physical: Fish community and habitat							WA-1.1 planning, WA-3.2 field checking
Stream morphology							WA-2.1 potential
Flow							WA-2.1 potential
Tier 2-More Focused							
Develop list of priority watersheds and issues in 2002-03							
Contaminant Chemistry	pilot screening 2002-2004	pilot screening, (L. Merritt monitoring by City-planned)		pilot screening 2002-2004	pilot screening 2002-2004	pilot screening 2002-2004	MS-1.4 selected parameters
Nutrients							MS-1.4 selected sites
Pathogens							WA-3.1 potential
Toxicity				Castro Valley Creek-post-diazinon phase-out, MS-1.3			MS-1.4 selected sites
Tier 3-TMDL/POC sampling							
Hg/PCB sediment survey		limited sampling at selected index sites in 2005-2008				(assist by city)	MS-1.2, MS-1.6
Hg/PCB Source investigation	*tbd	*tbd	*tbd				MS-2.1 or CEP
Chlorinated pesticides & PAH in sediment							MS-1.2, MS-1.6
Copper in stormwater				Castro Valley Creek 2003-2005,			MS-1.3
Diazinon in stormwater				Castro Valley Creek 2003-2005, track for reduction			MS-1.3
Trash		*2002-03		*2002-03	*2002-03		MS-2.1 pilot

Table III-1b. ACCWP Planned Monitoring and Assessment activities in eastern Alameda County

Watershed Assessment Unit	6		7	
	Alameda Creek-northern	Alameda Creek-southern	Fy02-04 Task ID	
Tier 1 -Screening Level				
Chemical-Physical Parameters	pilot screening 2003-2004		MS-1.4 sampling	
Chemical-Physical, basic screening by volunteers				
Bioassessment-macroinvertebrate			WA-2.1 sampling	
Biological-Physical: Fish community and habitat			WA-1.1 planning, WA-3.2 field checking	
Geophysical				
Stream morphology			WA-2.1 potential	
Vegetation				
Flow			WA-2.1 potential	
Tier 2-More Focused				
Contaminant Chemistry	pilot screening 2003-2004		MS-1.4 selected parameters	
Nutrients			MS-1.4 selected sites	
Pathogens			WA-3.1 potential	
Toxicity			MS-1.4 selected sites	
Geomorphic And Sediment Source Analysis				
Tier 3-TMDL/POC sampling				
Hg/PCB sediment survey			MS-1.2, MS-1.6	
Hg/PCB Source investigation			MS-2.1 or CEP	
Chlorinated pesticides & PAH in sediment			MS-1.2, MS-1.6	
Copper in stormwater			MS-1.6	
Diazinon in stormwater				
Trash			MS-2.1 pilot	

IV. STATUS AND ACCOMPLISHMENTS

This section reviews highlights and recent accomplishments in three main component areas. During the first permit period (1991-1996) The Program's monitoring focused on evaluating the general effectiveness of control measures and routine monitoring of rainfall, runoff and water quality at representative fixed stations. During the second permit ACCWP initiated a component for Focused Watershed Management to determine the water quality benefits of watershed-specific approaches and improve community awareness and stewardship of watersheds. In 2000 the coordination and facilitation activities for watershed management were assigned to the Planning and Regulatory Compliance component while the new Watershed Assessment component was established to support the technical and informational needs of watershed managers and stakeholders.

IV.A Watershed Assessment and Focused Watershed Management

- 1988-90 Loads Assessment Design:** Available data were compiled on watersheds, drainage areas and landuses to establish sampling stations at six stream stations representative of different watershed sizes and ten additional stations representing smaller catchments with a range of urban land use combinations.
- 2000-03 Watershed Inventory:** The Program purchased remote sensing satellite data and used it to develop a preliminary classification of landcover types throughout the County. Additional spatial data for streets, buildings and other landuse features were obtained from co-permittees and other agencies to refine this dataset. A technical memo documenting the production of the landcover dataset was drafted and will include recommendations for further data checking and validation. Watershed boundaries were delineated for over 100 watersheds and subwatersheds and other resource information compiled from public data sources.
- 1999-03 Indicators of creek health:** A general review of fisheries information for Alameda County (HES 1999) summarized fish habitat condition and fish communities in many creeks, and these data were assembled in database format. Existing fish community sampling data by Rob Leidy for streams in Alameda and Contra Costa Counties was also entered in table format and incorporated in a preliminary 2002 map reflecting the occurrence of fish communities in Alameda County. ACCWP began annual benthic macroinvertebrate surveys in Spring 2001 in the San Lorenzo, Sausal and Laguna Creek watersheds, ACCWP also organized the first regional discussion group meeting on macroinvertebrate bioassessment in February 2002, which has been continued as a BASMAA Task of Regional Benefit in collaboration with the Regional Board..
- 1999-03 Indicators of Contact Recreation:** ACCWP supported weekly bacteriological sampling in Lake Merritt as a follow-up to ACFCWCD monitoring in the early 1990's, and also sampled creeks and outfalls leading to the Lake during storm events. Creeks and channels were also sampled during both wet and dry weather to assess the variability of coliform and fecal coliform samples from creeks. A literature review of potential indicators for human health risk was initiated and guidance for local managers is also under development.

- 1996-99 San Leandro Creek Watershed Management Support:** The Program provided support for preparation of the Lower San Leandro Creek Watershed Management Plan (SLCWAC, 1999), including training of volunteer monitors to provide habitat inventory data and monthly water quality samples for the lower portions of the creek.
- 1995-03 Volunteer Monitoring:** The Program produced several reports on volunteer monitoring by the Friends of San Leandro Creek during 1996-1998, including grab samples confirming the widespread occurrence of diazinon. During 1998-2000 the Program assisted two additional watershed groups (Friends of Sausal Creek and Friends of Five Creeks), drafted guidance and training materials and sponsored pilot development of a new format "Talks in the Hallway" event for creek group networking. During 2001-2003 Program staff participated in a Technical Advisory Committee to assist state volunteer coordinators in developing new guidance documents and protocols and also helped produce a Streamside Biosurvey protocol for macroinvertebrate monitoring (posted on Clean Water Team website at <http://www.swrcb.ca.gov/nps/availdoc.html>). ACCWP also and participated in advisory meetings for the Watershed Assessment Resource Center to improve support for volunteer monitoring groups in the Bay Area.
- 1999-03 On-call watershed support:** Technical assistance was provided in 1999 to the cities of Oakland and Piedmont in discussing management responses to water quality problems at Lake Merritt, and formation of a Lake Merritt Water Quality Task Force. In 2000 the Program supported the city of Fremont in preparing a draft monitoring plan for the Laguna Creek watershed. Other technical assistance included preparation of maps for co-permittee projects and grant applications.

IV.B Pollutants of Concern

- 1988-00 Loads Assessment and fixed station sampling in creeks:** This multi-media program included rainfall and flow monitoring, wet and dry weather water quality sampling, sediment sampling and toxicity testing. Composite samples were collected over 11 events for a total of 98 station-events from December 1989 to March 1991. The resulting data were evaluated in an initial Loads Assessment report (WCC 1991) and further sampling was continued at a reduced number of stations. These data were reported in annual monitoring reports and integrated in a summary review of combined data from ACCWP and several other BASMAA agencies (WCC 1996). Copper and zinc exceeded water quality objectives more often than other metals, with sources predominantly from urbanized areas. Most of the Program's fixed-station stormwater sampling data was incorporated into an Access database structure in 2000 to facilitate searching and accommodate future sampling data.
- 1991-01 PAH special studies:** Since PAHs were frequently detected during loads assessment studies, additional sampling was conducted in 1991-92 without conclusive results in identifying patterns or sources. In 2000-01 the Program analyzed watershed sediment samples for PAHs (Salop et al 2002a) and also reviewed technical literature on PAHs to assist interpretation and guide further sampling (Salop et al 2001).

1995-02 Diazinon Special Studies: After studies found toxicity in Castro Valley Creek and identified diazinon as a likely cause (Hansen 1995), ACCWP conducted an intensive characterization study by sampling stormwater runoff and also collecting grabs from tributaries and street gutters (Scanlin and Feng 1997). The results showed that diazinon sources were widely dispersed throughout the watershed and suggested that the observed amounts could result from residential applications in accordance with label instructions. The Program also found diazinon in creeks and ponds during dry weather, often changing in concentration when sampled at intervals of 1-3 days. In 2002 the Program completed a study of diazinon wash-off, partially funded by the Department of Pesticide Regulation, which demonstrated the potential for liquid-formulation diazinon to enter stormwater after application to paved surfaces.

2000-2001 Surveys and special studies of TMDL pollutants: In 2000 ACCWP conducted trial sampling of bedded sediments in Codornices Creek; and assisted in PCB congener analysis of Regional Board-collected samples from San Leandro Creek. Field techniques were refined for coordinated sampling of watershed sediments throughout the Bay Area in 2001 and 2002. sediment surveys for mercury, PCBs, PAHs and organochlorine pesticides

During this period the Program also completed source investigation of PCBs in the Glen Echo Creek and Ettie Street Pump Station watersheds, and assisted the city of Oakland in preparing a successful application for Prop 13 grant funds to implement cleanup efforts within the Ettie Street watershed. ACCWP also contributed support to the North Bay Copper-Nickel Study initiated by the Bay Area Clean Water Agencies

IV.C Evaluate the effectiveness of urban runoff BMPs

See Table IV-1 for reports and products related to BMP evaluation. Highlights include:

1991-98 DUST Marsh studies: The DUST Marsh system was constructed in 1983 as a demonstration constructed wetland to treat runoff from a 4.6 square mile drainage centered on Crandall Creek in Fremont. The Program conducted a series of special studies to identify the main constituents of concern and study performance in relation to metals, selenium and toxicity and diazinon. A floating log baffle was found to improve residence time of toxic storm water; study results were also used to recommend improvements in the management of vegetated channels.. Further studies also evaluated sediment toxicity, fish tissue effects and the long-term accumulation of contaminants in the system.

1998 BASMAA database: ACCWP developed a searchable database of monitoring and BMP studies by BASMAA members. Parameters and BMP types as well as main results or lessons can be output as printed abstracts. This product was submitted to BASMAA for further updates.

Table IV-1 Selected BMP Studies

Title	Pub date	Type
Management of Storm Water Facilities in Alameda County	Aug 92	report
Labeling of Storm Drainage Facilities	Jan 93	manual/handbook
Vegetated Channels Study	Jan 94	report
Surveys of Alameda County Residents' Awareness of & Attitudes Toward Stormwater Pollution	Feb 94	report
Storm Inlet Pilot Study	Mar 94	technical report
Roof Runoff Water Quality: A Literature Review	Aug 94	report
Vegetated Channels Management Feasibility Study	Dec 94	report
Street Sweeping Storm Inlet Modification Literature Review	Dec 94	report
General Guidance for Monitoring Effectiveness of Post-Construction Structural Best Management Practices	Apr 95	manual/handbook
Stormwater Resource Guide	Jan 96	report
Residential Yard & Garden Care Baseline Survey	May 96	report
Parking Lot BMP Manual Final Report	Jun 96	report
Channel Vegetation Manual	Jul 96	reference
Final Monitoring Report-Grass Swales at the Advo Facility, Newark	Oct 96	technical report
Best Management Practice Guide Retail Gasoline Outlets	Mar 97	manual/handbook
Cost Estimates for Reducing Discharges of Sediment-Laden Stormwater Along Redwood Road	Aug 97	technical report
Street Sweeper Solids Evaluation	Mar 98	report
DUST Marsh Long Term Evaluation	Oct 98	technical report
Analysis of Street Sweeping Data	Jun 99	technical report
Survey of Public Awareness of Advertising Campaign	Jul 99	report
Tule Pond Baseline Characterization	Nov 99	technical report
Stormwater Inlet Insert Devices Literature Review	Jan 00	report
Summary of the Sawcut BMP Effectiveness Study	Jun 00	report
Developing A Volunteer Storm drain Stenciling Program	n/a	manual/handbook
Training Workshop for Illicit Discharge Inspectors	n/a	manual/handbook
Review Of Leaf And Litter Control Alternatives	in prep	report
Unpaved Road BMP Guide	in prep	manual/handbook

V. DETAILED WORKPLANS***V.A. Fiscal Year 2002-2003*****Watershed Assessment**

Task WA-1: Develop and maintain a GIS resource for watershed information

WA-1.1 Watershed Inventory: Refine existing information for channel condition and riparian zone characterization, and identify data gaps related to preliminary watershed classification. Continue work on preliminary statistics or maps of initial pilot watersheds such as Codornices, Sausal, San Lorenzo, Old Alameda and Laguna Creeks);

Objective: Provide base layers and basic map products for watershed assessment activities of Program, member agencies and interested public.

WA-1.2 Watershed assessment planning: Develop subplan for Long-Term Watershed Assessment including framework for development of indicators, watershed priority list and timeline. Develop standards for data management and incorporating new data from potential partners and other sources.

Objective: Develop a framework for ongoing coordination and planning of watershed assessment.

Task WA-2: Use a variety of indicators to assess the condition of streams and watersheds

WA-2.1 Indicators of creek health: Continue macroinvertebrate community sampling in Sausal, San Lorenzo and Mission-Laguna watersheds, and develop a priority list for rotating assessments of other watersheds. Continue work with Bay Area Macroinvertebrate Bioassessment Information Network to coordinate activities with other bioassessment projects in Bay Area, Regional Board's Stream Protection Policy and other regional initiatives.

Objective: Develop and test indicators of general watershed condition.

WA-2.2 Volunteer Monitoring: Continue support of local-area Talks in the Hallway to strengthen community involvement and interest in assessment issues; explore use of community volunteers to supplement macroinvertebrate field sampling or trash assessment.

Objective: Increase the participation of community stakeholders in watershed stewardship and assessment, and improve coordination of volunteer groups with agencies and other stakeholders.

Task WA-3: Provide useful watershed information to the Program and other watershed stakeholders

WA-3.1 Indicators of Contact Recreation: Continue support of local monitoring for coliform or other indicators. Complete literature review and review existing Alameda County data for purposes of drafting guidance for municipal staff and local creek or community groups.

Objective: improve ability to assess risks to human health from light (non-swimming) contact recreation or activity in creeks.

WA-3.2 On-call watershed support: Complete draft Watershed Framework to provide guidance on watershed-based management to municipal staff and other local groups. Identify candidate watersheds for focused technical support to co-permittees or their partners.

Objective: Support watershed management efforts led by Program member agencies.

WA-3.3 Website support: Provide watershed maps, links and other creek information in new “watersheds” section of ACCWP website.

Objective: Disseminate information about Alameda County watersheds and background on local watershed issues.

Monitoring and Special Studies

Task MS-1: Characterize and track pollutants of concern which are found in urban runoff and have been identified as possible sources of impairment.

MS-1.1 RMP contribution: Contribution for required participation in Regional Monitoring Program.

Objective: Comply with Regional Board requirements and assist with the accomplishment of the RMP’s objectives to provide regional characterization of pollution in the Bay.

MS-1.2 TMDL data collection: Reanalyze archived sediment samples for preliminary characterization of occurrence of dioxins in Alameda County creeks and channels.

Objective: Characterize watershed occurrences of pollutants of concern.

MS-1.3 Baseline trend monitoring for Pollutants of Concern: Continue stormwater monitoring for copper in Castro Valley Creek. .

Objective: assess long-term trends in selected Pollutants of Concern in creeks as recommended in draft monitoring plan (Gunther and Bernstein, 2001).

MS-1.4 Water Quality screening: Implement a pilot screening project at 10-15 sites distributed among different creek and channel types. Conduct initial sampling near end of dry season for general parameters (temperature, pH, conductivity, DO, turbidity) and also selected chemical parameters (ammonia, nitrate, chlorine, copper, hardness, TSS). Consider additional toxicity testing or continuous temperature monitoring at selected sites and adapt procedures for second-phase screening near end of wet season.

Objective: Provide general assessment of water quality conditions in stream reaches.

MS-1.5 Multi-Year Plan development: Incorporate additional data types, refine queries and user interface for existing Access relational database of past fixed-station sampling data; develop conceptual plan for analyses of long-term and spatial trends.

Objective: Improve coordination and planning for ACCWP pollutant monitoring.

MS-1.6 Clean Estuary Program Partnership: Contribution to CEP under terms of MOU between BASMAA, BACWA, WSPA and Regional Board.

Objective: Comply with MOU and the policies of CEP guidance committees to support CEP activities for controlling pollutants of concern including problem identification, characterization, linkage studies and development of implementation plans for source control and/or abatement.

Task MS-2: Evaluate the effectiveness of urban runoff BMPs

MS-2.1 Target pollutant special studies: Conduct pilot visual and photo assessments of trash in waterbodies, supported by more detailed inventory at selected sites. Coordinate procedures with prototype by Regional Board.

Objective: characterize details of distribution and impacts for Pollutants of Concern, and/or test hypotheses concerning their fate and transport.

MS-2.2 Support New Development stormwater controls: Develop model design scenarios to explore potential application of treatment and hydromodification controls, and develop preliminary maps as pilots for conceptual approach to determining areas eligible for Hydromodification Management Plan.

Objective: provide technical information needed to support implementation of design standards for New/Re-development as required in new permit.

Task MS-3: Provide technical information on management issues involving urban runoff

MS-3.1 Special studies: as needed, including planning and needs assessment.

Objective: Address data gaps or management issues concerning pollutants of concern and urban runoff impacts.

MS-3.2 On-call technical support: Miscellaneous technical support as needed.

Task MS-4: Coordinate planning and reporting with related monitoring efforts

MS-4.1 Coordinate with RMP, BASMAA and CEP Attend BASMAA Monitoring Committee meetings, CEP technical meetings, participate in RMP technical review and other special purpose technical or stakeholder discussions.

Objective: maximize effective use of monitoring resources through coordination of effort among BASMAA member agencies, the RMP and the CEP.

ACCWP FY 2002-2003 Watershed Assessment and Monitoring Tasks and Budget

Task #	Description	FY 02-03 Budget	Lead
Watershed Assessment			
WA-1.1	Watershed Inventory	\$40,000	EIP
WA-1.2	Watershed assessment planning	\$35,000	EIP/District
WA-2.1	Indicators of Creek Health	\$15,000	AMS/District
WA-2.2	Volunteer Monitoring Support	\$6,000	District
WA-3.1	Indicators for Contact Recreation	\$10,000	AMS
WA-3.2	On-Call Watershed Support	\$25,000	Tbd
WA-3.3	Web Site Development	\$15,000	EIP/District
WA-4.1	Reporting/component management	\$10,000	District
Component Total		\$156,000	
Monitoring & Special Studies			
MS-1.1	RMP fee	\$151,000	
MS-1.2	TMDL data collection	\$37,000	AMS
MS-1.3	Baseline trend monitoring	\$20,000	AMS/District
MS-1.4	Water Quality Screening	\$25,000	District
MS-1.5	Multi-Year Plan development	\$20,000	AMS/District
MS-2.1	Pollutant source investigations	\$27,000	AMS
MS-2.2	Studies supporting New Dev. provisions	\$40,000	URS/EIP
MS-3.1	Unspecified special studies	\$21,000	Tbd
MS-3.2	On-Call Technical Support	\$6,000	AMS
MS-4.1	Coordinate w/RMP, BASMAA and CEP	\$30,000	District
MS-5.1	WAMS Support	\$20,000	District
MS-5.2	Reporting/component management	\$25,000	District
Subtotal		\$422,000	
MS-1.6	Clean Estuary Partnership contribution	\$150,000	
Maximum Component Total		\$572,000	

*V.B. Fiscal Year 2003-2004 Proposed***Watershed Assessment**

Task WA-1: Develop and maintain a GIS resource for watershed information

WA-1.1 Watershed Inventory: Pilot a classification mapping scheme for County watersheds based on available GIS data for landuse/landcover, channel network characteristics and riparian zone condition.

WA-1.2 Watershed assessment planning: Refine subplan for Long-Term Watershed Assessment including framework for development of indicators, watershed priority list and timeline. Identify main data gaps and potential sources or partners for future assessment work.

Task WA-2: Use a variety of indicators to assess the condition of streams and watersheds

WA-2.1 Indicators of creek health: Develop rotation strategy for sampling benthic macroinvertebrate communities in different watersheds, and develop a priority list for rotating assessments of other watersheds. Continue work with Bay Area Macroinvertebrate Bioassessment Information Network to coordinate activities with other bioassessment projects in Bay Area, Regional Board's Stream Protection Policy and other regional initiatives.

WA-2.2 Volunteer Monitoring: Continue support of local-area Talks in the Hallway to strengthen community involvement and interest in assessment issues; explore use of community volunteers to supplement macroinvertebrate field sampling or trash assessment.

Task WA-3: Provide useful watershed information to the Program and other watershed stakeholders

WA-3.1 Indicators of Contact Recreation: Prepare guidance documents for municipal staff and local creek or community groups to manage local sites for light contact recreation. Identify possible strategies for improved monitoring of pathogen-related risk.

WA-3.2 On-call watershed support: Provide guidance and technical support for watershed-based management activities by copermittees and local groups.

WA-3.3 Website support: Transfer watershed indicator data and other creek information in new watersheds section of ACCWP website. Identify approaches for making monitoring and assessment data available in Web format.

Monitoring and Special Studies

Task MS-1: Characterize and track pollutants of concern which are found in urban runoff and have been identified as possible sources of impairment.

MS-1.1 RMP contribution: Contribution for required participation in Regional Monitoring Program.

MS-1.2 TMDL data collection: Continue studies for Pollutants of Concern and TMDL implementation as requested by Regional Board staff. Coordinate any sediment sampling with design for baseline trend monitoring as described in Multi-Year Plan.

MS-1.3 Baseline trend monitoring for Pollutants of Concern: Continue stormwater monitoring for copper in Castro Valley Creek.

MS-1.4 Water Quality screening: Refine pilot screening project and develop rotation schedule for additional sites.

MS-1.5 Multi-Year Plan and database development: Incorporate additional data types, refine queries and user interface for existing Access relational database of past fixed-station sampling data; develop plan for analyses of long-term and spatial trends.

MS-1.6 Clean Estuary Program Partnership: Contribution to CEP under terms of MOU between BASMAA, BACWA, WSPA and Regional Board.

MS-1.7 Participate in Brake Pad Partnership Fate and Transport Studies: Provide support to integrate Castro Valley-SWMM watershed model with air deposition and Bay models for copper from brake wear debris as part of Proposition 13 grant to Brake Pad Partnership (coordinated with Task MS-1.3)

Task MS-2: Evaluate the effectiveness of urban runoff BMPs

MS-2.1 Target pollutant special studies: Conduct pilot visual and photo assessments of trash in waterbodies, supported by more detailed inventory at selected sites. Coordinate procedures with prototype by Regional Board.

MS-2.2 Support New Development stormwater controls: Provide technical support as needed .

Task MS-3: Provide technical information on management issues involving urban runoff

MS-3.1 Special studies: as needed, subject to available funds.

MS-3.2 On-call technical support: Miscellaneous technical support as needed.

MS-3.3 Environmental Monitoring for PCB Abatement Program in the Ettie Street Watershed: Provide sediment sampling, analysis and other technical support to Proposition-13 funded pilot program in Oakland.

Task MS-4: Coordinate planning and reporting with related monitoring efforts

MS-4.1 Coordinate with RMP, BASMAA and CEP Attend BASMAA Monitoring Committee meetings, CEP technical meetings, participate in RMP technical review and other special purpose technical or stakeholder discussions.

ACCWP FY 2003-2004 Watershed Assessment and Monitoring Tasks and Budget

Task #	Description	FY 03-04 Budget	Lead
Watershed Assessment			
WA-1.1	Watershed Inventory	\$40,000	EIP
WA-1.2	Watershed assessment planning	\$15,000	EIP/District
WA-2.1	Indicators of Creek Health	\$15,000	AMS/District
WA-2.2	Volunteer Monitoring Support	\$6,000	District
WA-3.1	Indicators for Contact Recreation	\$10,000	AMS
WA-3.2	On-Call Watershed Support	\$22,000	Tbd
WA-3.3	Web Site Development	\$12,000	EIP/District
WA-4.1	Reporting/component management	\$10,000	District
Component Total		\$130,000	
Monitoring & Special Studies			
MS-1.1	RMP estimated fee	\$154,000	
MS-1.2	TMDL data collection ^a	\$20,000	AMS
MS-1.3	Baseline trend monitoring	\$20,000	AMS/District
MS-1.4	Water Quality Screening	\$17,000	District
MS-1.5	Database and planning support	\$10,000	AMS/District
MS-2.1	Pollutant source investigations ^a	\$20,000	Tbd
MS-2.2	Studies supporting New Dev. provisions ^b	\$40,000	Tbd
MS-3.1	Unspecified special studies	\$0	Tbd
MS-3.2	On-Call Technical Support	\$6,000	Tbd
MS-4.1	Coordinate w/RMP, BASMAA and CEP	\$30,000	District
MS-5.1	WAMS Support	\$20,000	District
MS-5.2	Reporting/component management	\$25,000	District
Subtotal		\$362,000	
MS-1.6	Clean Estuary Partnership contribution ^a	\$100,000	
Maximum Component Total		\$462,000	
MS-1.7	Brake Pad Fate and Transport Studies	\$16,000 ^c	District
MS-3.2	Environmental Monitoring for PCBs	\$74,000 ^c	AMS/District

^aClean Estuary Partnership contribution is partial substitution for RB-requested activities formerly under tasks MS-1.2, MS-2.1.

^bAdditional non-WAMS funds authorized by Management Committee for Hydromodification Management Plan development.

^cEstimated budget for contracted work to be funded by grants to ACCWP partners

VI. REFERENCE**VI.A. Literature cited**

* denotes ACCWP planning document or report containing workplan description.

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VI.B. Acronyms and abbreviations

ACCWP	Alameda Countywide Clean Water Program (Program)
ACFCWCD	Alameda County Flood Control and Water Conservation District (District)
BAMBI	Bay Area Macroinvertebrate Bioassessment Information network
BACWA	Bay Area Clean Water Agencies (wastewater treatment plant discharges)
BASMAA	Bay Area Stormwater Management Agencies Association
BMI	Benthic macroinvertebrate
BMPs	Best Management Practices
BPP	Brake Pad Partnership
CEP	Clean Estuary Partnership
DUST Marsh	Demonstration Urban Stormwater Treatment Marsh
GIS	Geographic Information Systems
MYP	Multi-Year Plan for Monitoring and Assessment
NPDES	National Pollutant Discharge Elimination System
OC	Organochlorine (pesticides)
OP	Organophosphate (pesticides)
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
POCs	Pollutants of Concern
PRPs	Pollutant Reduction Plans
RMAS	Regional Monitoring and Assessment Strategy
RMP	Regional Monitoring Program for Trace Substances in the San Francisco Estuary
RWQCB	California Regional Water Quality Control Board, S. F. Bay Region (Region 2)
SQMP	Stormwater Quality Management Plan, July 2002-June 2008 (Plan)
SWAMP	Surface Water Ambient Monitoring Program (by RWQCB)
TIE	Toxicity Identification Evaluation
TMDL	Total Maximum Daily Load
WAMS	Watershed Assessment and Monitoring Subcommittee
WAU	Watershed Assessment Unit
Zone 7	Zone 7 of ACFCWCD