CONTRA COSTA
CLEAN WATER
PROGRAM

Thomas E. Dalziel
Program Manager

September 14, 2012

Bruce H. Wolfe, Executive Officer
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San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

Ms. Pamela Creedon, Executive Officer
California Regional Water Quality Control Board
Central Valley Region
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Dear Mr. Wolfe and Ms. Creedon:

Enclosed is the Contra Costa Clean Water Program's (CCCWP's) *Fiscal Year 2011-2012 Volume I, Group Activities, Annual Report*. This report documents activities conducted collectively by Contra Costa Permittees ("Group Activities") in accordance with National Pollutant Discharge Elimination System (NPDES) Permit No. CAS612008 (Orders R2-2009-0074 and R2-2011-83) issued by the San Francisco Bay Regional Water Quality Control Board (Water Board), and NPDES Permit No. CA0083313 (Order R5-2010-0102) issued by the Central Valley Water Board. This submittal includes by reference the following reports submitted separately by the Bay Area Stormwater Management Agencies Association (BASMAA) on behalf of Contra Costa Permittees:

- *"MRP Regional Supplement for New Development and Redevelopment Annual Reporting for FY 2011-2012"*
- *"MRP Regional Supplement for Training and Outreach Annual Reporting for FY 2011-2012"*
- *"MRP Regional Supplement for Monitoring and Pollutants of Concern Annual Reporting for FY 2011-2012"*

With the approval and direction from each duly authorized representative of each Permittee, I have been authorized to submit and certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibly of fine and imprisonment for knowing violations.

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Program Participants: Antioch, Brentwood, Clayton, Concord, Danville, El Cerrito, Hercules, Lafayette, Martinez, Moraga, Oakley, Orinda, Pinole, Pittsburg, Pleasant Hill, Richmond, San Pablo, San Ramon, Walnut Creek, Contra Costa County and Contra Costa County Flood Control & Water Conservation District

Also provided with this submittal are the *Fiscal Year 2011-2012 Individual Municipal Annual Reports* compiled in Volume II.

Sincerely,

Thomas E. Dalziel, Program Manager
Contra Costa Clean Water Program

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Enclosures

CONTRA COSTA
CLEAN WATER PROGRAM

FISCAL YEAR 2011-2012
ANNUAL REPORT

VOLUME 1:
GROUP ACTIVITIES

VOLUME 1
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VOLUME 1

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	1.2	Contra Costa Clean Water Program Management
	1.3	Program Subcommittee Participation and Attendance Rosters
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VOLUME 1 – List of Acronyms

Acronym	Term
ABAG	Association of Bay Area Governments
BASMAA	Bay Area Stormwater Management Agencies Association
BMI	Benthic Macroinvertebrate
BMP	Best Management Practice
CASQA	California Stormwater Quality Association
CCC	Contra Costa County
CCCAG	Contra Costa County Agricultural Commissioner
CCCWP	Contra Costa Clean Water Program
CCMAP	Contra Costa Monitoring and Assessment Plan
CCWF	Contra Costa Watershed Forum
CCCSD	Central Contra Costa Sanitary District
CPSC	California Product Stewardship Council
CCCDCD	Contra Costa County Department of Conservation & Development
DC	Development Committee
DDSD	Delta Diablo Sanitation District
EBMUD	East Bay Municipal Utility District
FY	Fiscal Year
GPS	Global Positioning System
HMP	Hydrograph Modification Management Plan
IPM	Integrated Pest Management
LID	Low Impact Development
MOC	Municipal Operations Committee
MRP	Municipal Regional Permit
MS4	Municipal Separate Storm Sewer System
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
PBDEs	Polybrominated Diphenyl Ethers
PCBs	Polychlorinated Biphenyls
PCO	Pest Control Operator
POC	Pollutants of Concern
POTW	Publicly Owned Treatment Works
RMC	Regional Monitoring Coalition
RMP	Regional Monitoring Program
SFEI	San Francisco Estuary Institute
SFEP	San Francisco Estuary Partnership
SPLWG	Sources, Pathways and Loadings Workgroup
UPC	Urban Pesticide Committee
USEPA	United States Environmental Protection Agency
WY	Water Year

SECTION 1 – EXECUTIVE SUMMARY

Introduction

The Contra Costa Clean Water Program (CCCWP) comprises Contra Costa County, its 19 incorporated cities/towns[1], and the Contra Costa County Flood Control & Water Conservation District (Flood Control District). These 21 public agencies are collectively referred to as Permittees. The Permittees are submitting their Fiscal Year (FY) 2011-2012 Annual Report to the San Francisco Bay and Central Valley Regional Water Quality Control Boards (Water Boards) as required by their Joint Municipal National Pollutant Discharge Elimination System (NPDES) Permits (discussed further below). The report documents permit compliance activities conducted during the previous fiscal year (July 1, 2011 to June 30, 2012). The FY 2011-2012 Annual Report consists of the following:

- **Volume I – Group Activities Annual Report**: This Volume I report documents permit compliance activities conducted collectively as a group by all twenty-one (21) Contra Costa Permittees.
- **Volume II – Individual Municipal Annual Reports**: Volume II is a compilation of the Permittees' individual Annual Reports, which document implementation of compliance activities conducted within each agency's jurisdiction.
- **BASMAA Regional Supplemental Reports**: These reports document compliance activities conducted regionally (Bay Area-wide) in coordination with the Bay Area Stormwater Management Agencies Association (BASMAA)[2]. On behalf of the

[1] Cities of Antioch, Brentwood, Clayton, Concord, El Cerrito, Hercules, Lafayette, Martinez, Oakley, Orinda, Pinole, Pittsburg, Pleasant Hill, Richmond, San Pablo, San Ramon, and Walnut Creek, and Towns of Danville and Moraga.

[2] BASMAA is a consortium of municipal stormwater programs representing over 90 agencies, including 79 cities and 6 counties. BASMAA was started by local governments in the Bay Area to share information and combine resources to develop products and programs that would be more cost-effective if done regionally. In FY 2008-2009, BASMAA reorganized as a 501(c)(3) non-profit organization. This allows BASMAA to enter into contracts and seek grant funds on behalf of its members. BASMAA is focused on regional challenges and opportunities to improving the quality of stormwater that flows to our local creeks, San Francisco Bay and Delta, and the Ocean.

Contra Costa Permittees, BASMAA submitted separately the following regional supplemental reports directly to the Water Boards:

1. *MRP* [Municipal Regional Permit] *Regional Supplement for New Development and Redevelopment Annual Reporting for FY 2011-2012*
2. *MRP Regional Supplement for Training and Outreach Annual Reporting for FY 2011-2012*
3. *MRP Regional Supplement for Monitoring and Pollutants of Concern Annual Reporting for FY 2011-2012*

Joint Municipal NPDES Permits

The San Francisco Bay Water Board issued a *Municipal Regional Stormwater NPDES Permit* to 76 Phase I[3] municipalities within the San Francisco Bay Region on October 14, 2009. This permit is hereinafter referred to as the "Municipal Regional Permit" or "MRP". The MRP excludes the cities of Antioch, Brentwood, and Oakley, and the eastern portions of Contra Costa County and Contra Costa County Flood Control District. These agencies and agency areas are within the jurisdiction of the Central Valley Water Board and were issued a separate Joint Municipal NPDES Permit ("East Contra Costa Municipal Storm Water Permit") on September 23, 2010. Most provisions of this permit are substantively identical to those in the MRP. Unless specified otherwise, hereinafter all group activities reported below will reference activities conducted by all Contra Costa Permittees in accordance with the MRP. Copies of both permits can be downloaded from the CCCWP website at: http://www.cccleanwater.org/permits.html.

The MRP is in effect for five years ending on November 30, 2014. This Annual Report documents activities conducted under the third year of the five-year MRP. MRP

[3] Phase I regulations were promulgated in 1990 and requires medium and large cities or certain counties with populations of 100,000 or more to obtain NPDES permit coverage for their stormwater discharges.

Permittees include all Phase I Municipal Stormwater Programs[4] in the San Francisco Bay Region. Each Permittee is individually responsible for complying with the permit mandates; however, the MRP allows, and in some cases encourages, Permittees to collaborate in the design, development, and/or implementation of certain mandates collectively – either countywide and/or region-wide. Activities conducted collectively are referred to as "group activities" and are documented in this Volume I report and in BASMAA's regional supplemental reports.

Program Structure

The CCCWP operates under a "Program Agreement", which was first entered into in 1991 and has been updated several times since. The roles and responsibilities of CCCWP staff and its 21 Permittees are outlined in the Program Agreement (2010-2025), which was adopted by all 21 Permittees in 2010. During most of FY 2011-2012, the CCCWP was staffed by four (4) full-time employees and two (2) part-time employees. Consultant support services are also retained to assist with group activities. The Management Committee, which consists of one designated representative from each of the 21 municipalities, is the decision-making body of the CCCWP. The Management Committee meets monthly and directs and monitors the implementation of all group activities. Five (5) subcommittees review, research and make recommendations to the Management Committee. Program staff and designated municipal representatives also participate on similar BASMAA subcommittees, which are focused on the implementation of regional tasks and projects. Attachments 1.1 and 1.2 outline the CCCWP's organizational structure, staffing and representatives, and consultants. Attachment 1.3 shows Contra Costa Permittee participation and attendance on the CCCWP's Management Committee and five (5) subcommittees. In

[4] Phase I Municipal Stormwater Programs include: 17 public agencies comprising the Alameda Countywide Clean Water Program (ACCWP); 18 of the 21 public agencies comprising the CCCWP; 15 public agencies comprising the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP); 22 public agencies comprising the San Mateo Countywide Stormwater Pollution Prevention Program (STOPPP); the cities of Fairfield and Suisun City comprising the Fairfield-Suisun Urban Runoff Management Program (FSURMP); and, the City of Vallejo and the Vallejo Sanitation and Flood Control District.

accordance with the Program Agreement, municipal representatives with voting rights are expected to attend at least 80% of the CCCWP's regularly scheduled meetings.

Summary of Major Group Activities for FY 2011-2012

2012 Community Clean Water Initiative

In FY 2011-2012, the CCCWP conducted a countywide Proposition 218[5]-compliant property-related-fee ballot measure, titled the "2012 Community Clean Water Initiative". The initiative, which would have generated approximately $8.7 million beginning in FY 2012-2013, was the culmination of more than six years of planning and analysis. The proposed Clean Water fee was based on the cost of clean water and pollution control services and facilities needed to improve water quality and comply with federal and state mandates (i.e., the MRP). The ballot measure failed to achieve the necessary votes by property owners in Contra Costa County. Election results are as follows:

- Mailed Ballots - 339,586
- Received Valid Ballots - 100,768
- "Yes" Ballots - 40,924 (40.6%)
- "No" Ballots - 59,844 (59.4%)
- Invalid Ballots - 1,355

The 2012 Community Clean Water Initiative was sponsored by the CCCWP as part of a collaborative effort with the Contra Costa County Flood Control District. This public-agency partnership specifically designed the initiative to offset the rising costs associated with managing and implementing the stricter federal and state permit standards designed to keep Contra Costa waterways free of trash and other pollutants of concern. The ballot initiative was developed to give property owners a voice on fees

[5] Prop 218 amended the California Constitution (Articles XIIIC and XIIID) which, as it relates to assessments, requires the local government to have a vote of the affected property owners for any proposed new or increased assessment before it could be levied. The Proposition was passed by California voters on November 5, 1996, and the assessments portion placed in effect on July 1, 1997. Government agencies affected by Proposition 218 are counties, cities, and special districts.

that are specific to those individuals and businesses that own property in Contra Costa County.

A primary influence on voter support levels during this effort was the local print media. During the balloting period, there was active opposition by the major local newspaper. This newspaper was fundamentally critical of the initiative, and consistently opposes many local taxes, assessments and fees proposed by any local agency. It published eleven (11) major opinion columns and at least ten (10) Letters to the Editor that were critical of the initiative and government services. None that were neutral or supportive were published. The paper was particularly critical of the required Proposition 218 property-related fee process. (Ironically, this process was designed by the Howard Jarvis Taxpayers Association, and has been used in other jurisdictions without similar criticism from local media.) The opinion pieces provided negative perspectives and questions about the initiative. Most local print media stories focused on the Proposition 218 process rather than on needs for water quality and pollution prevention.

An inherent “softness” of support for stormwater quality issues exists. Stormwater runoff is generally accepted as an important element to a healthy environment and high quality of life. However, when water quality is contrasted with other municipal services or community priorities such as education and fire protection, support for water quality is relatively less. Also, despite significant outreach, many local property owners still do not understand, or are skeptical of, the environmental importance of water quality.

Underlying opinions and sentiment exists in every local and regional community. Within Contra Costa County, property owners are generally frustrated with local government spending, with particular concern about public employee pension programs. This negative opinion is not directed exclusively at water quality, but includes opposition to any additional fees or taxes.

California State Law contains multiple tax, assessment and fee mechanisms. While a parcel tax election is a widely known method for generating revenue, stormwater quality

services are better suited for funding by a property-related fee. Although the property-related fee is a commonly used mechanism for funding water quality services, there is some unfamiliarity with the processes of the property-related fee mechanism, which was exploited by opponents.

Considering the significant and well-resourced opposition to the "2012 Community Clean Water Initiative", extensive efforts would be needed to overcome generally negative voter sentiment. Contra Costa County's current political climate is not supportive of government spending and additional taxes. Much of the community remains relatively uninformed, and skeptical, over clean water and pollution prevention issues. Even with a much larger outreach effort, success of a clean water measure would likely not be achieved at this time, particularly if local print media remain unsupportive.

The defeat of the "2012 Community Clean Water Initiative" represents a setback for Permittees' clean water programs in Contra Costa County. Permittees have exhausted or nearly exhausted their reserves. Many are now relying on other municipal revenues, such as their general funds, to implement MRP compliance. At the same time, reductions in general fund revenues due to significant losses in property and sales tax revenues has resulted in reductions in staffing, salaries and benefits, and community services and programs. Local elected officials are faced with agonizing and unpopular public policy decisions on how to use and allocate their limited resources and revenues to continue to provide critical services (e.g., public safety, road maintenance, public facilities operation and maintenance, natural resource protection).

Keeping Trash Out of Our Local Creeks, the Delta and Bay

Contra Costa Permittees met a significant milestone during FY 2011-2012 in addressing the San Francisco Bay Water Board's priority to reduce trash discharged into and from municipal storm drain systems. Initiated in early 2010 and continuing into FY 2011-2012, CCCWP staff and Permittees continued to cooperate with BASMAA members in

the regional development of: 1) baseline trash generation rates; 2) trash load reduction tracking methods; and, 3) a model "Short-Term Trash Loading Reduction Plan". On February 1, 2012, in accordance with MRP Provision C.10, BASMAA and Permittees submitted the following reports and plans, respectively:

1. "*Preliminary Baseline Trash Generation Rates for San Francisco Bay Area MS4s*"
2. "*Trash Load Reduction Tracking Method*"
3. Municipal Short-Term Trash Load Reduction Plans

Copies of BASMAA and Permittees' reports and plans can be downloaded from the San Francisco Bay Water Board's website at http://www.swrcb.ca.gov/rwqcb2/water_issues/programs/stormwater/MRP/02-2012/index.shtml. The Municipal Short-Term Trash Load Reduction Plans contain Permittees' commitments to install and maintain capital facilities, and to implement a variety of new and enhanced actions to further reduce trash loads from their municipal storm drainage facilities by 40% by July 1, 2014. These facilities and actions constitute a considerable accomplishment and investment of public resources. Specifically, in the two years since MRP adoption, Permittees have:

- Created a BASMAA Trash Committee to coordinate trash requirements at the regional level and engaged Water Board staff and other stakeholders in how to best achieve significant trash load reductions.
- Identified hundreds of trash hot spots and conducted annual cleanups at these sites in water bodies to reduce existing trash impacts.
- Installed hundreds of full capture trash control devices resulting in the treatment of thousands of acres of urban land area.
- Conducted reviews of the worldwide literature to guide development of science-based baseline trash loads and load reduction tracking methods.
- Conducted over 20 meetings during which preliminary concepts and methods for developing trash baseline loads and tracking methods were openly discussed with Water Board staff and stakeholders and constructive feedback was solicited.

- Developed and provided draft versions of sampling and analysis plans and tracking methods to Water Board staff and stakeholders for review and comment.
- Implemented a baseline trash generation rate study where thousands of gallons of material collected by full capture devices were characterized.
- Developed preliminary baseline trash generation rates and trash load reduction tracking methods that incorporated feedback provided by active stakeholders.
- Created a template and guidance for Permittees to use when developing their short-term trash load reduction plans, which was provided to Water Board staff and other stakeholders for review and comment, and was intended to standardize plans and ease review by Water Board staff.
- Planned, created, and submitted individual short-term plans for review by Water Board staff.
- Applied for grants to assist Permittees in implementing enhanced trash controls and developing methods to verify trash load reduction and control measure effectiveness.

BASMAA is preparing and will submit next fiscal year a "*Final Trash Load Generation Rates*" report. The final report will incorporate additional data collected from sample sites monitored during the spring of 2012. In FY 2012-2013, Permittees through BASMAA will also be working with Water Board staff and interested stakeholders to refine the Trash Load Reduction Tracking Method. Permittees will use the revised trash generation rates and refined trash tracking methods in development of their Long-Term Trash Load Reduction Plans due in accordance with Provision C.10 on February 1, 2014. These plans will describe additional control measures (i.e., facilities and actions) that will be implemented to attain the next significant milestone – a 70% reduction in the trash load from municipal storm drain systems by 2017.

Further details on regional trash reduction efforts are provided in BASMAA's "*MRP Regional Supplement for Monitoring and Pollutants of Concern Reporting for Fiscal Year 2011-2012*". Section 10 in this Volume I report provides further details on countywide coordination in development of the Municipal Short-Term Trash Load

Reduction Plans. The Volume II individual municipal reports document each Contra Costa Permittee's trash reduction actions and loads reduced.

Revised Land Development Requirements, Policies and Guidance

In addition to the considerable efforts associated with the "2012 Community Clean Water Initiative" and Trash Load Reduction activities described above, CCCWP staff, consultants and Permittees were also focused on:

1) Implementation of the new Provision C.3.c. Low Impact Development requirements, which became effective on December 1, 2011;
2) Review and development of comments on San Francisco Bay Water Board staff's proposed amendment to the MRP revising Provision C.3; and,
3) Development of the CCCWP's 6th Edition, Stormwater C.3 Guidebook, which the Management Committee adopted on February 15, 2012.

A brief description of each activity listed above is as follows:

Implementation of the New Provision C.3.c Low Impact Development Requirements - On December 1, 2011, new land development standards became effective. This included a new category of Regulated Projects[6]. The new category includes auto service facilities, retail gasoline outlets, restaurants, and uncovered parking lots. For these land uses, a new lower threshold applies (i.e., from 10,000 square feet of impervious area created or replaced to 5,000 square feet). Furthermore, the new standards require all "Regulated Projects" implement new Low Impact Development (LID) source control and site design measures, and stormwater treatment facilities. LID is a stormwater management strategy aimed at maintaining or restoring the natural hydrologic function of the site. LID design detains, treats, and infiltrates runoff by minimizing impervious area, using pervious pavements and green roofs,

[6] Regulated Projects include new and redevelopment projects, includes new roads and road widening with additional traffic lanes, that create or replace more than 10,000 square feet of impervious surface.

dispersing runoff to landscaped areas, and routing runoff to rain gardens, cisterns, swales, and other small-scale facilities distributed throughout the site. Implementation of LID design has been a formal policy of Contra Costa Permittees since February 2005.

Water Board Amendment Revising Provision C.3 - On November 28, 2011, the San Francisco Bay Water Board adopted Order No. R2-2011-0083 amending the MRP with revised Provision C.3 land development standards. As reported last year, CCCWP staff and consultants, and designated staff from local municipalities provided substantial assistance and leadership in the development of regional policies and the revised land development standards contained in the amendment. The amendment included, among other new requirements, biotreatment soil media minimum specifications, green roof minimum specifications, and criteria allowing non-LID treatment facilities (tree-box-type high flow rate biofilters, and vault-based high flow rate media filters) on certain smart-growth, high density, and transit oriented developments ("Special Projects"). The amendment can be downloaded from the San Francisco Bay Water Board's website at: http://www.swrcb.ca.gov/rwqcb2/board_decisions/adopted_orders/2011/R2-2011-0083.pdf.

CCCWP's 6th Edition, Stormwater C.3 Guidebook - On February 15, 2012, the CCCWP's Management Committee adopted the *6th Edition, Stormwater C.3 Guidebook*. The 6th Edition incorporated the amended Provision C.3 and new design procedures to assess the feasibility of incorporating harvesting and re-use on a proposed development project. A copy of the 6th Edition can be downloaded from the CCCWP website at: http://cccleanwater.org/c3-guidebook.html. Section 3 of this Volume I report documents: 1) further details on the above mentioned activities; 2) the CCCWP's May 17, 2012 C.3 training workshop; 3) the CCCWP's ongoing Hydrograph Modification Management Model Calibration and Validation Monitoring Project; and 4) the status of pilot green street projects in Contra Costa.

Monitoring Water Quality in Local Creeks, the Delta and Bay

CCCWP Permittees are collectively conducting technically complex and comprehensive water quality monitoring programs encompassing local creeks, and the Delta and Bay. These monitoring programs are conducted and coordinated as part of a Regional Monitoring Collaborative through BASMAA, and are in accordance with prescriptive requirements in MRP Provision C.8 and Provisions C.11 – 14. These water quality monitoring activities include:

- ***Delta and Bay Receiving Water Quality Monitoring*** – Contra Costa creeks ultimately discharge to the San Francisco Bay/Delta Estuary. Water quality monitoring within the Bay/Delta and tributaries is referred to as "Receiving Water Quality Monitoring". The San Francisco Estuary Institute's (SFEI's) Regional Monitoring Program for Trace Substances (RMP) has financial support, direction, and participation shared by regulatory agencies and the regulated community, which includes MRP Permittees. Monitoring performed by the RMP helps determine spatial patterns and long-term trends in contamination through sampling of water, sediment, bivalves, bird eggs, and fish, and evaluates toxic effects on sensitive organisms and chemical loading to the Bay. The Program combines RMP data with data from other sources to provide for comprehensive assessment of chemical contamination in the Bay. Monitoring of receiving waters is intended to help understand:

  a. Are chemical concentrations in the Estuary potentially at levels of concern and are associated impacts likely?
  b. What are the concentrations and masses of contaminants in the Estuary and its segments?
  c. What are the sources, pathways, loadings, and processes leading to contaminant related impacts in the Estuary?
  d. Have the concentrations, masses, and associated impacts of contaminants in the Estuary increased or decreased?

e. What are the projected concentrations, masses, and associated impacts of contaminants in the Estuary?

- ***Status Monitoring/Rotating Watersheds*** – In FY 2011-2012, CCCWP Permittees initiated their status monitoring program, which will be conducted annually in rotating, randomly selected watersheds during spring (i.e., April-June) and during the dry season (i.e., July-September). Status monitoring is intended to answer these questions:

  a. Are water quality objectives, both numeric and narrative[7], being met in local creeks?
  b. Are conditions in local creeks supportive of or likely to be supportive of beneficial uses[8]?

Status monitoring involves multiple sampling sites; a variety of sampling techniques, parameters, and analytical methods are used. Should a sample exceed or "trigger" a specified threshold, Permittees may conduct a step-wise process to identify and address the cause of the exceedance.

- ***Pollutants of Concern and Long-Term Trends Monitoring*** – In FY 2011-2012, CCCWP Permittees established a Pollutants of Concern (POC) and Long-Term Trends Monitoring (POC Monitoring) station on Marsh Creek. POC Monitoring is intended to assess inputs of Category 1 and Category 2 POCs[9] to the Bay from local

[7] Narrative objectives present general descriptions of water quality that must be attained through pollutant control measures and watershed management. Numerical objectives typically describe pollutant concentrations, physical/chemical conditions of the water itself, and the toxicity of the water to aquatic organisms.
[8] Surface and ground water provide many benefits. These benefits vary and are collectively referred to as "beneficial uses". An example beneficial use is "Municipal and Domestic Supply", which is the use of water for community, military, or individual water supply systems, including, but not limited to, drinking water supply. Other examples include "Marine Habitat" and "Water Contact Recreation" (swimming).
[9] Category 1 pollutants of concern are those for which San Francisco Bay Water Board has active water quality attainment strategies (WQAS) (i.e., copper, mercury, PCBs, suspended sediments, total organic carbon, toxicity, Nitrates and Hardness). Category 2 pollutants of concern are those for which WQAS are in development (i.e., Selenium, PBDEs, PAHs, Chlordane, DDTs, Dielfrin, Nitrate, Pyrethroids, Caboryl and Fipronil, and Phosphorus).

tributaries and urban runoff, assess progress toward achieving pollutant load reductions for Category 1 POCs, and help resolve uncertainties associated with loading estimates for these pollutants.

- ***POC Pilot Studies and Programs*** - Contra Costa Permittees are also implementing several pilot studies and programs to assess and implement effective controls to prevent and/or remove mercury, Polychlorinated Biphenyls (PCBs), copper, PBDE, legacy pesticides and selenium from municipal storm drain systems and urban runoff.

Detailed reporting on the above mentioned water quality monitoring activities, studies and programs are provided in Section 8, and Sections 11-14 in this Volume I report, and in BASMAA's "*MRP Regional Supplement for Monitoring and Pollutants of Concern Reporting for Fiscal Year 2011-2012*".

Other Activities and Programs for FY 2011-2012

In addition to the major activities and programs summarized above, CCCWP Permittees conducted a broad range of other activities and programs designed to reduce or eliminate the discharge of pollutants (i.e., anything other than stormwater) into and from their municipal storm drain systems. This Volume I report documents the other activities conducted or coordinated collectively as follows:

Program Component	Section
Municipal Operations – Controls to reduce non-stormwater discharges and polluted stormwater to storm drains and watercourses during operation, inspection, and routine repair and maintenance activities of municipal facilities and infrastructure.	2
Industrial and Commercial Site Controls – Inspections and enforcement of stormwater regulations at businesses to prevent pollutant exposure and discharges into the municipal storm drain systems.	4
Illicit Discharge Detection and Elimination – Surveillance, spill and complaint response, control of mobile sources, and enforcement and case follow-up.	5
Construction Site Controls – Inspections and enforcement of stormwater regulations at construction sites to prevent pollutant discharges into the municipal storm drain systems.	6
Public Information and Outreach – Outreach to increase the knowledge of target audiences regarding the impacts of stormwater pollution through advertising campaigns, use of free media, public outreach events, citizen involvement events, etc…	7
Pesticide Toxicity Control – Actions to prevent impairment of urban streams by pesticide-related toxicity, including implementation of Integrated Pest Management (IPM), outreach and training to municipal employees and pest control operators, and outreach to consumers on less-toxic methods of pest prevention and control.	9

Contra Costa Permittees are Moving Forward

The federal and/or state mandates for municipalities to control discharges of trash and other pollutants of concern into and from their municipal storm drain systems, and to conduct comprehensive water quality monitoring programs, including various studies and pilot projects, will continue to require a significant investment of public funds. With the defeat of the 2012 Community Clean Water Initiative, CCCWP Permittees

collectively and individually have begun a review focused on how they can more efficiently and effectively keep trash and pollutants out of our local creeks, the Delta and Bay; and, comply with the plethora of prescriptive and administratively burdensome mandates outlined in the 278-page MRP. While this review is ongoing, specific actions identified include, but are not limited to:

- Review and analyze alternative CCCWP organizational structures, staffing and consultant support levels, and tasks;
- Review other potential sources of revenue (e.g., increased fees) to fund mandated compliance activities;
- Engage local elected officials, municipal managers, businesses, citizens, and other stakeholders in development of effective water quality attainment strategies;
- Identify prioritized actions to reduce the discharge of trash and other pollutants of concern to local creeks, the Delta and Bay; and
- Seek flexibility in permit requirements to allow individual Permittees to focus their limited resources to address local water quality priority problems.

Despite the significant challenges that lie ahead, CCCWP Permittees remain committed to finding and implementing creative and innovative ways to effectively conserve and protect water quality within our local watersheds and the San Francisco Bay/Delta.

SECTION 2 – PROVISION C.2 MUNICIPAL OPERATIONS

Introduction

The CCCWP Municipal Operations Committee (MOC) includes municipal and CCCWP staff and consultants. The MOC helps prepare guidance and training for municipal maintenance, commercial/industrial inspection, illicit discharge control, pesticide reduction, and trash load reduction activities. Designated representatives of the CCCWP MOC and CCCWP staff also participate on the Bay Area Stormwater Management Agencies Association (BASMAA) MOC and Trash Subcommittees, which coordinates related regional activities.

The CCCWP MOC meets every fourth Thursday of the month. The BASMAA MOC and Trash Subcommittees meet every third Thursday of the month. For a listing of Contra Costa municipal representatives on the CCCWP MOC and BASMAA MOC, see Attachment 1-1.

Accomplishments

Stormwater Pump Station Monitoring

At several meetings, CCCWP MOC participants discussed pump station maintenance and monitoring, with a focus on trash collection and Dissolved Oxygen (DO) monitoring during pump station inspections. The CCCWP MOC is reviewing and contributing to development of forthcoming BASMAA MOC guidance for determining when specific pump stations do not need to be monitored based on closer examination of pump station monitoring performance and the requirements of Provision C.2.d. The BASMAA MOC plans to complete the guidance during 2012.

BMPs for Mobile Cleaning Operations

BASMAA's Mobile Surface Cleaner Program is a training and certification program for

individual mobile surface cleaners to implement Best Management Practices (BMPs). Contra Costa municipalities hire only BASMAA certified mobile surface cleaners—or use trained staff—for surface pavement washing of public facilities, and also require private businesses to implement the BMPs in BASMAA's Mobile Surface Cleaner Program. BASMAA's program is consistent with Provision C.2.b., "Sidewalk/Plaza Maintenance and Pavement Washing".

For some years, the surface cleaning certification program has addressed the cleaning of surface pavement (e.g., parking lots, plazas, and sidewalks). The CCCWP MOC in coordination with the BASMAA MOC is expanding the program to include other mobile cleaners such as carpet cleaners, mobile auto detailers and auto body workers, mobile pet cleaners, mobile food providers, and other mobile businesses in accordance with Provision C.5.d. "Control of Mobile Sources". During FY 2010-2011, a consultant was procured for the program expansion and during FY 2011-2012 a consultant was procured for producing new segments of the training video. This effort is scheduled to be completed in FY 2012-2013.

BMPs and Training for Rural Road Construction and Maintenance

The CCCWP MOC assisted Unincorporated County, the Permittee in Contra Costa with the majority of rural roads, to help procure funds for and to promote and organize a rural roads BMP workshop on September 29, 2011. Funds were provided by the San Francisco Estuary Partnership (SFEP) with coordination from Program staff. The Unincorporated County Watershed Program hosted the workshop, recruited speakers, and organized the agenda. The workshop agenda included topics such as:

- Effects of Roads on Watershed Hydrology, Channel Morphology, Salmon Rearing and Spawning Habitat
- Best Management Practices for Rural Road Construction and Maintenance to protect water quality

- Best Management Practices for Working Near Streams and other Waterways to protect water quality

The workshop was attended by 26 stormwater and municipal maintenance employees, including those from two other Permittees (the city of San Ramon and Orinda) and was well received. More information on the workshop is in Contra Costa County's annual report.

FY 2012-2013 Activities

In FY 2012-2013, the CCCWP MOC will continue to assist municipal operations staff to implement consistent and effective BMPs in accordance with the mandates in Provisions C.2 (Municipal Operations), C.4 (Industrial Commercial Site Controls), C.5 (Illicit Discharge Detection and Elimination), C.9 (Pesticide Toxicity Control) and C.10 (Trash Load Reduction).

With regard to C.2 Municipal Operations for FY 2012-2013, the CCCWP MOC's goals are to promote and implement the updated BASMAA Mobile Surface Cleaner Program, to encourage emphasis on C.2 BMPs and activities that benefit water quality and adhere to the objectives of the MRP, and continue to improve and train municipal workers on proper BMPs for their daily activities.

SECTION 3 – C.3 NEW DEVELOPMENT AND REDEVELOPMENT

Introduction

Provision C.3, New Development and Redevelopment, was the most controversial new provision when the San Francisco Bay Water Board adopted the Municipal Regional Permit (MRP) in 2009. Because of this controversy, some permit requirements were deferred for resolution during the permit term. After receiving required submittals from the Permittees during FY 2010-2011, the Water Board amended this permit provision in November 2011.

The Water Board's changing permit requirements—and adoption of new requirements with very short implementation times—could have disrupted implementation of LID on new development projects in Contra Costa. During FY 2011-2012, the CCCWP endeavored, through advocacy and careful planning, to limit this potential disruption.

Review of FY 2011-2012 Objectives

The CCCWP FY 2011-2012 C.3 Work Plan was guided by the following objectives:

- Facilitate member agencies' compliance with MRP Provision C.3.
- Facilitate implementation of permanent controls on new developments in Contra Costa County.
- Organize and implement all required C.3 group activities and submittals.
- Integrate MRP requirements and BASMAA MRP submittals into existing training and guidance.
- Negotiate permit requirements and interpretations that protect water quality and are implementable and cost-effective.
- Continuously improve Program outreach and guidance on new development controls.
- Continue CCCWP's regional and statewide role as an exemplar and leader in

implementation of new development controls.

Review of FY 2011-2012 Accomplishments

Negotiation of MRP Amendment

During FY 2011-2012—as in recent years past—a good portion of the Program's resources for implementing new development controls were directed toward negotiation of future permit conditions. Additional resources were directed toward responding to various Water Board staff "informal" requests for additional submittals beyond those required by the permit.

Through careful negotiations, Program staff, consultants, and municipal staff participants were fairly successful at ensuring Contra Costa municipalities can continue to implement and continuously improve their LID programs. However, the Water Board's new permit conditions could result in less LID being implemented on some "Special Projects." Additional reporting burdens may divert some local and countywide resources away from on-the-ground LID implementation.

The MRP Amendment adopted in November, 2011:

- Incorporated Contra Costa's existing specification for bioretention media, with the minor change of a requirement to obtain a sieve analysis of the compost fraction of the sand/compost mix.
- Eliminated Contra Costa's allowance for non-LID treatment facilities (tree-box-type high-rate biotreatment facilities and in-vault media filters) to be used for (1) portions of existing sites retrofit for LID treatment under the "50% rule" and for (2) lot-line-to-lot-line sites in pedestrian-friendly areas between one-half acre and one acre in impervious area. The allowance was retained for sites under one-half acre.
- Expanded this same allowance to "transit-oriented development" sites (in graduated form, depending on density of the development).

New minimum requirements for the use of green roofs for stormwater management did not require any material changes to Contra Costa policy.

Changes to Guidance to Comply with MRP Provisions

The following permit provisions became effective on December 1, 2011 (December 1, 2012 for municipalities and portions thereof that are in Region 5):

- The Regulated Projects threshold for auto service facilities, retail gasoline outlets, restaurants, and uncovered parking lots changed from 10,000 square feet of impervious area created or replaced to 5,000 square feet. (Provision C.3.b., in the 2009 MRP)
- Private projects that widen existing streets or roads with additional traffic lanes and create 10,000 square feet or more of impervious area are Regulated Projects if final discretionary approval has not been received by this date. (Provision C.3.b., in the 2009 MRP)
- LID requirements apply to Regulated Projects (except "Special Projects") which have not received discretionary approval by this date. (Provision C.3.c., in the 2009 MRP)
- Permittees are required to track any identified potential Special Projects that have not received final discretionary approval. (Provision C.3.e., added in the November 2011 MRP amendment)

The *Stormwater C.3 Guidebook, 5th Edition* was published October 20, 2010 and included, in Table 1-1, the MRP Regulated Projects thresholds, including effective dates. All Contra Costa municipalities have adopted a stormwater ordinance that requires all applications for development approvals be accompanied by a Stormwater Control Plan prepared according to the criteria in the most current edition of the *Guidebook.* The new thresholds were highlighted in a 2-page CCCWP *Stormwater C.3*

Update published in March 2010 and distributed at municipal permit counters. The same table appears in the 6th Edition of the *Guidebook*.

Provision C.3.c.iii.(3) requires the Permittees to report the methods of implementation of Provisions C.3.c.i. (LID) in the 2012 Annual Report. After submitting the May 1, 2011 "Harvest and Use, Infiltration, and Evapotranspiration Feasibility/Infeasibility Criteria Report" as required by MRP Provisions C.3.c.i.(2) and C.3.c.iii.(1)—and with the December 1, 2011 implementation date looming—BASMAA agencies immediately began work on developing methods to implement the criteria in accordance with Provision C.3.c.

Contra Costa municipalities already had in place interim requirements for analyzing feasibility; these were included in the *Stormwater C.3 Guidebook* 5th Edition. Other BASMAA agencies proceeded to develop a set of worksheets applicants would use to assess feasibility/infeasibility of infiltration, evapotranspiration, and harvesting/reuse. After reviewing drafts of these worksheets, the CCCWP Development Committee (DC) directed the Program's consultant to prepare Contra Costa-specific guidance that would use the criteria from BASMAA's May 1, 2011 report but integrate feasibility analysis steps into the LID design procedure in Chapter 4 of the *Stormwater C.3 Guidebook* and simplify the applicant's incorporation of the analysis into the required Stormwater Control Plan submittal. This procedure was distributed to municipal staff as a draft revised *Stormwater C.3 Guidebook* Chapter 4, and a December 1, 2011 2-page CCCWP *Stormwater C.3 Update* (and Guidebook addendum) advised applicants to obtain the draft instructions and calculation tables from municipal staff. The *Stormwater C.3 Guidebook* 6th Edition, published February 15, 2012, incorporates the instructions and calculation tables.

The 6th Edition also incorporated Attachment "L" (bioretention soil specification) from the MRP Amendment adopted November 28, 2011 and criteria to place the underdrain outlet for bioretention facilities near the top of a 12-inch subsurface gravel drainage layer. An updated Stormwater Control Plan template corresponds to the headings and

instructions in *Guidebook* Chapter 3 ("Preparing Your Stormwater Control Plan") and prompts the new analyses and reporting requirements contained in the MRP amendment.

Provision C.3.e.v. requires the Permittees to submit the ordinance/legal authority and procedural changes made, if any, to implement Provision C.3.e. with their 2012 Annual Report. The *Stormwater C.3 Guidebook, 6th Edition* includes, on page 10, a description of the offsite compliance options in Provision C.3.e. The "Special Projects" categories adopted by the Board on November 28, 2011 were included in the *Stormwater C.3 Update* published and distributed on December 1, 2011 and were subsequently incorporated into the 6th Edition (pp. 58-60), along with guidance for the required narrative discussion of the feasibility or infeasibility of 100% LID treatment. The CCCWP assisted municipalities to prepare the required first report on Special Projects in accordance with Provision C.3.e.vi.(2), which was due on March 15, 2012. There were no Special Projects that had submitted planning applications after December 1, 2011 but had not received final discretionary approval by March 1, 2012.

Provision C.3.e.vi.(3)(i) requires Permittees to list all non-LID stormwater treatment systems approved and, "for each non-LID treatment system, indicate whether the treatment system either meets minimum design criteria published by a government agency or received certification issued by a government agency, and reference the applicable criteria or certification." This requirement was discussed in the CCCWP DC as well as the BASMAA Development Committee. The CCCWP DC decided that countywide policy on design criteria or certifications for non-LID systems would be developed at the time a non-LID system is approved by a Contra Costa municipality, which may happen during 2012-2013.

<u>Green Streets Implementation</u>

Provision C.3.b.iii. requires the Permittees to cumulatively complete ten pilot green street projects that incorporate LID techniques for site design and treatment in

accordance with Provision C.3.c. and that provide stormwater treatment sized in accordance with Provision C.3.d. At least two of these pilot green streets projects must be located in Contra Costa County. All pilot green street projects shall be completed by December 1, 2014.

Two green streets projects, one in El Cerrito on San Pablo Avenue near Madison Avenue, the other in El Cerrito on San Pablo Avenue near Eureka Avenue, were completed in 2011, fulfilling Contra Costa's countywide requirement under this provision. These projects are known as the "San Pablo Avenue Rain Gardens." Funding for the project included Federal American Recovery and Reinvestment Act (ARRA) monies.

Another El Cerrito green streets project, funded through an SWRCB Proposition 84 Urban Greening grant, is in final design. The rain garden on the Ohlone Greenway at Fairmount Avenue is scheduled to begin construction during 2012-2013.
Additional Contra Costa green streets projects, funded by Proposition 84 through the San Francisco Estuary Project, are currently in design and may be completed by 2014. These projects in El Cerrito and Richmond are known as part of the "San Pablo Avenue Green Spine" project.

Training for Land Development Professionals and Municipal Reviewers

To implement Provision C.3.a.i.(4), the Program sponsored a workshop for municipal staff and land development professionals, titled "How to Prepare Stormwater Control Plans for Development Projects" on May 17, 2012. The workshop was held at the Shadelands Art Center, 111 N. Wiget Lane, Walnut Creek, from 8:30 until 12:30. About 100 attended. As with workshops in previous years, CCCWP staff issued an invitation to Water Board staff; however, (also as in recent years), none chose to attend. The purpose of the workshop was to promote thorough and consistent application of the *Stormwater C.3 Guidebook, 6th Edition,* including consistent preparation of stormwater

compliance submittals for new development projects using the updated Stormwater Control Plan template.

A May 2, 2012 construction inspection (Provision C.6) CCCWP-sponsored workshop included a presentation and discussion on construction of LID facilities.

HMP Model Calibration and Validation Plan Implementation

During late 2011, six bioretention facilities were completed at the County Fire Protection District office building on Loveridge Road in Pittsburg. Three of the facilities are fitted with instrumentation for measuring flow-control performance. Tipping buckets are located at the underdrain discharges, and pressure transducers, designed to measure the height of saturation within the facilities, are located in monitoring wells. All monitoring instrumentation was working throughout the FY 2011-2012 rainy season.

Also during late 2011, bioretention facilities and associated large-diameter buried pipes were installed at the Walden Park Commons townhouse development in Walnut Creek. These facilities are configured into two bioretention + vault systems. Monitoring instrumentation was working throughout the FY 2011-2012 rainy season. Data from early-season storms was compromised because of errors in the construction of the bioretention facilities. These errors were reportedly corrected prior to the last of the seasonal storms. Data availability was delayed because of problems with transmission; however, all data were captured in on-site dataloggers.

CCCWP staff and consultants presented the available first-year data to Water Board staff at a meeting on April 19, 2012. A copy of a PowerPoint slide showing key data was sent to participants as a follow-up on April 26, with an explanatory correction. As discussed at that time, at the three Pittsburg locations, there was no discharge from the underdrains recorded during the FY 2011-2012 rainy season. Subsequently, data from the two Walnut Creek locations have become available; however, this data has not yet

been reviewed. All raw data collected is attached to this Annual Report; however, all data are pending review for quality control (see Attachment 3.1).

The CCCWP applied for a Proposition 84 Storm Water Quality Grant for the purpose of extending and improving the HMP Model Calibration and Validation Plan; however, the application was not placed on the SWRCB's funding list.

Revisions to Model Ordinance

The current model ordinance was adopted, with minor revisions, by each Contra Costa municipality in late 2004 and early 2005. That model incorporated provisions to facilitate implementation of the then-new "C.3" requirements for new developments. In FY 2010-11, the CCCWP convened a Technical Work Group and Legal Work Group to review the current model ordinance in context with the adopted MRP. That review determined that the current model ordinance did provide the legal authority to address the MRP; however, other formatting and language clarifications were identified; suggested changes identified during subsequent meetings during FY 2011-12 were then forwarded to the CCCWP's Legal Work Group for review and evaluation. In FY 2011-12, CCCWP Manager Tom Dalziel reconvened the Legal Work Group. Because of the press of other business (largely related to submittals required by the MRP), work on the review of these comments was delayed. Final changes to the revised model ordinance are currently being completed.

Required Site Design Measures for Small Projects

Provision C.3.i. mandates the Permittees require development projects that create and/or replace between 2,500 square feet (SF) and 10,000 SF of impervious surface, and detached single family home projects that create and/or replace 2,500 square feet or more of impervious surface, to install one or more of six specified site design measures. The Permittees are required to, on an annual basis, discuss implementation

of the requirements, including ordinance revisions, permit conditions, development of standard specifications and/or guidance materials, and staff training.

The CCCWP is developing a submittal template with checklists incorporating standard specifications, many of which are derived from specifications in Chapter 4 of the *Stormwater C.3 Guidebook*. The submittal template will be an addendum to the *Guidebook*. The submittal template will help ensure consistency and thoroughness in implementation. The template will likely reference fact sheets, currently in preparation by BASMAA, as a design resource, along with BASMAA's 1999 *Start at the Source* Manual and *Slow It, Spread It, Sink It*, a publication of resource conservation districts in Santa Cruz and Sonoma Counties.

Coordination and Assistance to Local C.3 Implementation

The CCCWP DC met in July, October, and November 2011 and in January, February, and April 2012. Phil Hoffmeister, Stormwater Coordinator for the City of Antioch, served as DC chair. Frank Kennedy, representing Concord, served as DC vice-chair. David Swartz, Stormwater Coordinator for Contra Costa County, served as CCCWP's representative to the BASMAA Development Committee, and Frank served as alternate.

The CCCWP DC provides a vital forum for staff active in the implementation of LID to share experiences and contribute to the continuous improvement of LID guidance and LID practice in Contra Costa. Each DC meeting agenda includes an item to discuss issues that have arisen during C.3 implementation by municipalities.

Regional and Statewide Leadership for New Development Controls

During FY 2011-2012, Contra Costa's LID approach continued to be increasingly emulated throughout California.

CCCWP Consultant Dan Cloak provided two presentations, on soil media specifications for bioretention and on design of “green streets” projects, at an all-day LID workshop at the California Stormwater Quality Association’s (CASQA’s) annual conference in Monterey on September 26, 2011. Cloak and CCCWP Manager Tom Dalziel provided a presentation, “Building and Testing Rain Gardens” during the conference regular session two days later.

The LID design procedure and bioretention design specification in Chapter 4 of the *Stormwater C.3 Guidebook* were adapted for use in a draft Tentative Order for the statewide Phase II municipal NPDES permit.

FY 2012-2013 Activities

The CCCWP fulfilled its FY 2011-2012 objectives for C.3 implementation. In particular, CCCWP staff and Permittee staff worked together closely and effectively to limit and manage the ongoing potential for disruptions and confusion created by the MRP LID requirements, including those in the November 2011 MRP amendment. The quality and consistency of LID design and construction in Contra Costa continues to improve. The goals in the FY 2012-2013 work plan are the same as in the previous year.

SECTION 4 – PROVISION C.4 INDUSTRIAL AND COMMERCIAL SITE CONTROLS

Introduction

Municipalities have implemented industrial and commercial site controls through facility inspections and enforcement since the inception of the CCCWP in 1993.

Contra Costa municipalities use a variety of resources to implement stormwater business inspection programs. In FY 2011-2012, Antioch, Clayton, Concord, El Cerrito, Hercules, Lafayette, Martinez, Orinda, Pittsburg, Pleasant Hill, Richmond, and San Ramon, and the Towns of Danville and Moraga made use of the CCCWP's Inspection Service Contract with local sanitary district (or Publicly Owned Treatment Works (POTW)) inspectors. This institutional arrangement of using local POTW inspectors to conduct municipal stormwater inspections was initiated soon after the CCCWP was issued its first Joint Municipal NPDES Permit in 1993. This arrangement has been praised by staff of the San Francisco Bay Water Board and has served as a model for other municipalities throughout California. Business inspections conducted by contracted POTW inspectors with the CCCWP's Inspection Service Contract are referred to in this Annual Report collectively as the "Group Inspection Program". The CCCWP provides administrative support to the Group Inspection Program. This includes management of the contracts, agreements, invoices and reporting, and assistance in review and development of annual inspection plans and goals. The cities of Brentwood, Oakley, Pinole, San Pablo, and Walnut Creek, and Contra Costa County currently conduct their own business inspection programs.

Accomplishments

During FY 2011-2012, CCCWP staff and the CCCWP's MOC assisted Permittees with implementation of Provision C.4 by:

1. Administering the CCCWP's Stormwater Inspection Service Contract for the Group Inspection Program;
2. Hosting one (1) Inspector Training workshop;
3. Supporting and participating in the Contra Costa Green Business Program; and,
4. Providing outreach to the business community.

The following is a detailed account of each activity listed above:

Administering the CCCWP's Stormwater Inspection Service Contract for the Group Inspection Program

CCCWP staff manages the inspection contract between the fourteen (14) municipalities involved in the "Group Inspection Program" and three local POTWs - Central Contra Costa Sanitary District (CCCSD), Delta Diablo Sanitary District (DDSD), and East Bay Municipal Utility District (EBMUD). Management of the contract includes administrative oversight of the contract billing, review of inspection goals and MRP compliance concerns, training of inspectors for consistent inspection services, and field support to inspectors and municipal staff when needed. CCCWP staff meets with the participating municipalities annually to assess the services provided, set goals for the upcoming FY, and reviews any special issues or enforcement problems that have occurred.

After a review of the Provision C.4 permit requirements, CCCWP staff has determined that inspection programs managed by the CCCWP's contract are consistent with the MRP. The inspection programs already include: a) the list of facilities suggested as potential stormwater polluters; b) an enforcement structure to address non-compliant businesses; and, c) careful review of industrial sites that may require coverage under the State's Industrial General Permit. No new activities were needed to be compliant with the MRP. For previous work updating the Model ERP and Model Business Inspection Plan, please refer to the CCCWP's FY 2010-2011 Annual Report, Section 4.

Inspector Training Workshop

The CCCWP hosted a June 7, 2012 inspector training workshop to satisfy C.4.d (annual training requirement in Provision C.4 Industrial and Commercial Site Controls). Topics included food service alternative products (how to enforce local ordinances for food ware); potential sources of mercury and copper during stormwater inspections (consistent with the aims of Provisions C.11 and the specific requirements of Provision C.13.d); current stormwater enforcement cases in Contra Costa County; how to build rapport with businesses; field trip and guided tour of the Richmond Pick and Pull industrial facility to learn about the auto dismantling business. The workshop was well attended. Based upon the workshop evaluations, it was well received.

Green Business Program

During FY 2011-2012, the CCCWP provided $9,000 to support the Green Business Program; the CCCWP is the largest partner contributor of funds to the Green Business Program in the County. The Green Business Program is designed to publicly recognize private businesses and public agencies taking the extra step beyond baseline compliance with environmental regulations by instituting business practices designed to conserve resources (i.e., water and energy), reduce waste (reuse and recycling), and prevent pollution (good housekeeping practices and other pollution prevention BMPs like using non-toxic cleaning products and promoting IPM for elimination of pests). This program encourages and facilitates business managers and inspectors to engage more openly, and fosters an environment of collaboration and cooperation in identifying and implementing cost-effective pollution prevention practices.

During FY 2011-2012, a total of 516 businesses were certified as a Green Business. The Green Business Program prepares an annual report every calendar year. The stormwater inspectors have assisted the Green Business program by encouraging potential Green Business candidates.

The effectiveness of this program is indicated by the lengthening list of businesses certified as green year-over-year. CCCWP serves on the “Partners Committee” and actively engages in development of the business checklists that each business needs to complete before becoming green certified.

Providing Outreach and Resources to Businesses

With CCCWP MOC input and direction, CCCWP staff develops and updates a variety of business outreach materials including BMP brochures and posters, a website, and a hotline. Stormwater inspectors promote these resources during their inspections.

During FY 2011-2012, the CCCWP MOC developed and produced a new version of the CCCWP’s restaurant ‘TIPS’ poster. This new poster updates the previous TIPs poster with new trash BMPs and condenses standard BMPs for housekeeping, grease management, floor and mat cleaning, spill prevention and cleanup, hazardous waste, training for employees, and IPM for encouraging non-toxic pest control. During FY 2012-2013, all municipalities and stormwater inspectors will be distributing this new poster to restaurants.

During FY 2011-2012, CCCWP staff, with input and direction from BASMAA’s MOC members, developed a fire sprinkler testing brochure. The brochure encourages businesses to avoid discharging fire sprinkler test water to storm drains by using appropriate BMPs. It will be made available to BASMAA members during 2012-2013.

More outreach materials will be developed during FY 2012-2013, including translating pieces already developed to languages other than English.

Throughout the year, CCCWP staff responds to businesses requesting copies of outreach materials. Business owners use the website to find information on stormwater pollution prevention practices and how they can make their stormwater inspections as easy as possible. They also use the hotline to report illegal dumping in their area to help

their business community prosper from a cleaner environment for their customers. A growing awareness of stormwater BMPs has stemmed from use of these resources. It is unknown how to link this increased watershed stewardship to improved water quality but many direct discharges of pollution have been eliminated from educating businesses in proper stormwater BMPs.

FY 2012-2013 Activities

For over fifteen years the CCCWP has consistently maintained a strong inspection program. Many of the MRP requirements were already part of municipalities' existing business inspection programs. With the exception of developing and implementing Enforcement Response Plans (ERPs), no significant changes have been made to the municipal inspection programs. To promote continuous improvement in the municipal inspection programs, CCCWP's MOC established the following goals for FY 2012-2013:

- Conduct an annual training workshop for all stormwater inspectors,
- Provide follow-up training on POC source identification and management,
- Update and/or expand the potential list of businesses to be inspected,
- Develop more outreach material for the businesses,
- Maintain the CCCWP's telephone hotline and website for businesses, and
- Continue support to the Green Business Program.

SECTION 5 – PROVISION C.5 ILLICIT DISCHARGE DETECTION AND ELIMINATION

Introduction

The CCCWP MOC oversees Illicit Discharge Detection and Elimination (IDDE) group activities.

Accomplishments

The following IDDE group activities were conducted or initiated during FY 2011-2012:

1. Managed the 1-800-NO-DUMPING Hotline and Hazmat Incident Reports;
2. Developed scope and budget to expand BASMAA's Mobile Surface Cleaner Program in FY 2011-2012; and,
3. Continued promotion of Charity Car Wash Kits

Provided below is a brief summary of each activity listed above:

1-800-NO-DUMPING Hotline and Hazmat Incident Reports

The CCCWP continues to operate the 1-800-NO-DUMPING hotline. The hotline helps the public throughout Contra Costa to report illegal dumping and to obtain stormwater information. All hotline calls are referred to the appropriate municipality for follow-up and, if necessary, enforcement**.** Calls have been logged since FY 2004-2005. Calls to the hotline are combined with calls that come directly to municipalities and County Hazmat and are tracked annually.

Of the 186 calls received during FY 2011-2012, the overwhelming majority were attributed to report an illegal dumping incident. The most common materials reported included garbage, mattresses, furniture, sofas, building materials, TVs/computers, and

shopping carts. Other reported dumped materials included yard waste, auto batteries/tires and other debris. The information from the hotline can help discern and address problem areas and countywide trends.

The CCCWP continues to collaborate with the Contra Costa County Hazmat Division. Hazmat's countywide 24-hour spill response is a vital component of municipalities' IDDE programs. Each month the CCCWP disseminates the Hazmat spill response or "Incident Reports" to each municipality's Management Committee representative. These reports inform each municipality of Hazmat occurrences within their jurisdiction as well as provide the CCCWP with illicit discharge incidents for tracking trends. Municipalities also use this information to track the type and locations of spills and dumping incidents, and to conduct appropriate follow-up. More information on each municipality's illicit discharge program is provided in the individual municipal annual reports compiled in Volume II of this report.

Scope and Budget to Expand BASMAA's Mobile Surface Cleaner Program in FY 2011-2012

BASMAA's Mobile Surface Cleaner Program is a training and certification program for mobile surface cleaners (see Sections 2 and 4 above). The CCCWP MOC is working with BASMAA to expand the program to include two new mobile business categories: automotive washing and carpet cleaning. This effort will be completed in FY 2012-2013. For further details, see BASMAA's "*MRP Regional Supplement: Training and Outreach Annual Reporting for Fiscal Year 2011-2012.*"

Charity Car Wash Kits

During FY 2007-2008, the CCCWP created a charity car wash pilot campaign to assist charity car wash sponsors to avoid illegal discharges of wash waters to storm drains. The charity car washing campaign included the creation of a brochure and several car washing kits each containing: one (1) submersible pump; one (1) 50' extension cord;

one (1) 3' rubber mat; one (1) 50' garden hoses; one (1) metal spray nozzle; three (3) collapsible safety cones, and tape. The brochure instructs charity car wash organizers how to conduct a car washing event without discharging wash water into the storm drain system. The brochure instructs organizations to: 1) contact the CCCWP; 2) make sure that charity car washes are legal within their municipality; and, 3) use the car washing kit in accordance with the instructions provided. In FY 2011-2012, six (6) organizations requested and successfully used the CCCWP's charity car wash kits. The CCCWP will continue to promote and track the use of these charity car wash kits next FY.

FY 2012-2013 Activities

The CCCWP's MOC will continue to review and assist in the development of needed guidance and training to help improve municipal IDDE programs. The CCCWP's MOC will be incorporating IDDE topics during the annual C.4 inspector training workshop, and will continued to provide input and direction on BASMAA's project to expand the mobile surface cleaners program.

SECTION 6 – PROVISION C.6 CONSTRUCTION SITE CONTROLS

To implement Provision C.6.f.ii., the CCCWP sponsored an all-day workshop, “How to Ensure Compliance with NPDES Construction Inspection Requirements.” The workshop was held May 2, 2012 at the Brentwood Community Center in Brentwood. Topics included:

- Provision C.6 Construction Inspection Requirements
- Key Requirements of the Construction General Permit
- Overview of Construction BMPs
- Construction Pollution Prevention for Single-Family Residence Projects
- Construction Site Compliance Exercise
- Compiling and Reporting Inspection Data Using Adobe Acrobat and MS Excel
- Construction and Maintenance of Low Impact Development Stormwater Facilities

In meetings of the CCCWP’s Development Committee, participants discussed Water Board staff requests from various municipalities for their “electronic database or tabular format” of construction inspections described in Provision C.6.e.ii.(4). Throughout the year, the Committee discussed topics of interest related to the implementation of construction site BMPs.

SECTION 7 – PROVISION C.7 PUBLIC INFORMATION AND OUTREACH

Introduction

The CCCWP Public Information/Participation (PIP) Committee, with assistance from CCCWP staff and consultants, is responsible for development of materials and products, information dissemination, marketing and public outreach in accordance with the MRP. Most of the public information and outreach requirements in the MRP are contained in Provision C.7; however, additional outreach activities are required or encouraged in other MRP provisions. The PIP Committee works to identify and coordinate these public information and outreach mandates conducted as a group, or conducted regionally through BASMAA's Public Information/Participation Committee. Attachments 1.1 and 1.3 provide a list of CCCWP representatives to BASMAA's PIP Committee and participation and attendance at CCCWP PIP Committee meetings, respectively. In FY 2011-2012 Julie Haas-Wajdowicz, City of Antioch, and Rinta Perkins, City of Walnut Creek, served as Chair and Vice-Chair, respectively, of the CCCWP PIP Committee.

The CCCWP's public information and outreach budget for FY 2011-2012 was $350,300. This was supplemented by the CalRecycle Oil Payment Program (OPP-2) Grant totaling approximately $74,000 for a combined budget of approximately $424,300.

In FY 2011-2012, the CCCWP continued to improve the CCCWP website. A "Litter Travels" video was prominent on the homepage so that it would catch viewers' attention as soon as they visited the site. The website was used to help educate the public on the CCCWP and watershed protection, as well as to educate the public on the "2012 Community Clean Water Initiative" discussed in Section 1 in the Volume 1 report. In addition, development of a Community Calendar began with the intent that this calendar will provide a popular site to visit to find out about watershed related activities, events and volunteer opportunities throughout Contra Costa County. An added bonus of having a calendar will be repeat visits to the website with the intent to spark additional interest in other parts of the website.

The CCCWP, through BASMAA, provided regional media relations outreach and representatives attended and supported BASMAA's PIP meetings and outreach efforts. CCCWP representatives were regular participants in the Regional Behavior Change Campaign supporting the efforts to come up with a regional brand. See BASMAA's "MRP Regional Supplement for Training and Outreach Report" for further details.

The remainder of the section documents public education and outreach activities conducted collectively in Contra Costa County.

Accomplishments

C.7.b – Advertising Campaign

Creative Development - The Program revised existing TV, print, online, and outdoor media pieces for the "Litter Travels" campaign that ran in FY 2011-2012. The tag line was first shortened from "Litter Travels. But it can STOP with you." to just "Litter Travels". After three consistent seasons utilizing the original language, the brevity of this tag line helped to reinforce the CCCWP's message while still presenting something engaging and thoughtful.

The overall artwork and design for this year's campaign was also revised. The primary focus was the shortened tag line "Litter Travels"; this statement was depicted surrounded by floating pieces of trash in an ambiguous body of water. The visuals are striking and also relatable for all residents because the body of water, and the trash polluting it, could exist anywhere in the County.

In order to continue using the existing TV spots, the CCCWP integrated them into the new campaign by adding a new animated end slate featuring litter floating in a body of water that resembled the other campaign artwork. The end slate also featured the call to action to visit the CCCWP's website, CCCleanwater.org.

The CCCWP developed the following media pieces for FY 2011-2012:

TV

- TV spots, which ran countywide on Comcast and Galavision, on networks including Bravo, Family, Food, Home & Garden, TLC, TNT, TBS and USA. Spots also aired during E!'s Academy Award After Party, Basketball Wives, Pretty Little Liars, Jerseylicious, Iron Chef, Fashion Police, Oprah's Next Chapter, WWE Monday Night RAW, and several NBA games on Comcast Sports Bay Area, ESPN and TNT. 9,187 TV spots ran as part of this campaign, 4,630 of which were bonus spots. The bonus spots added $45,000 in additional value to the campaign, representing a 50% value add.
- As an additional promotion negotiated as part of the TV buy, Comcast also gave away two iPads on behalf of the CCCWP. This promotion included iPad giveaway promo spots airing on Comcast and bonus online ads that directed users to the CCCleanwater.org website to register to win, exposing users to information about the CCCWP in the process. The ads received 800,255 impressions and 942 clicks for a Click Through Rate (CTR) of 0.12%. There were 155 contest entries for the first iPad giveaway, and 149 for the second.

Outdoor / Transit

- Billboard, which was placed alongside I-680 in Walnut Creek for the month of February. This key placement reached commuters driving northbound through one of the county's busiest thoroughfares.
- Digital Billboard, which ran in East County along Highway 4 in the City of Pittsburg for four months. This billboard reached commuters entering the county each day.
- BART posters, which ran in stations throughout Contra Costa County for a total of 3 months. There were 80 posters total across two flights, 40 of which were bonus placements.
- Transit ads including 6 Queens and 6 Tails on the West Cat line, and 34 Queens and 34 tails on Tri Delta lines. Interior cards were secured as a bonus on both bus systems. A fully wrapped County Connection bus was also included in this portion of the buy. All Transit ads ran for 8 weeks.

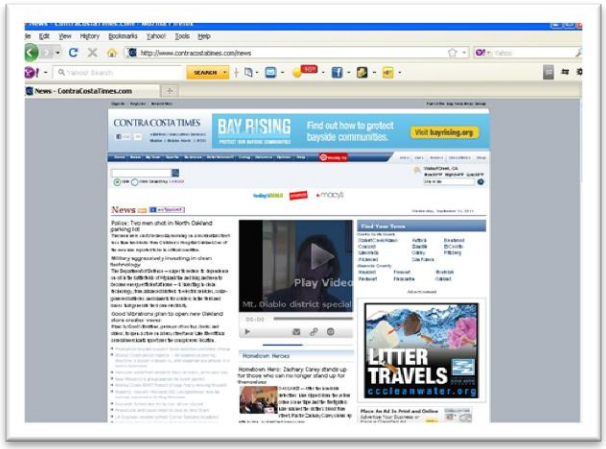
Online

- CBS.com online ads ran geo-targeted to County residents on sanfrancisco.cbslocal.com. These ads received 661,016 impressions and 798 clicks for a CTR of 0.12%.

- Facebook online ads were geo-targeted to County residents ages 18 and older, and received an astounding 19,355,705 impressions, and 3,800 clicks for a CTR of

.02%.

- ContraCostaTimes.com ads were geo-targeted to County residents. These ads received 483,104 impressions, 288 clicks and a .06% CTR.
- Claycord.com ads ran on the homepage of this popular local website frequented primarily by residents of the North/Central region of the County.
- 100mag.com and 86mag.com ads ran on these sites as a bonus for booking print ads with their respective magazines.
- Xfinity.com online ads ran during the spring portion of the campaign. These ads received 48,953 impressions, 29 clicks and a .06% CTR.
- Including Comcast online ads promoting the iPad giveaway, online impressions for the campaign were in excess of **21,300,080**.



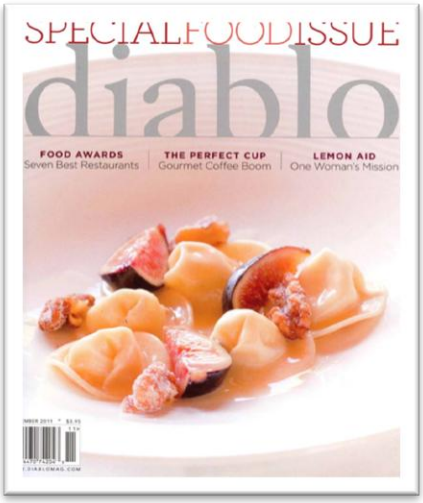
Grassroots

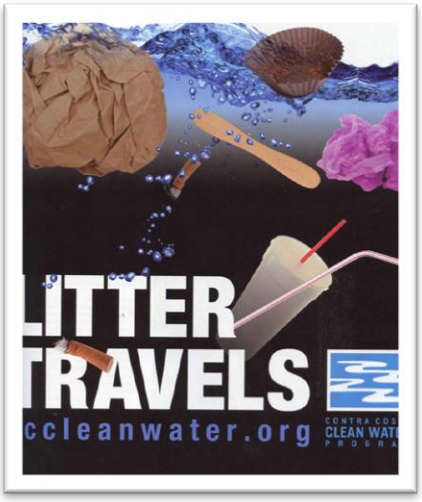
- Outdoor mobile outreach was conducted by a cyclist riding a recumbent bicycle with attached signage. The cyclist rode at 20 community events and popular destinations throughout the county in the spring and fall, including the following:
  - The Delta Blues Festival - Antioch
  - Lafayette Art & Wine Festival

- Clayton Oktoberfest
- 67th Semi-Annual Sidewalk Fine Arts & Crafts Festival – Walnut Creek
- Martinez Farmers Market, 2 visits
- Pinole Farmers Market
- Pleasant Hill Art Jazz & Wine Festival
- Danville Farmers Market
- Danville Fall Crafts Festival
- El Cerrito Farmers' Market
- Hercules & Herpoco
- Downtown Orinda shopping district
- Downtown San Ramon shopping district
- Downtown Lafayette shopping district
- Moraga Farmers Market
- Concord Farmers Market
- Antioch Swap Meet
- Old Town Pittsburg
- Walnut Creek Farmers Market

Print

- 2 full-page print ads ran in Diablo Magazine, and 1 additional bonus ad was also secured.





- 2 full page print ads ran in both 110 Magazine and 86 Magazine.
- 2 Front page flags ran on the Contra Costa Times. An additional bonus flag ran in the spring.

The detailed CCCWP Advertising, Outreach and Media Schedule can be seen in Attachment 7.1.

Samples of print, online and outdoor media campaign materials can be seen in Attachment 7.2.

CCCWP Website - In order to keep visitors to the CCCWP website CCCleanwater.org interested and engaged, the home page was updated to show the same animated graphic featuring litter floating in a body of water that was used on the end slate of the TV commercial. This replaced the slide show of compelling campaign photographs used in FY 20010/11.

The site was also updated to improve user experience and to streamline navigation. Edits included the addition of a dedicated 'Home' button, consolidation of links and documents, revisions to the left navigation bar, and overall improvements to the page structure. The most significant change included developing a YouTube account for the program that served as a place to host videos; this update allows videos to load and play more quickly.

The final Google Analytics report on website traffic for FY 2011-2012 can be seen in the Attachment 7.3.

Section C.7.c – Media Relations – Use of Free Media

Opinion Editorial (Op Ed) - An Op Ed piece was authored by Walnut Creek Mayor and Contra Costa County resident Bob Simmons. This Op Ed focused on the amount of litter in Walnut Creek and other cities in the region, and the small changes residents can make to reduce trash. This piece ran in the Contra Costa Times Editorial section on January 6th.

Regional Effort - In addition, the CCCWP was supported through BASMAA's regional efforts in conducting of 7 media pitches during FY 2011-2012. See additional detail in BASMAA's *"MRP Regional Supplement for Training and Outreach Report*" in BASMAA's *FY 2011-2012* Annual Report which was submitted separately by BASMAA on behalf of Contra Costa Permittees.

C.7.d – Stormwater Point of Contact

The CCCWP's website provides a phone number and email contact information for each municipality's designated stormwater representative at http://cccleanwater.org/city-contact-list.html. CCCWP staff updates the Contacts page when notified of a change of representative. The CCCWP website is also accessible from the "Links" page on the BASMAA website.

In addition, the CCCWP provides a "1-800-No Dumping" hotline where people can call and report illegal dumping which is then reported to clean up companies for follow up.

C.7.e – Public Outreach Events

Bringing Back the Natives Garden Tour - The CCCWP sponsored the Eighth Annual Bringing Back the Natives Garden Tour, which took place on Sunday, May 6, 2012, showcasing 41 gardens located in 17 cities and unincorporated areas of Alameda and Contra Costa counties. For summary information and a detailed report about the Bringing Back the Natives Garden Tour, see Attachment 7.4 and Attachment 7.5.

Our Water Our World – As in past year, the CCCWP partnered with the Our Water Our World (OWOW) Program to help raise awareness of the connection between pesticide use and water quality and provide information to consumers at the point-of-purchase about IPM and less toxic alternatives that do not cause water quality problems. Eighteen stores participated. Over 100 store staff members were trained. Seven (7) outreach events were held reaching over 500 people. For more detailed information, see Section 9 of this Volume 1 report.

C.7.f – Watershed Stewardship Collaborative Events

Bay-friendly Landscape (BFL) and Gardening Coalition – The CCCWP continued to be a major advocate of BFL, a one of a kind organization that provides local nonstructural IPM Landscape training. The CCCWP supported the offering of a BFL workshop series which met weekly March 6 to April 16, 2011, and by paying annual dues. For more detail regarding BFL, see Section 9 of this Volume 1 report.

California Products Stewardship Council (CPSC) – The CCCWP continued to support CPSC through its annual membership fees. The advocacy of the CPSC to try to make producers responsible for their own waste is an important step toward reducing trash and mass consumption. Product stewardship creates incentives for producers to "design it green and take it back," thereby reducing the environmental impact of product waste. By diverting products from the waste stream, we conserve resources and ultimately reduce the demand for landfills. CPSC's goal is to align public and private sectors through information, advocacy and legislation to ensure ongoing product responsibility. For more details regarding CPSC activities and accomplishments, see Section 10 of this Volume 1 report.

Green Business Program – The CCCWP has annually provided staff support and financial contributions to the Green Business Program to assist with their outreach activities to the business community. The CCCWP, one of 25 local agencies, continues

to be the highest contributor to this effort. Strategic meetings are held quarterly. For more details on the Green Business Program see Section 4 of this Volume 1 report.

Contra Costa Watershed Forum – CCCWP Staff routinely attend and participate in Contra Costa Watershed Forum (CCWF) meetings, an open committee of some fifty organizations, including state and local agencies, local non-profit environmental and education organizations, community volunteer groups, and private citizens. The Forum operates on the premise that actions in a watershed are inter-related and, therefore, that broad participation and cooperation is needed to affect change. Members of the CCWF work together in an effort to find common approaches to making our water resources healthy, functional, attractive and safe community assets.

The Forum impacts the community, environment and decision makers in Contra Costa. Concerned with urban, suburban, and rural areas in the San Francisco Bay Delta area, the CCWF facilitates local agency and citizen collaboration, fosters innovative strategies for stewardship and protection of watershed resources, and encourages regional capacity building in Contra Costa and neighboring areas.

CCCWP Community Calendar – The CCCWP website has a new community calendar to be used to promote watershed related events, activities and volunteer opportunities. Creek groups and other organizations have been invited to promote their events on the calendar.

Community Car Wash Kits – As reported in detail in Section 5 of this Volume I report, the CCCWP provides community car wash kits to various groups and organizations for charity car washing events. The kit allows a group to hold a charity car wash event, and also teaches them how to become stewards of their watershed.

C.7.g – Citizen Involvement Events

Community Watershed Stewardship Grant Program (CWSGP) – The CCCWP continued to provide financial and staff support the CWSGP. The purpose of this grant program is to distribute funds to local creek and watershed stewardship groups with projects that further the watershed protection mission and facilitate citizen involvement. A total of 11 grants were awarded totaling $100,000.

C.7.h – School Age Children

Oil Payment Program (OPP-2) Grant/Mr. Funnelhead – Several municipalities within the CCCWP provided their allocation of grant funds to the CCCWP so a countywide comprehensive effort could be instituted. Approximately $74,000 was budgeted for this activity in FY 2011-2012. Matt Bolender is our OPP-2 Grant consultant, using the "Mr. Funnelhead" character to provide educational outreach.

The OPP strives to reach across all age groups, but places particular emphasis on the youth because they are our most forceful environmental stewards. CCCWP staff believes nothing will motivate an adult to change behavior more than being corrected by a child.

There are several components of the OPP including: certifying and recertifying used-oil recycling centers throughout Contra Costa County; providing and educational program targeted to third and fourth graders in schools throughout Contra Costa County; providing outreach at public events throughout Contra Costa County distributing materials; providing programming to educate and entertain people; and, a cable advertising component. A "Mr. Funnelhead" website exists as an additional outreach activity.

A total of 17 oil collection centers were certified, 1 was lost, for a net gain of 16, now a total of 116 oil collection sites.

Mr. Funnelhead made appearances at 23 community events in the cities/towns of Danville, Orinda, Brentwood, Walnut Creek, Moraga, Clayton, Concord, Antioch, and San Ramon, providing a broad outreach to all demographics. New this year was the introduction of a diorama used to educate children and adults on proper disposal of used oil and oil filters.

Mr. Funnelhead's educational and entertaining assemblies were held at 18 elementary schools in the cities/towns of San Pablo, Richmond, Pleasant Hill, Concord, Pinole, Hercules, Walnut Creek, Pittsburg and Antioch educating nearly 4,500 students about recycling used motor oil and its harmful effects on stormwater. These appearances have a long lasting effect on the children who recount their experience years later when they see Mr. Bolender at community events.

Mr. Funnelhead also holds an annual art contest where children incorporate Mr. Funnelhead into their own message about recycling used oil. Prizes are given to the top three artists with the winners appearing in a Mr. Funnelhead Oil Buster Public Service Announcement which airs on premium cable television.

Online Youth Outreach via Facebook – In an effort to reach youth in the 12 to 18 year range advertisements and surveys were strategically placed on Facebook. These received 1,170,832 impressions, 203 clicks with a .017% CTR. There were 96 visits to the CCCWP website from these ads with those visits averaging approximately one minute each.

CCCWP Watershed Diorama – The CCCWP's Watershed Diorama is used by stakeholder organizations and municipalities for youth-education programs and various public outreach events. The watershed diorama shows how rain becomes stormwater runoff and then picks up and carries dirt, garbage, and any other pollutants into our storm drainage systems, which flow untreated to local creeks, the Delta and Bay. In FY 2011-2012, the diorama was used 12 times as follows:

Diorama Use Tracking Sheet

Pick Up Date	Representing	Target/Event	# of People Viewing Demo
7/7/11	City of Brentwood	Annual Cornfest	150
9/6/11	Resource Conservation District	Elementary school children	40
12/1/11	New Leaf School	John Swett Elementary School	100
2/1/12	New Leaf School	New Leaf School students	30
4/4/12	Resource Conservation District	Delta View Elementary School, Bay Point, 3rd grade	120
4/4/12	Resource Conservation District	(At New Leaf) Krey Elementary School, Brentwood, 2nd grade	150
4/4/12	New Leaf School	Earth Day/John Muir Birthday, Martinez, families	1000
4/24/12	County Environmental Health	Take Your Kids to Work Day	20
4/4/12	Resource Conservation District	Walnut Creek - Creek Clean Up, families	150
4/4/12	Resource Conservation District	Marina Vista Elementary School, Pittsburg, 1st/2nd/3rd grade	75
5/22/12	City of Brentwood	Brentwood Public Works Open House; 4th and 5th grade display	500
5/31/12	Town of Danville	Baldwin Elementary School, Danville	100

C.7.i – Outreach to Municipal Officials

2012 Community Clean Water Initiative – In an effort to gain additional funds for the CCCWP put the "2012 Community Clean Water Initiative" out to a vote of property owners. As part of this effort, multiple presentations were made to reach and educate municipal officials throughout Contra Costa County, including the Contra Costa Mayors' Conference, City and Town Councils, County Board of Supervisors, and the Public Managers' Association. These presentations educated elected officials and municipal managers on the CCCWP, the associated regulations and implementation of

compliance measures and why there is a need for additional funding. For more details on the 2012 Community Clean Water Initiative see Section 1 of this Volume 1 report.

FY 2012-2013 Activities

The PIP Committee and Program staff looks forward to continuing to establish itself as the local environmental steward the public can trust, respect and depend on to enhance our water quality and environment. CCCWP goals for FY 2012-2013 include: design and initial implementation of an urban pesticide campaign; identifying new and creative ways to reach youth with the watershed protection message; and enhance the CCCWP website so it can be kept fresh and become a place that site visitors want to keep coming back to for more information.

SECTION 8 – PROVISION C.8 WATER QUALITY MONITORING

Introduction

This section provides an overview of the CCCWP's monitoring work for FY 2011-2012. A summary of the historical context of water quality monitoring in Contra Costa County was presented in the CCCWP's Annual Report for FY 2009-2010 and will not be repeated here. The following sections will provide an overview of the current monitoring assessment activities and accomplishments for the FY 2011-2012.

All water quality monitoring activities required under Provision C.8 of the MRP are planned on a regional level through BASMAA and the Regional Monitoring Coalition (RMC) and implemented by CCCWP staff and environmental services consultants. The only exceptions to this are ProvisionsC.8.b, San Francisco Estuary Receiving Water Monitoring and C.8.f, Citizen Monitoring and Participation. Compliance with C.8.b is attained via the CCCWP's annual contribution to the RMP which in FY 2011-2012 totaled $137,317. Compliance with C.8.f was attained by supporting Contra Costa County's Watershed Stewardship Grants in the amount of $20,000 for FY 2011-2012. Further discussion of this provision, can be found in the sections that follow.

In addition, CCCWP staff and consultants actively participated in the RMP's Sources, Pathways and Loadings Workgroup (SPLWG) and the Small Tributaries Loading Strategy Workgroup.

The CCCWP's Role in the Regional Monitoring Coalition (RMC)

The RMC is a consortium of MRP-regulated Permittees who have committed to collaboration and cooperation in the implementation of monitoring and POC-related provisions. This collaboration ensures consistency in monitoring means and methods as well as economies of scale in implementation. As reported in the FY 2009-2010 Annual Report, all 21 Contra Costa Permittees affirmed their participation in the RMC as

of July 1, 2010. In FY 2011-2012, CCCWP staff actively participated in BASMAA's Monitoring and POCs Committee (MPC) which meets every first Wednesday of the month and is the lead committee responsible for MRP implementation of monitoring and POC-related provisions. In addition, two (2) Permittee representatives, Alfredo Hurtado of Pittsburg and Rinta Perkins of Walnut Creek, served as CCCWP representatives to the BASMAA MPC and actively participated and helped shape its direction.

Under the RMC, work on the design of Creek Status Monitoring/Rotating Watersheds (C.8.c) was finalized during FY 2011-2012 and sampling commenced in March 2012 with the collection of parameters described in Table 8.1 of the MRP. As described in C.8.g, the first Electronic Reporting of Status and Trends Data will be submitted to the Water Boards on January 15, 2013 and will include data collected during the period of September 30, 2011 through October 1, 2012. The first Urban Creeks Monitoring Report will be submitted to the Water Board on March 15, 2013 and will include data collected from the same period. A detailed discussion of the status monitoring that commenced in March 2012 will be provided in those reports.

CCCWP staff and a representative from the City of Pittsburg, Alfredo Hurtado, actively participated in the RMC Monitoring Design Workgroup and brought many cogent arguments to the attention of the group. In addition, the CCCWP provided in-kind contributions towards the RMC in the form of funding for its consultants to do direct-MRP compliance work. For creek status design, the CCCWP sponsored Armand Ruby Consulting to lead the planning for provision C.8.d.i, Stressor/Source Identification for a cost not to exceed $30,000. These in-kind contributions on the part of individual stormwater programs are being tracked in a regional spreadsheet designed to equilibrate the level of effort among stormwater programs to levels which are equivalent to their proportional share of population.

Under the RMC, much progress was also made on the design of Pollutants of Concern/Long Term Monitoring, C.8.e, in FY 2011-2012. As described in the MRP, Permittees are allowed to pursue an alternative approach to POC/Long Term Monitoring

by designing a monitoring program with an equivalent level of effort to that proscribed in C.8.e. Stormwater programs elected to take this approach and met under the auspices of the Small Tributaries Loading Strategy Workgroup (STLS) to continue development of this alternative approach. CCCWP staff and consultants actively participated in the STLS especially during the summer of 2011 as numerous details of the sampling and analysis were worked out. CCCWP installed gauging, instrumentation and sampling equipment at its POC sampling site at Marsh Creek just upstream of the fish ladder and Brentwood's wastewater treatment plant outfall in the fall of 2011. The station was fully operational on November 22, 2011 but due to the late onset of winter rains and lack of significant rainfall events, the first storm was sampled on January 20, 2012. The task of monitoring on Marsh Creek is more complicated and costly than the other Bay Area creeks because the CCCWP is also bound by the requirements of the Central Valley Water Board's permit for eastern Contra Costa County.

All of the remaining monitoring and POC-related activities of the MRP that are coordinated through the RMC, for which there are deadlines in FY 2011-2012, are summarized in the BASMAA "MRP Regional Supplement for Monitoring FY 2011-2012".

Contra Costa Monitoring and Assessment Program (CCMAP)

In addition to monitoring required under the MRP, the CCCWP has elected to continue its own monitoring program, the Contra Costa Monitoring and Assessment Program (CCMAP), in the years between MRP adoption and commencement of MRP-required Long Term/POC and Status Monitoring. This voluntary effort is indicative of a strong commitment on the part of Contra Costa Permittees to assess and document the health of creeks in their county. CCMAP is a long-term strategy designed to assess the condition of watersheds, water bodies, and water quality within Contra Costa County using benthic macroinvertebrate (BMI) community assemblages as the primary indicator of water quality and watershed health. The overall goal of CCMAP is to identify problem areas and reduce stormwater pollutants within the County's watersheds.

CCMAP is under the direction of the CCCWP's Monitoring Committee that in FY 2011-2012 was comprised of representatives from eight (8) Contra Costa Permittees who met nine (9) times over the course of the year (see Attachment 1.3, CCCWP Subcommittee Attendance, for the list of CCCWP representatives). The CCCWP Monitoring Committee provides the overall guidance for the monitoring program and recommends actions to be taken on behalf of all Permittees.

CCMAP has been implemented in three phases:

Phase 1: Preliminary Development
Phase 2: Implementation of CCMAP into Pilot Watershed
Phase 3: Volunteer Training, Recommendations and Continued Monitoring

Phases 1 and 2 of CCMAP were initiated within our pilot watershed, Alhambra Creek in FY 2000-2001. The CCCWP began implementing Phase 3 in FY 2001-2002 using lessons learned from the pilot effort. The CCCWP hired a Volunteer Monitoring Coordinator in FY 2003-2004 to assist in expanding into new watersheds, and continued to work with the coordinator in leading citizen-based GPS surveys and biological and physical habitat assessments in Contra Costa Watersheds in FY 2011-2012. See the next section "Accomplishments" for a discussion of these results.

Contra Costa Volunteer Monitoring Program

In collaboration with the Contra Costa Department of Conservation and Development (CCCDCD), the CCCWP submitted a Proposition 13 grant application to the State Water Resources Control Board (SWRCB) in FY 2001-2002. In FY 2002-2003, the CCCWP and CCCDCD were notified that they had been awarded a grant of $250,000 for the development and implementation of the Contra Costa Citizen Watershed Monitoring/Assessment Program (Volunteer Monitoring Program). The overall goal of the Volunteer Monitoring Program is to aid in protecting and restoring the San Francisco estuary and its tributaries by reducing/eliminating pollutants and impacts to Contra

Costa water bodies. Grant funding expired in 2007 and as of that time bioassessments had been conducted in 19 of the 29 major in Contra Costa watersheds.

When the grant ended, the Volunteer Program was in danger of expiring completely. Through the collaboration of the CCCWP and CCCDCD, a plan was developed to sponsor the Volunteer Program with funding from the CCCWP. The CCCWP has since provided financial support in the amount of $60,000 per year to the Volunteer Monitoring Program starting in FY 2006-2007 through FY 2011-2012. In exchange, the volunteers, under the leadership of CCCWP staff and the Volunteer Monitoring Coordinator, have conducted BMI sampling in creeks throughout the County.

Accomplishments

Implementation of CCMAP monitoring continued in spring 2011. Due to the fact that BMI samples are collected in late spring and take approximately 3-5 months to analyze (i.e., into the next fiscal year) it has been standard practice for the CCCWP to report on the previous fiscal year's sample results. So this FY 2011-2012 Annual Report provides data and reporting on samples collected in spring 2011 (FY 2010-2011).

The following paragraphs summarize the findings and conclusions of spring 2011 monitoring conducted via CCMAP. A copy of the full report entitled "CCMAP, Summary of Benthic Macroinvertebrate Bioassessment Results (2011), July 17, 2012" can be found as Attachment 8.1.

In spring 2011, the volunteers conducted bioassessment monitoring at 12 creek sampling stations in 8 watersheds under the guidance and direction of the Volunteer Creek Monitoring Coordinator. To provide a measurement of Aquatic Life Use condition at these stations, a preliminary Benthic Index of Biotic Integrity (B-IBI) score was calculated for each station. The B-IBI score is based on a set of metrics computed from the raw BMI taxonomic data, according to the approach developed previously for Contra Costa creeks. The B-IBI scores were then attributed to aquatic life use condition

categories (poor, marginal, fair, good, or very good), based on a standardized grading system that assigns specific ranges of B-IBI scores to the categories.

Results from the 2011 bioassessment monitoring indicate that B-IBI scores from the majority of creek stations sampled in Contra Costa fell in the fair (five stations) or good (four stations) categories, with the remainder scoring in either very good, marginal or poor (one station each). . Because of the relatively low number of sites monitored, the 2011 results cannot be reliably extrapolated as being more broadly representative of Contra Costa watersheds.

BMI community composition and the resulting B-IBI scores vary both spatially throughout Contra Costa County (due to differences in geographical factors, including land use, underlying geology, and topography) and temporally (due particularly to annual and seasonal differences in climate and weather, especially hydrological factors). Analysis was performed to assess both temporal and spatial variation in B-IBI scores over the ten-year period of bioassessment monitoring.

Annual variability in average IBI scores is attributable to a number of factors, including antecedent (preceding) rainfall and other climatological conditions, as well as monitoring site selection for that year. Prior analysis of the 2006-2009 BMI metrics indicated that annual rainfall amount and antecedent spring rainfall amount may affect average BMI community composition in a given year. Additionally, detailed analysis conducted with the -11-year (2001-2011) data set indicated that certain climatological factors (prior 30-day rainfall total, cumulative seasonal rainfall to date, and prior 30-day average high temperature) did not correlate well with site-and-date-specific B-IBI scores. The effects of these climatological factors on BMI community composition seem to be overwhelmed by the spatial differences among sites at any given time.

Selected geographical factors that may influence benthic community composition at bioassessment monitoring sites throughout Contra Costa were evaluated using average site B-IBI scores from the 11-year (2001-2011) data set. This analysis confirmed that

elevation correlates significantly with mean site B-IBI score, with higher average B-IBI scores generally occurring at higher elevations. This may reflect prevailing land use, as the degree of urbanization tends to decrease with increasing elevation in Contra Costa County. The various effects of urbanization (changes in hydrology, riparian vegetation, creek substrate, and water quality) may be reflected therefore in the correlation of B-IBI scores with elevation.

New Zealand mud snails (*Potamopyrgus antipodarum*) were present at the WAL050 site (Grayson Creek) in 2011, and dominated the BMI assemblage at that site, with 54% of the individuals identified.

Conclusion

FY 2011-2012 marked the second full year of MRP implementation for the CCCWP and the RMC, and the first year of sampling for Status Monitoring and Long Term and POC Monitoring parameters. There were many challenges and due to the collaboration among stormwater programs, there was also much progress. In FY 2012-2013, the CCCWP expects to continue Status Monitoring at various locations in spring 2013, continue POC Monitoring for a second year at Marsh Creek, and commence POC Monitoring at a 2nd station, North Richmond Pump Station in fall 2012.

SECTION 9 – PROVISION C.9 PESTICIDES TOXICITY CONTROLS

Introduction

The CCCWP conducts pesticide toxicity control group activities on behalf of all 21 Permittees within Contra Costa. Group pesticide toxicity controls activities conducted in FY 2011-2012 included: assisting municipalities with implementation and improvement of their pesticide reduction programs; tracking and participating in pesticide regulatory initiatives; conducting training and outreach to municipal employees and contractors on IPM; providing outreach to residents and the general public on proper pesticide use and disposal; working with the Contra Costa County Agricultural Commissioner (CCCAC) on reporting improper pesticide use; and, facilitating the CCCWP's MOC to coordinate countywide compliance with the Provision C.9 mandates.

Accomplishments

A summary of pesticide toxicity control related activities conducted as a group in FY 2011-2012 are provided below:

Facilitating monthly CCCWP MOC meetings and participating on BASMAA's MOC

The CCCWP's MOC provides a forum for Contra Costa municipalities to share information, common issues and lessons learned related to reducing pesticide toxicity in our urban creeks. A summary review of specific topics and activities coordinated through the CCCWP's MOC are discussed below. CCCWP staff chaired BASMAA's MOC, which facilitates pesticide related discussion topics and C.9 compliance concerns.

C.9.b. - Continuous Improvement to Municipal IPM Programs

CCCWP staff assists Contra Costa municipalities with continuous improvement of their IPM programs, plans, and policies. For details regarding the model IPM program supporting documents developed by CCCWP staff, including IPM policies and standard operating procedures, see the CCCWP's FY 2009-2010 Annual Report. In response to Water Board staff review and comments on Section C.9 in the FY 2010-2011 Municipal Annual Reports, CCCWP staff conducted a thorough review of the model IPM program and policies, and worked closely with Permittees in reviewing and refining, if necessary, their IPM programs in response to Water Board staff comments on the municipalities' FY 2010-2011 Annual Reports.

C.9.c. – Train Municipal Employees

During FY 2011-2012, CCCWP sponsored two workshops attended by municipal staff. Further details regarding these two workshop is provided below (See "*C.9.h.iii – Public Outreach: Pest Control Operators (PCOs)*" below).

C.9.e – Track and Participate in Relevant Regulatory Processes

Tracking and participating in the ongoing regulatory efforts related to pesticides is accomplished primarily through BASMAA member participation in the UP3 Project, as well as participation on CASQA's Pesticides Subcommittee. See BASMAA's "*MRP Regional Supplement for Monitoring and Pollutants of Concern Reporting for Fiscal Year 2011-2012*".

CCCWP staff served as Vice-Chair of the CASQA Pesticides Subcommittee in FY 2011-2012 and the CCCWP provided funding through BASMAA to support the work of the subcommittee. CCCWP staff has also actively participated in the UP3 Project since 2006.

C.9.f – Interface with Contra Costa County Agricultural Commissioner (CCCAC)

As in the previous FY, during FY 2011-2012 the Deputy CCCAC attended a CCCWP MOC meeting. It was agreed CCCWP staff would act as a liaison in compiling and providing to the Contra Costa County Agricultural Commissioner (CCCAG) reports of improper pesticide use observed by municipalities. During FY 2011-2012, no reports of improper pesticide use were observed.

C.9.h.i – Public Outreach: Point of Purchase

Our Water Our World - The CCCWP funds and participates in the "Our Water Our World" (OWOW) Program, which provides educational outreach directly to the consumer/user at the point of purchase (i.e., in the store). Details are provided in the BASMAA's "*MRP Regional Supplement for Training and Outreach Annual Reporting for FY 2011-2012*".

Locally, the CCCWP distributes OWOW educational literature to schools and at community events in addition to the general public when requested. CCCWP staff promotes OWOW through its website and direct interactions with citizens, schools, and businesses. A total of 18 Contra Costa stores participated in the OWOW Program in Contra Costa County in FY 2011-2012, including two new stores added this year - Urban Farmer in Richmond and McDonnell Nursery in Orinda. All 18 were set up with literature racks, fact sheets, and shelf talkers. Training on the OWOW Program was provided to staff from 13 stores in FY 2011-2012. The training included: information on the tie between pesticides, run-off and water quality, identification of beneficial insects in the landscape, common and new pests/diseases and invasive plants, techniques for managing pest problems, tips and techniques for using/selling the less-toxic products, and correct disposal of toxic materials. Each training participant received a packet of information and resources including background on the OWOW program and IPM techniques, information on how products work and how to read a pesticide label, a laminated bug guide, a chart for identifying pest damage, pest fact sheets, *The 10 Most Wanted Bugs in Your Garden* brochure, and a list of resources and helpful websites. In addition this year, each store was given a laminated guide identifying beneficial insects,

rat/mouse management, and pests that may be newly becoming a problem in Contra Costa. Store employees were also encouraged to take the additional online training for retail stores through the University of California Integrated Pest Management (UCIPM) and to sign up for the UCIPM quarterly online newsletter. For additional information see Attachment 9.1.

C.9.h.iii – Public Outreach: Pest Control Operators (PCOs)

Bay-friendly Landscape and Gardening (BFL) Coalition – The CCCWP continues to be a major supporter of the BFL Coalition, which is an organization that provides IPM training and certification to public employees and private sector landscape professionals. As a member of the BFL Coalition, the CCCWP pays dues to support BFL activities and sponsors and coordinates BFL training events in Contra Costa County.

During spring 2012, with financial and in-kind support from the City of Walnut Creek, the CCCWP funded a well-attended-and-received BFL training and certification workshop series. This was the fourth workshop series for Contra Costa. Municipal and CCCWP staff, and private landscaping business employees attended the workshop and received their BFL IPM landscaping certification. The CCCWP will continue to encourage all municipal employees who apply pesticides to attend this valuable training.

A CCCWP staff member and a Water Board staff member were guest speakers at an October 12, 2011 California Park & Recreation Society (CPRS) District 3 IPM training workshop. The workshop provided training credits to PCOs who attended the workshop. Topics included pesticides, water quality, and the MRP; introduction to landscape IPM; enhancing your IPM program with new irrigation technology; maintaining landscapes organically, and landscape IPM best management practices.

Structural Pesticide Application Outreach – The CCCWP hosted an October 25, 2011 half-day workshop for structural PCOs and municipal staff. The workshop was co-

hosted and funded through the San Francisco Estuary Partnership (SFEP). The agenda included principles and practices of structural IPM, clean water requirements for pesticide and MRP reporting, a panel discussion on creating a successful IPM program, and the ins and outs of contracting for structural IPM pest control. This workshop was promoted to private structural pest control companies as well as municipal employees through mailers and posted flyers at work places and online. Both municipal and private PCOs attended the workshop.

FY 2012-2013 Activities

CCCWP goals for FY 2012-2013 include providing another Bay Friendly Landscaping Certification and Training Workshop for landscape businesses and municipal staff; promoting and organizing any structural pesticide certification and training Workshops and outreach opportunities for structural pesticide applicators/businesses and municipal staff; continuing to support BASMAA's OWOW program; continuing to participate in the review and development of pesticide regulations and initiatives; conducting a regional advertising campaign targeting a broad audience on reducing the impact of urban pesticide use on water quality, and, working closely with Contra Costa Permittees to implement effective IPM programs.

SECTION 10 – PROVISION C.10 TRASH LOAD REDUCTION

Introduction

The CCCWP MOC coordinates implementation of group activities to support implementation of Provision C.10. CCCWP staff participated, along with staff from some Contra Costa municipalities, in meetings of the BASMAA Trash Committee.

Accomplishments

During FY 2011-2012, the CCCWP MOC assisted Contra Costa municipalities in the coordination of annual hot spot cleanup and assessments; the selection and siting of trash capture device installations; and participation in trash load reduction initiatives. For further details on these activities, see the individual municipal Annual Reports compiled in Volume II. The CCCWP MOC representatives participated in BASMAA's development of methodologies for estimating baseline trash loads and for tracking trash load reductions. For further details regarding these regional activities, refer to BASMAA's "*MRP Regional Supplement for Monitoring and Pollutants of Concern Reporting for Fiscal Year 2011-2012*".

<u>Selection and Installation of Full Trash Capture Devices</u>

The CCCWP MOC coordinated assistance and information to municipalities to select and install trash capture devices, and to track progress of the installations. The CCCWP MOC coordinated Contra Costa municipalities' use of American Recovery and Reinvestment Act (ARRA) funds for this purpose through the Association of Bay Area Governments (ABAG) Trash Grant. Most Contra Costa municipalities are participating in this grant program. Installation of the devices is scheduled to be completed by November 2012. Some of the installed full trash capture devices were monitored and the results incorporated into regional development of preliminary baseline trash generation rates.

Trash Baseline Load Estimates and Trash Loads Reduction Tracking

The CCCWP MOC was a forum for disseminating information and discussing BASMAA's development of baseline loads estimates and a trash loads reduction methodology, both of which continued throughout FY 2011-2012.

CCCWP staff helped coordinate participation by 5 Contra Costa municipalities in collecting material from full-capture trash devices and delivering the captured material for characterization as part of BASMAA's baseline loads estimates study.

CCCWP staff also coordinated a consultant contract and assisted with obtaining municipal street sweeping information that was incorporated into the baseline loads estimates. CCCWP staff coordinated the municipalities' submittal of short-term trash loading plans submitted on February 1, 2012.

Trash Load Source Control Initiatives

California Product Stewardship Council - The CCCWP is a member of the California Product Stewardship Council (CPSC) and its mission to promote Extended Producer Responsibility (EPR) that shifts California's product waste management system from one focused on government funded and ratepayer financed waste diversion to one that relies on producer responsibility in order to reduce public costs and drive improvements in product design that promote environmental sustainability. This initiative advocates that the producers have the primary responsibility to establish, fund, and manage end of life systems for their products. The CCCWP supports the CPSC financially through membership fees equaling $2,500 a year and through direct participation in their associate meetings. CPSC has an impressive record of accomplishments over the last year:

- Hundreds of new supporters, including the US Green Chamber of Commerce;
- Harmonized EPR principles nationally;

- Organized a very successful legislative staff briefing at the Capitol and provided an update on EPR laws and implementation to over 55 legislators and their staff;
- Hosted and facilitated eight free public webinars: Four on the paint stewardship law with financial support from PaintCare; one webinar on battery stewardship funded by Call2Recycle; two webinars co-hosted by EPA Region 9 on sharps and mercury lamps via a CalRecycle grant to Del Norte Solid Waste Management Authority; and one webinar on how to utilize social media to our collective advantage to get the word out on EPR;
- Presented the Second Annual Arrow Awards to recognize the efforts of companies who are leaders in product stewardship in California;
- Worked with industry leaders on how to increase take-back of their products including Dell Computers, Nestle Waters, Interface Flooring, and Armstrong Floor and Ceiling Tile;
- Advocated for strong and enforceable regulations for paint, carpet, mercury thermostats and Green Chemistry;
- Reviewed, commented and provided advocacy for EPR and transitional producer responsibility bills including: Batteries SB 515(Corbett), Sharps SB419 (Simitian) and Pharmaceuticals AB1442 (Wieckowski), Mattresses (SB 1118);
- CPSC achieved national and statewide press coverage by being featured on NPR Radio<http://www.calpsc.org/assets/projects/SanGabriel/2012-03-19_KPCC-batteries-article.pdf>, Waste Age Magazine<http://waste360.com/rechargeable-batteries/shock-system?cid=nl_green&YM_MID=1279903&YM_RID=bhsan@comcast.net>, Waste and Recycling News<http://www.calpsc.org/assets/projects/SanGabriel/2012_04_04%20CA%20Recycling%20Project%20Nets%207,800%20lbs%20-%20Waste%20&%20Recycling%20News.pdf>, Diabetes Health magazine<http://www.calpsc.org/assets/projects/DelNorte-HD18/2012-02-11_DiabetesHealth.pdf> and Sacramento Bee<http://www.calpsc.org/assets/projects/SanGabriel/2012_04_03%20SGV%20Project%20Collects%207,809%20lbs-The%20Sacramento%20Bee.pdf>;

- CPSC supported local governments resulting in 129 local jurisdictions in adopting EPR resolutions<http://www.calpsc.org/policies/local/index.html>;
- Added two for-profit businesses to the CPSC board of directors to broaden partnerships with private sector partners and chambers
- Starting in the fall of 2012, California local governments are expected to save 21 million dollars annually when paint stewardship is in full effect. CPSC is engaged and working with both the paint and carpet stewardship programs to ensure that they work for all stakeholders. CPSC continues to work collaboratively with the private sector to develop business friendly producer responsibility approaches to increase the management of products and foster better product design.

The CCCWP will continue to support and participate in the CPSC's mission and efforts in FY 2012-2013.

Reusable Shopping Bag Ordinance – In consultation with the CCCWP MOC, Central Contra Costa Solid Waste Authority, the Contra Costa County Department of Conservation and Development, and RecycleMore (West Contra Costa Integrated Waste Management Authority), CCCWP staff prepared, and the Management Committee approved, a model bag ban ordinance designed to promote use of reusable shopping bags.

FY 2012-2013 Activities

During FY 2012-2013, CCCWP staff and the CCCWP MOC will continue to coordinate information dissemination and discussion as BASMAA refines its methodologies for estimating baseline trash loads and trash load reductions. The CCCWP MOC will also be a forum as municipal staff considers the implications of updated estimates and how these will affect development of the Long-Term Trash Load Reduction Plans due February 1, 2014.

SECTION 11 – PROVISION C.11 MERCURY CONTROLS

Introduction

The majority of MRP requirements related to mercury are being addressed regionally through BASMAA and the RMC. Reporting on these elements of the MRP, for which there were deadlines in FY 2011-2012, can be found in the BASMAA "*MRP Regional Supplement for Monitoring and Pollutants of Concern Reporting for Fiscal Year 2011-2012.*" However, additional details about actions taken directly by the CCCWP in implementing these regional projects are described below:

CCCWP Role in the Regionally Coordinated Projects

Two provisions related to mercury that the CCCWP performed in cooperation with BASMAA and Permittees are C.11.a.i and C.11.a.ii.

C.11.a.i – Mercury Recycling Efforts

The CCCWP's Permittees collect household hazardous waste at three (3) regional facilities throughout the county: Central Contra Costa Sanitary District (CCCSD), Delta Diablo Sanitation District (DDSD), and West County Wastewater District (WCWD). CCCSD serves the communities of Concord, Clayton, Martinez, Pleasant Hill, Orinda, Lafayette, Moraga, Walnut Creek, Danville, San Ramon and unincorporated county. DDSD serves Pittsburg, Antioch and Bay Point. WCWD serves Richmond, Pinole, El Sobrante and San Pablo.

In addition, the CCCWP has collaborated with DDSD for several years to sponsor collection of mercury containing devices at OSH Hardware Stores in East County. Consumers can drop off their batteries and fluorescent bulbs free of charge at the participating stores.

C.11.a.ii – Mercury Collection

The types of data collected at each facility are slightly different as is the level of differentiation between types of mercury containing devices and the level of specificity in reporting the data. BASMAA has developed a simple, spreadsheet-based tool to estimate the mass of mercury based on the number of different types of mercury-containing devices and products collected by household hazardous waste (HHW) programs. CCCWP will be working with HHW programs in FY 2012–2013 to help them develop and implement tracking programs by device so that consistent collection data are provided in an efficient manner.

In FY 2011-2012, CCCSD collected approximately 0.5 kg of mercury from itemized devices, and an additional 27 kg as elemental mercury. DDSD and its retail partners collected approximately 0.2 kg of mercury from itemized devices, an additional 0.1–6.0 kg in unitemized mercury-containing devices. WCWD collected approximately 0.2–11 kg of mercury from unitemized mercury containing devices. WCWD also collected 9,586 pounds of fluorescent lights. Assuming that bulbs weigh 0.2 lbs. each, this would correspond to approximately 50,000 bulbs. Assuming 4 mg per bulb, this means that approximately 0.2 kg of mercury were collected by WCWD in the form of fluorescent lights. This is consistent with the mercury mass estimates for itemized devices collected by CCCSD and DDSD. The range of mercury estimated for unitemized devices is large because of uncertainties in the actual mercury content; the lower end range is likely closer to the actual amount of mercury recovered. For a detailed breakdown by facility, see Attachment C.11 of this Annual Report. These estimates fulfill provision C.11.a, which requires Permittees to report an estimate of the mercury mass collected.

As stated previously, the majority of MRP requirements related to mercury are being addressed regionally through BASMAA and the RMC and reporting on these elements can be found in the BASMAA "*MRP Regional Supplement for Monitoring and Pollutants of Concern for Fiscal Year 2011-2012."* Nevertheless, in FY 2011-2012 the CCCWP, its

staff, Permittees and consultants were active collaborators on implementation of various C.11 provisions as described below.

Clean Watersheds for a Clean Bay

Clean Watersheds for a Clean Bay (CW4CB) is a grant-funded project that is anticipated to result in Permittee compliance with the following MRP Provisions that jointly address PCBs and mercury:

- C.11/12.c (CW4CB Tasks 2 and 3) - Pilot Projects to Investigate and Abate Mercury/PCB Sources;
- C.11/12.d (CW4CB Task 4) - Pilot Projects to Evaluate and Enhance Municipal Sediment Removal and Management Practices;
- C.11/12.e. (CW4CB Task 5) - Pilot Projects to Evaluate On-Site Stormwater Treatment via Retrofit; and,
- C.11/12.i (CW4CB Task 6) - Development of a Risk Reduction Program Implemented throughout the Region.

CW4CB is funded by a grant to BASMAA from the United States Environmental Protection Agency (EPA) for $5 million. An additional $2 million in funds will be provided from Bay Area municipal stormwater agencies, wastewater treatment agencies, and industrial dischargers to serve as a grant match.

CCCWP staff, consultants and the City of Richmond, participated actively in CW4CB by participating in monthly project team meetings in addition to more detailed investigations specific to Tasks 2, 3 and 5 as described below under C.12 compliance activities.

Provision C.11.b requires methylmercury monitoring. This was fulfilled by analysis of methylmercury in samples collected from the POC monitoring station located in Marsh Creek. Provision C.11.c requires investigation of mercury in sediments collected from the public right of way. The CCCWP will fulfill this requirement in FY 2012–2013 through

sediment investigations conducted through the CW4CB grant. Provision C.11.d requires pilot studies to evaluate enhanced municipal sediment removal practices. The CCCWP began implementing this provision in 2011 by participation in the first Technical Advisory Committee meeting of the CW4CB grant program, where the scope of pilot studies was discussed. Provisions C.11.e requires pilot studies to evaluate stormwater treatment retrofits. Two locations in Richmond were selected for this requirement; additional detail is provided in descriptions of C.12 activities below. Project details are provided in Appendices A2 – A5 of the BASMAA "*MRP Regional Supplement for Monitoring and Pollutants of Concern for Fiscal Year 2011-2012*". Provision C.11.f requires a pilot study to evaluate diversion of stormwater into a publicly owned treatment works facility. The pilot project being scoped is located at the North Richmond Pumping Station, and discussions are under way with the West County Sanitation District about obtaining a permit for stormwater treatment. Details are provided in Appendix A8 of the BASMAA "*MRP Regional Supplement for Monitoring and Pollutants of Concern for Fiscal Year 2011-2012"*. Provision C.11.g requires development and implementation of a monitoring program to track mercury loads and loads reduced or avoided. This was fulfilled in the FY 2009–2010 annual reporting cycle through a BASMAA regional report:

http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/MRP/2010_AR/BASMAA/appendices/BASMAA_A5_2009-10_MRP_AR.pdf

Provision C.11.h requires a fate and transport study of mercury in urban runoff. This was fulfilled with the report contained in Appendix A9 of the BASMAA "*MRP Regional Supplement for Monitoring and Pollutants of Concern for Fiscal Year 2011-2012"*. Provision C.11.i requires development of a regional risk reduction program. This was fulfilled through activities described in Appendices A6 and A7 of the BASMAA "*MRP Regional Supplement for Monitoring and Pollutants of Concern for Fiscal Year 2011-2012"*. Provision C.11.j requires development of an allocation sharing scheme with the California Department of Transportation. The CCCWP has retained Armand Ruby to facilitate this discussion as a regional project on behalf of BASMAA member agencies.

Conclusion

Work on the C.11 provisions for FY 2011-2012 was extensive on both a regional level through BASMAA as well as on a CCCWP-level and Permittee level (City of Richmond). Tasks 2 and 3 of the CW4CB were largely completed and significant work accomplished on Task 5. The CCCWP and its consultants and Permittees will continue to advance the implementation of C.11 provisions in the coming fiscal year.

SECTION 12 – PROVISION C.12 PCB CONTROLS

Introduction

The majority of MRP requirements related to PCBs are being addressed regionally through BASMAA and the RMC. Reporting on these elements of the MRP, for which there were deadlines in FY 2010-2011, can be found in the BASMAA "*MRP Regional Supplement for Monitoring and Pollutants of Concern Reporting for Fiscal Year 2011-12.*" However, additional details about actions taken directly by the CCCWP in implementing these regional projects are described below. Mercury reduction benefits derived from PCB control measures will be concurrently evaluated, and so this section is referenced in relevant sections describing C.11 activities.

Provision C.12.a requires inspector training of inspectors in the identification of PCB-containing equipment. Training was completed in FY 2010 – 2011. The CCCWP will follow up with Permittees in 2012-2013 to evaluate how the training is being used. Provision C.12.b requires pilot projects to evaluate managing PCB-Containing materials and wastes during building demolition and renovation. That provision was fulfilled by a collaborative, grant funded project at the direction of the San Francisco Estuary Partnership. Results and outcomes are documented at http://www.sfestuary.org/projects/detail.php?projectID=29.

CW4CB Tasks 2 and 3

CCCWP completed the initial steps (data review, driving inspections, and onsite property inspections) of contaminated sediment identification In FY 2010-2011. That assessment was based on lessons learned from the 2000 – 2001 investigation of PCBs in Municipal Separate Storm Sewer System (MS4) sediment conducted in collaboration with other BASMAA member agencies, and follow-on investigations conducted by CCCWP and the City of Richmond in 2002 and 2005. Based on information from the assessments, one property owner was notified by the City of Richmond that they are not

allowed to discharge stormwater from the property into the MS4 system unless they provide detailed monitoring results for PCBs using an appropriately low detection limit, and could demonstrate attainment of EPA benchmark values for other constituents. The property owner stored and re-used stormwater onsite during the FY 2010 – 2011 storm season.

In FY 2011–2012, CCCWP coordinated with other BASMAA member agencies through the CW4CB work groups to share lessons learned by CCCWP about the onsite property inspections. Also, in FY 2011- 2012, CCCWP collected a sediment sample from a storm drain near a potential source area in the Lauritzen Channel watershed where a storm drain inlet plugged with sediment had been discovered during Task 3 inspections. The sediment sampled from the storm drain was analyzed for PCBs using EPA Method 8020. PCBs were non-detect (< 250 µg/kg total PCBs), indicating that the sediment did not have PCB concentrations greater than would be expected from an industrial urban setting. Follow-on investigations using lower detection limits and targeting suspected source areas in the Lauritzen and Parr / Harbor watersheds (i.e., a wider area) are scheduled to occur prior to October 15, 2012 through the CW4CB grant.

These activities addressed the requirements of Provision C.12.c.

CW4CB Task 4

CCCWP staff and consultants participated in the first Technical Advisory Committee (TAC) meeting of the CW4CB grant program in FY 2010-2011. Feedback from the TAC members directed participating programs to develop a brief desktop analysis that summarized the logic leading to proposed Operation and Maintenance (O&M) enhancements to be tested in the pilot watersheds. Photo documentation, previous PCB analysis in sediments, and maps of the storm drain network has been gathered to develop a desktop analysis to be provided to TAC members in their October, 2012 meeting. These activities addressed the requirements of Provision C.12.d.

CW4CB Task 5

CCCWP staff, consultants, and City of Richmond staff provided oversight and direction to assist with the selection and scoping of two sites for stormwater treatment retrofits. The first site is located in the Lauritzen Channel watershed, on Cutting Blvd between First and Second Streets. The area has previously been shown to have sediments with PCB concentrations that are elevated (i.e., up to ~1,000 ppb) compared to expected background concentrations for older industrial urban areas (i.e., 200 – 500 ppb). It is unknown whether the elevated PCB concentrations are due to adjacent private properties or vehicle track out from other potentially contaminated areas nearby; the Task 3 work is expected to shed some light on that question in FY 2011-2012. A bioswale with an under drain is planned for installation in the public right of way between the sidewalk and Cutting Blvd. Curb cuts will allow urban stormwater to be treated by infiltration through the root zones of the bioswale prior to discharging into the MS4 system. PCB concentrations of water flowing into and out of the bioswale will be measured to characterize the loads avoided through treatment.

The second location selected is an area along Nevin Avenue that is being enhanced to make more pedestrian friendly access between the Richmond BART station and Civic Center. Grant funds will be used to add LID-type stormwater treatment to sidewalk bulb outs, as well as permeable pavement in parking areas. Monitoring will also be performed in this area to characterize loads avoided. In contrast to the Cutting Blvd. location, this pilot treatment retrofit addresses more general urban background PCB concentrations in sediments expected in areas more distant from source areas.

Two design firms were brought on a site walk at the treatment retrofit planned along Cutting Blvd. and asked to provide design concepts for the retrofit. Based on feedback provided by the two teams, the team led by WRECO was selected to provide design services. WRECO advanced the concept design for the retrofit along Cutting Boulevard. Design completion and award of a construction contract is expected to be complete in FY 2012–2013.

City of Richmond staff and CCCWP consultants reviewed 100% design drawings for the Nevin Avenue improvements. Based on the review, specific design comments were provided to ensure that the stormwater treatment retrofits included features that would allow inflow and outflow monitoring.

These activities addressed the requirements of Provision C.12.e.

Provision C.12.f requires a pilot study to evaluate diversion of stormwater into a publicly owned treatment work. The pilot project being scoped is located at the North Richmond Pumping Station, and discussions are under way with the West County Sanitation District about obtaining a permit for stormwater treatment. Details are provided in Appendix A8 of the BASMAA Regional Pollutants of Concern report. Provision C.12.g requires development and implementation of a monitoring program to track mercury loads and loads reduced or avoided. This was fulfilled in the FY 2009–2010 annual reporting cycle through a BASMAA regional report:

http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/MRP/2010_AR/BASMAA/appendices/BASMAA_A5_2009-10_MRP_AR.pdf

Provision C.12.h requires a fate and transport study of PCBs in urban runoff. This was fulfilled with the report contained in Appendix A9 of the BASMAA Regional Pollutants of Concern report. Provision C.12.i requires development of a regional risk reduction program. This was fulfilled through activities described in Appendices A6 and A7 of the BASMAA Regional Pollutants of Concern report. Provision C.12.j requires development of an allocation sharing scheme with the California Department of Transportation. The CCCWP has retained Armand Ruby to facilitate this discussion as a regional project on behalf of BASMAA member agencies.

Conclusion

Work on C.12 provisions for FY 2010-2011 was very extensive on both a regional level through BASMAA as well as on a CCCWP-level and Permittee level (City of Richmond). Tasks 2 and 3 of the CW4CB were largely completed and significant work was accomplished on Task 5. The CCCWP, its consultants, and Permittees will continue to advance the implementation of C.12 provisions in the coming fiscal year.

SECTION 13 – PROVISION C.13 COPPER CONTROLS

The majority of MRP requirements related to copper are being addressed directly by Permittees or regionally through BASMAA. Reporting on these elements of the MRP, for which there were deadlines in FY 2011-2012, can be found in the BASMAA *"MRP Regional Supplement for Monitoring and Pollutants of Concern Reporting for Fiscal Year 2011-2012.*"

SECTION 14 – PROVISION C.14 PBDE, LEGACY PESTICIDES AND SELENIUM CONTROLS

MRP requirements related to Polybrominated Diphenyl Ethers (PBDEs), legacy pesticides and Selenium are being addressed regionally through BASMAA. Reporting on these elements of the MRP, for which there were deadlines in FY 2011-2012, can be found in the BASMAA "MRP *Regional Supplement for Monitoring and Pollutants of Concern Reporting for Fiscal Year 2011-2012*."

SECTION 15 – PROVISION C.15 EXEMPTED AND CONDITIONALLY EXEMPTED DISCHARGES

Introduction

The CCCWP MOC is tasked with, among other things, the review, development and coordination of any countywide and/or regional tasks conducted to assist Permittees with implementation of the mandates in Provision C.15. However, due to other competing priorities under the purview of the CCCWP MOC, no specific actions were conducted in FY 2011-2012.

Accomplishments

Though the CCCWP's MOC did not conduct any specific group activities to assist Permittees with compliance with Provision C.15, the CCCWP Permittees did approve and adopt in FY 2011-2012, the *6th Edition, Stormwater C.3 Guidebook*. This guidebook outlines source controls, site design measures, and stormwater treatment and flow control requirements consistent with the mandates in Provision C.3. This guidance includes BMPs addressing the following discharges:

- Swimming Pool, Hot Tub, Spa, and Fountain Water Discharges (C.15.b.v.)
- Irrigation Water, Landscape Irrigation, and Lawn or Garden Watering Discharges (C.15.b.vi.)

This past year, the CCCWP MOC and BASMAA's MOC were primarily focused on activities to implement the trash load reduction mandates in Provisions C.10. However, CCCWP MOC members have tentatively identified the need to coordinate regional review and development of the following in FY 2012-2013:

- Development of BMPs and procedures for emergency fire-fighting discharges;
- Outreach efforts to discourage individual residential car washing, and encouraging instead use of commercial car wash facilities; and,
- Identifying whether additional types or categories of dischargers not listed in C.15 should be conditionally exempt.

CONTRA COSTA CLEAN WATER PROGRAM
ORGANIZATIONAL STRUCTURE AND REPRESENTATION

Attachment 1.1

Participants -- Antioch, Brentwood, Clayton, Concord, Danville, El Cerrito, Hercules, Lafayette, Martinez, Moraga, Oakley, Orinda, Pinole, Pittsburg, Pleasant Hill, Richmond, San Pablo, San Ramon, Walnut Creek, Contra Costa County, and Contra Costa County Flood Control & Water Conservation District

ADMINISTRATIVE COMMITTEE

DUTIES

- Administration
- Strategic Planning
- Personnel
- Budget
- Conflict Resolution

MANAGEMENT COMMITTEE

DUTIES

- Decision Making Body
- Strategic Planning
- Sets Policies / Directives
- Program Manager Evaluation
- Approves / Appropriates Budget

STAFF

Tom Dalziel, Program Manager
Elisa Wilfong, Watershed Management Planning Specialist
Jamison Crosby, Watershed Management Planning Specialist
Tracy Hein, Administrative Analyst
Fan Ventura, Clerk - Experienced Level

MONITORING COMMITTEE

DUTIES

- C.8 - Water Quality Monitoring
- C.9 - Pesticides Toxicity Control
- C.11 - Mercury Controls
- C.12 - Polychlorinated Biphenols (PCBs) Controls
- C.13 - Copper Controls
- C.14 - PBDEs, Legacy Pesticides and Selenium

DEVELOPMENT COMMITTEE

DUTIES

- C.3 - New Development and Redevelopment
- C.6 - Construction Site Control

PUBLIC INFORMATION / PARTICIPATION COMMITTEE

DUTIES

- C.7 - Public Information and Outreach
- C.9 Pesticides Toxicity Control
- Coordinaton of Program Outreach

MUNICIPAL OPERATIONS COMMITTEE

DUTIES

- C.2 - Municipal Operations
- C.4 - Industrial and Commercial Site Controls
- C.5 - Illicit Discharge Detention and Elimination
- C.9 - Pesticides Toxicity Control
- C.10 - Trash Reduction
- C.15 - Exempted and Conditonally Exempted Discharges

BASMAA MONITORING / POC COMMITTEE

PROGRAM REPRESENTATIVES

Jamison Crosby, Program Staff
Rinta Perkins, City of Walnut Creek
Alfredo Hurtado, City of Pittsburg

BASMAA DEVELOPMENT COMMITTEE

PROGRAM REPRESENTATIVES

Tom Dalziel, Program Staff
David Swartz, Contra Costa County
Frank Kennedy, City of Concord

BASMAA PUBLIC INFORMATION / PARTICIPATION COMMITTEE

PROGRAM REPRESENTATIVES

Tracy Hein, Program Staff
Rinta Perkins, City of Walnut Creek
Dan Jordan, Contra Costa County

BASMAA MUNICIPAL OPERATIONS COMMITTEE

PROGRAM REPRESENTATIVES

Elisa Wilfong, Program Staff
Lynne Scarpa, City of Richmond

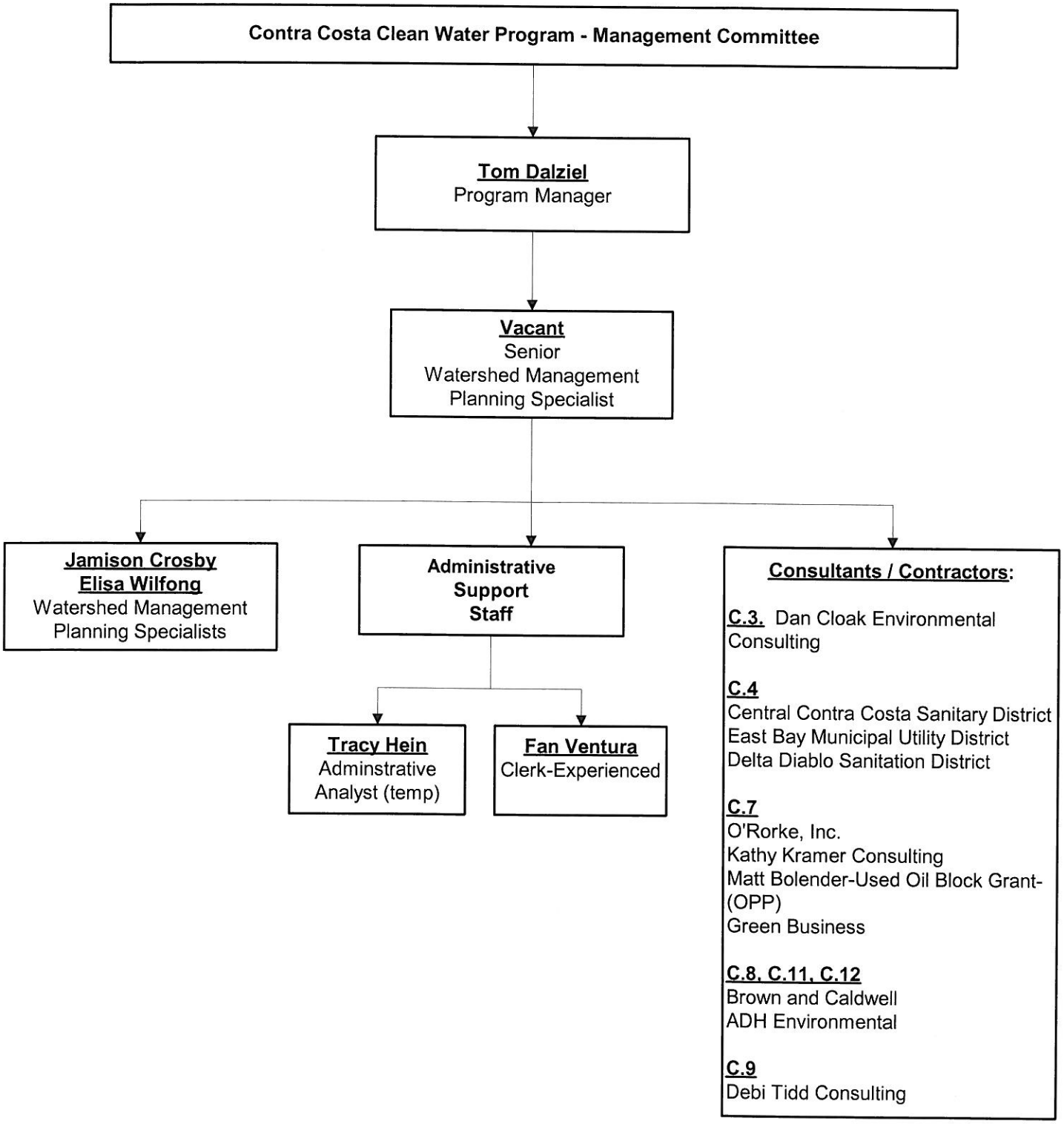
BASMAA TRASH COMMITTEE

PROGRAM REPRESENTATIVES

Elisa Wilfong, Program Staff
Lynne Scarpa, City of Richmond

Contra Costa Clean Water Program Management

Attachment 1.2



G://GrpData/NPDES/Org Charts/CCCWP Program Management 11/12
Last Updated: August 16, 2012

MANAGEMENT COMMITTEE
FY 2011-12 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL	AUG[3]	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	INDIV % ATT	MUNI % ATT
City of Antioch	**Phil Hoffmeister**			1	1	1		1	1	1	1		1	73%	**90.9%**
	Julie Haas-Wajdowicz	1		1								1		27%	
City of Brentwood	Jeff Cowling	1												9%	**100.0%**
	Jack Dhaliwal			1	1	1	1	1	1	1	1	1		82%	
	Miki Tsubota												1	9%	
City of Clayton	David Woltering													0%	**90.9%**
	Laura Hoffmeister			1	1	1	1	1	1	1	1	1	1	91%	
City of Concord	**Dan Sequeira****										1	1	1	27%	**100.0%**
	Danea Gammell	1		1		1								27%	
	Frank Kennedy				1		1	1	1	1				45%	
Town of Danville	**Christine McCann**			1	1	1	1	1	1		1	1	1	82%	**81.8%**
	Michael Stella													0%	
City of El Cerrito	**Jerry Bradshaw**	1		1	1	1								36%	**100.0%**
	Stephen Pree				1		1	1	1	1	1	1	1	73%	
City of Hercules	John McGuire			1	1	1		1		1				45%	
	Jose Pacheco	1					1				1	1		36%	**81.8%**
City of Lafayette	**Donna Feehan**	1		1	1	1	1	1	1	1	1	1	1	100%	**100.0%**
	Ron Lefler													0%	
City of Martinez	**Khalil Yowakim**	1		1	1	1	1	1	1	1	1	1	1	100%	**100.0%**
	Tim Tucker													0%	
Town of Moraga	Frank Kennedy										1	1	1	27%	**100.0%**
	John Sherbert	1					1		1	1				36%	
	Jill Mercurio			1	1	1		1						36%	
City of Oakley	**Keith Coggins**	1		1	1	1		1	1	1	1	1	1	91%	**90.9%**
	Jason Vogan													0%	
City of Orinda	**Cathy Terentieff**	1		1	1	1	1	1	1	1	1	1	1	100%	**100.0%**
	Charles Swanson												1	9%	
	Paul Lang													0%	
City of Pinole	Dean Allison			1										9%	**90.9%**
	Frank Kennedy			1	1	1	1	1	1	1	1	1	1	91%	

MANAGEMENT COMMITTEE
FY 2011-12 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL	AUG[3]	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	INDIV % ATT	MUNI % ATT
City of Pittsburg	Jason Burke													0%	
	Laura Wright										1			9%	
	Jolan Longway	1		1	1	1	1	1	1	1			1	82%	**90.9%**
City of Pleasant Hill	**Rod Wui**			1	1	1		1	1	1	1	1	1	82%	**81.8%**
City of Richmond	**Lynne Scarpa**	1		1	1	1		1	1	1	1	1	1	91%	**100.0%**
	Joanne Le					1	1						1	27%	
	Chad Davisson													0%	
City of San Pablo	**Karineh Samkian**	1		1	1	1	1	1	1	1	1	1	1	100%	**100.0%**
	Adele Ho													0%	
City of San Ramon	**Steven Spedowfski** [2]	1		1	1		1	1	1	1	1	1		82%	**90.9%**
	Robin Bartlett					1								9%	
City of Walnut Creek	**Rinta Perkins** [1]	1		1	1	1		1	1	1	1	1		82%	**100.0%**
	Michael Hawthorne												1	9%	
	Steve Waymire						1							9%	
Contra Costa County	**Rich Lierly**	1				1								18%	**90.9%**
	Mike Carlson			1	1			1						27%	
	Mitch Avalon					1			1			1		27%	
	CeCe Sellgren						1	1	1		1	1	1	55%	
	Charmaine Bernard													0%	
Flood Control	**Mike Carlson**	1		1	1	1	1	1	1		1	1	1	91%	**90.9%**
	Tim Jensen													0%	
PROGRAM STAFF															
	Tom Dalziel	1		1		1	1	1	1	1	1	1	1		
	Jamison Crosby	1		1		1	1	1	1	1	1	1			
	Elisa Wilfong	1		1		1	1	1	1	1	1	1	1		
	M. McCauley/T. Hein*	1		1		1	1	1	1	1	1	1	1		
	Donald Freitas					1	1		1	1	1	1			
	V. Wiley/F. Ventura*	1					1	1	1	1	1	1	1		

(1) Chairperson, (2)Vice-Chairperson, (3) Meeting cancelled * Staff change G:\NPDES\Management Committee\Minutes&Attendance\MC Attendance 2011-12

ADMINISTRATIVE COMMITTEE
FY 2011-12 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL	AUG [3]	SEP	OCT	NOV [3]	DEC	JAN	FEB	MAR	APR [3]	MAY	JUN[3]	INDIV % ATT	MUNI % ATT
City of Antioch	**Phil Hoffmeister [2]**	1		1	1			1	1	1		1		88%	**88%**
	Julie Haas-Wajdowicz													0%	
City of Clayton	**Laura Hoffmeister**	1							1			1		38%	**38%**
	David Woltering													0%	
County Unincorp.	**David Swartz**				1			1	1	1				50%	**100%**
	Rich Lierly	1												13%	
	Cece Sellgren									1		1		25%	
	Mitch Avalon							1		1				25%	
	Dan Jordan						1							13%	
Flood Control District	**Mike Carlson**	1		1	1		1	1	1	1		1		100%	**100%**
	Tim Jensen													0%	
City of Hercules	**Jose Pacheco**			1	1		1	1	1	1		1		88%	**88%**
	John McGuire											1		13%	
City of Martinez	**Tim Tucker**	1		1	1		1			1		1		75%	**75%**
	Khalil Yowakim													0%	
City of San Ramon	**Steven Spedowfski [1]**	1		1	1		1	1	1	1		1		100%	**100%**
	Robin Bartlett													0%	
PROGRAM STAFF															
	Tom Dalziel	1		1	1		1	1	1	1		1			
	Jamison Crosby								1						
	Elisa Wilfong				1										
	M. McCauley/T. Hein*	1		1			1	1	1						
	V. Wiley/F. Ventura*				1							1			
NON-VOTING															
Town of Danville	Chris McCann							1		1		1			
City of Walnut Creek	Rinta Perkins								1			1			

[1] Chairperson, (2) Vice-Chairperson, (3) Meeting Cancelled * Staff Change G:\NPDES\Admin Committee\Minutes&Attend\AC Attendance 2011-12

DEVELOPMENT COMMITTEE
FY 2011-12 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL[3]	AUG[3]	SEP[3]	OCT	NOV	DEC[3]	JAN	FEB	MAR[3]	APR	MAY[3]	JUN[3]	INDIV % ATT	MUNI % ATT
City of Antioch	**Phil Hoffmeister[1]**				1	1		1	1		1			100%	**100%**
	Julie Haas-Wajdowicz													0%	
City of Brentwood	**Jack Dhaliwal**				1									20%	**100%**
	Jeff Cowling					1		1	1		1			80%	
City of Clayton	**Laura Hoffmeister**										1			20%	**20%**
	David Woltering													0%	
City of Concord	**Frank Kennedy[2]**							1	1					40%	**40%**
	Danea Gammell													0%	
Contra Costa County	**David Swartz**				1			1			1			60%	**100%**
	Alex Anaya					1			1					40%	
Town of Moraga	**John Sherbert**					1		1	1					60%	**60%**
City of Oakley	**Keith Coggins**				1			1	1		1			80%	**80%**
	Jason Vogan													0%	
City of Orinda	**Cathleen Terentieff**				1	1		1	1		1			100%	**100%**
	David McIntire													0%	
City of Pinole	**Tim Harless**													0%	**40%**
	Dean Allison													0%	
	Frank Kennedy							1	1					40%	
City of Pittsburg	**Majeed Bahri**				1	1		1	1		1			100%	**100%**
	Jolan Longway					1								20%	
City of Richmond	**Lynne Scarpa**				1			1			1			60%	**60%**
	Joanne Le													0%	
City of Walnut Creek	**Michael Hawthorne**								1		1			40%	**100%**
	Scott Wikstrom													0%	
	Rinta Perkins							1						20%	
	Carlton Thompson				1	1								40%	
NON-VOTING															
Town of Danville	Chris McCann					1		1	1		1				
City of El Cerrito	Yvetteh Ortiz														
City of Hercules	Jeff Brown														

DEVELOPMENT COMMITTEE
FY 2011-12 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL(3)	AUG(3)	SEP(3)	OCT	NOV	DEC(3)	JAN	FEB	MAR(3)	APR	MAY(3)	JUN(3)	INDIV % ATT	MUNI % ATT
PROGRAM STAFF															
	Tom Dalziel				1	1		1	1		1				
	Valarie Wiley				1										
	Dan Cloak				1	1		1	1		1				

(1) Chairperson, (2) Vice-Chairperson, (3) Meeting Cancelled

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MONITORING COMMITTEE
FY 2011-12 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL	AUG[3]	SEP	OCT	NOV	DEC	JAN	FEB[3]	MAR	APR	MAY[3]	JUN	INDIV % ATT	MUNI % ATT
City of Antioch	**Phil Hoffmeister [1]**	1		1	1	1	1	1		1	1		1	100%	**100%**
	Julie Haas-Wajdowicz													0%	
Contra Costa County	**Dan Jordan**	1			1		1	1		1	1			67%	**100%**
	Charmaine Bernard					1							1	22%	
	Alex Anaya			1										11%	
County Flood Control	**Mike Carlson**	1		1	1	1	1	1		1	1			89%	**100%**
	Cece Sellgren												1	11%	
City of Pittsburg	**Alfredo Hurtado**	1		1		1		1		1	1		1	78%	**100%**
	Jolan Longway						1							11%	
	Walter Pease			1										11%	
City of San Pablo	**Karineh Samkian [2]**	1		1	1	1	1	1		1	1		1	100%	**100%**
														0%	
City of San Ramon	**Steven Spedowfski**	1		1			1			1	1		1	67%	**67%**
														0%	
City of Walnut Creek	Michael Hawthorne												1	11%	**89%**
	Rinta Perkins	1		1	1	1	1	1		1				78%	
NON-VOTING															
City of Richmond	Joanne Le						1	1		1	1		1		
	Lynne Scarpa						1								
PROGRAM STAFF															
	Elisa Wilfong														
	Jamison Crosby	1		1	1	1	1	1		1	1		1		
	M. McCauley/T. Hein	1		1			1								

[1] Chairperson, (2) Vice-Chairperson, (3) Meeting Cancelled

MUNICIPAL OPERATIONS COMMITTEE
FY 2011-12 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL[3]	AUG 4[4]	AUG	SEP	OCT	NOV[3]	DEC	JAN	FEB[3]	MAR	APR	MAY[3]	JUN	INDIV % ATT	MUNI % ATT
City of Antioch	**Roger Clarke**														0%	**67%**
	Rose Ramirez		1			1			1						33%	
	Julie Haas-Wajdowicz		1												11%	
	Phil Hoffmeister				1						1			1	33%	
City of Brentwood[2]	**Jeff Cowling**		1		1	1			1		1			1	67%	**89%**
	Kelly Martinez		1	1					1			1			44%	
City of Concord	**Andrew Kennedy**		1						1			1			33%	**33%**
	Frank Kennedy														0%	
	Jesse Crawford														0%	
Contra Costa County	**Charmaine Bernard**		1	1	1			1	1		1	1		1	89%	**100%**
	Dan Jordan		1												11%	
	Chris Hallford					1									11%	
	Alex Anaya		1			1									22%	
Town of Danville	Chris McCann			1	1	1		1	1					1	67%	**78%**
	Jim Parke														0%	
City of El Cerrito	**Stephen Pree**					1		1				1		1	44%	**44%**
	Bill Driscoll														0%	
City of Lafayette	**David Terhune**		1	1	1	1		1	1			1		1	89%	**89%**
	Donna Feehan														0%	
	Jules Walton (intern)													1	11%	
City of Pittsburg[1]	**Jolan Longway**		1	1	1	1		1	1		1				78%	**78%**
	Ramona Anderson														0%	
City of Richmond	**Lynne Scarpa**		1	1	1	1		1	1		1			1	89%	**89%**
	Joanne Le							1	1		1	1			44%	
City of Walnut Creek[5]	**Rich Payne**				1				1					1	33%	**56%**
	Michael Hawthorne														0%	
	Rinta Perkins		1									1			22%	

MUNICIPAL OPERATIONS COMMITTEE
FY 2011-12 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL[3]	AUG 4[4]	AUG	SEP	OCT	NOV[3]	DEC	JAN	FEB[3]	MAR	APR	MAY[3]	JUN	INDIV % ATT	MUNI % ATT
PROGRAM STAFF																
	Elisa Wilfong		1	1	1	1		1	1		1	1		1		
	Jamison Crosby															
	Tracy Hein							1	1							
NON-VOTING																
City of Clayton	Laura Hoffmeister															
City of Hercules	Glen Moniz		1	1	1	1		1	1		1	1				
Town of Moraga	John Sherbert		1		1											
City of Orinda	Cathy Terrentieff			1				1								
City of Orinda	Paul Lang		1													
City of Pinole	Tim Harless				1	1										
City of Pinole	Patrick Bowie			1		1		1								
City of Pleasant Hill	Rod Wui															
City of San Ramon	Steven Spedowfski			1												

[1] Chairperson, (2) Vice-Chairperson, (3) Meeting Cancelled, (4) Not a Regular Meeting, (5) Voting municipality as of October 2011

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PUBLIC INFORMATION/PARTICIPATION COMMITTEE
FY 2011-12 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL	AUG	SEP(3)	OCT(3)	NOV(3)	DEC(3)	JAN	FEB	MAR(3)	APR	MAY	JUN	INDIV % ATT	MUNI % ATT
City of Antioch	**Julie Haas-Wajdowicz**	1	1					1	1		1	1	1	100%	**100%**
	Phil Hoffmeister													0%	
Contra Costa County	**Dan Jordan**	1	1					1	1		1	1	1	100%	**100%**
	Charmaine Bernard													0%	
CCC Flood Control District	**Cece Sellgren**							1	1		1			43%	**43%**
	Tim Jensen													0%	
City of Pittsburg	**Laura Wright**	1	1					1	1		1	1	1	100%	**100%**
	Jolan Longway													0%	
City of Pleasant Hill	**Ann Page**							1			1		1	43%	**43%**
	Rod Wui													0%	
City of Walnut Creek	**Rinta Perkins**								1		1	1		43%	**71%**
	Michael Hawthorne		1										1	29%	
NON-VOTING MEMBERS															
City of Richmond	Lynne Scarpa														
	Joanne Le							1	1		1	1	1		
City of San Ramon	Steven Spedowfski	1	1												
PROGRAM STAFF															
	Tom Dalziel							1	1			1			
	Elisa Wilfong											1	1		
	Fan Ventura											1			
	M. McCauley/T. Hein*		1					1	1		1	1	1		
	Don Freitas							1	1						
	O'Rorke, Inc. (consultants)	1	1					1	1		1	1	1		

(1) Chairperson, (2) Vice-Chairperson, (3) Meeting Cancelled *Staff change

G:\NPDES\PIP_PEIO\Minutes&Attendance\PIP Attendance 2011-12

To: **Tom Dalziel, Program Manager**
Contra Costa Clean Water Program

From: Dan Cloak

Subject: **HMP Modeling and Verification Study**
First Year Data Summary

Date: 5 September 2012

Introduction

Attachment C to the Municipal Regional Stormwater Permit (MRP) specifies Contra Costa Permittees' Hydromodification Management Requirements, including requirements to implement an IMP [Integrated Management Practice] Model Calibration and Validation Plan.

The Contra Costa Clean Water Program (CCCWP), with assistance from the cities of Pittsburg and Walnut Creek, accomplished the following during the fiscal year ending June 30, 2012:

- Installation of monitoring facilities at three locations (three IMPs) at the Contra Costa County Fire Protection Bureau offices on Loveridge Road in Pittsburg.
- Installation of monitoring facilities at two locations (two IMPs) at the Walden Park Commons residential townhouse development in Walnut Creek.
- Initial monitoring of rainfall at each of the two sites and IMP discharge at all five locations (conducted by the Contra Costa Flood Control and Water Conservation District under contract to CCCWP) during Water Year (WY) 2011-2012.

Current design parameters for IMPs, including IMP sizing factors, are contained in the CCCWP's *Stormwater C.3 Guidebook*. These design parameters were selected based on hydrologic performance predicted by a computer model. The principal use of the monitoring data will be to compare actual flows to the flows predicted by the computer model.

On page C-4 of Attachment C it is stated:

> ….If the first year's data indicate IMPs are not effectively controlling flows as modeled in the HMP, the Executive Officer may require the Program to make adjustments to the IMP sizing factors or design, or otherwise take appropriate corrective action….

Some significant available results of initial monitoring were presented to San Francisco Bay Regional Water Quality Control Board Executive Officer Tom Mumley and to Dale Bowyer of Water Board staff on April 19, 2012 and in a follow-up email on April 26, 2012.

Additional data will be collected during the current (2012-2013) fiscal year. The complete data set will be presented and analyzed in a report scheduled for submittal to the Water Board on August 30, 2013.

The data set includes rainfall recorded at the monitoring sites in 5-minute intervals. For the August 2013 report, the complete 2-year rainfall data will be imported into a computer model. The computer model will be customized to represent the monitored IMPs and the drainage management areas tributary to the IMPs. The customized computer model will generate predicted IMP outflows in response to the rainfall at the site. The predicted outflows will be compared to the actual outflows measured by monitoring.

Because the customized models have not yet been constructed, it is not possible to conduct this comparison for the first-year data.

Excel files containing the raw, unverified monitoring data accompany this memorandum. Some of the data is plotted below, along with some observations and insights that are of interest with regard to IMP performance and effectiveness.

Preliminary Data Review and Validation

Following are preliminary conclusions from an initial review of first-year data for validity:

1. The rainfall data from both sites (Pittsburg and Walnut Creek) appears to be consistent and within expected ranges.
2. No outflow was recorded from any of the 3 Pittsburg locations (IMPs). There were isolated single tips during rain events; these may have been from rain falling directly into the tipping buckets used to measure discharge.
3. Monitoring wells in the three Pittsburg IMPs were fitted with pressure transducers to measure the depth of saturation within the subsurface gravel storage layer. Two of the three IMPs exhibited stored water within the gravel storage layer. (It may be that in the third Pittsburg IMP, runoff infiltrated the storage layer rapidly enough that there was no accumulation during any of the 2011-2012 rainstorms.)
4. There were some occasions when data from the pressure transducers indicated water storage within the gravel layer when it was not raining. This occurred early in the rainy season (and during the establishment phase for bioretention plantings) and may have been caused by irrigation.
5. Discharge occured following rain events at the Walnut Creek site and followed the expected pattern of increased flows following sustained rainfall, and then decreasing flows dropping to zero some hours later.
6. Following storms in January, it was discovered that the Walnut Creek IMPs (bioretention facilities) had been constructed with

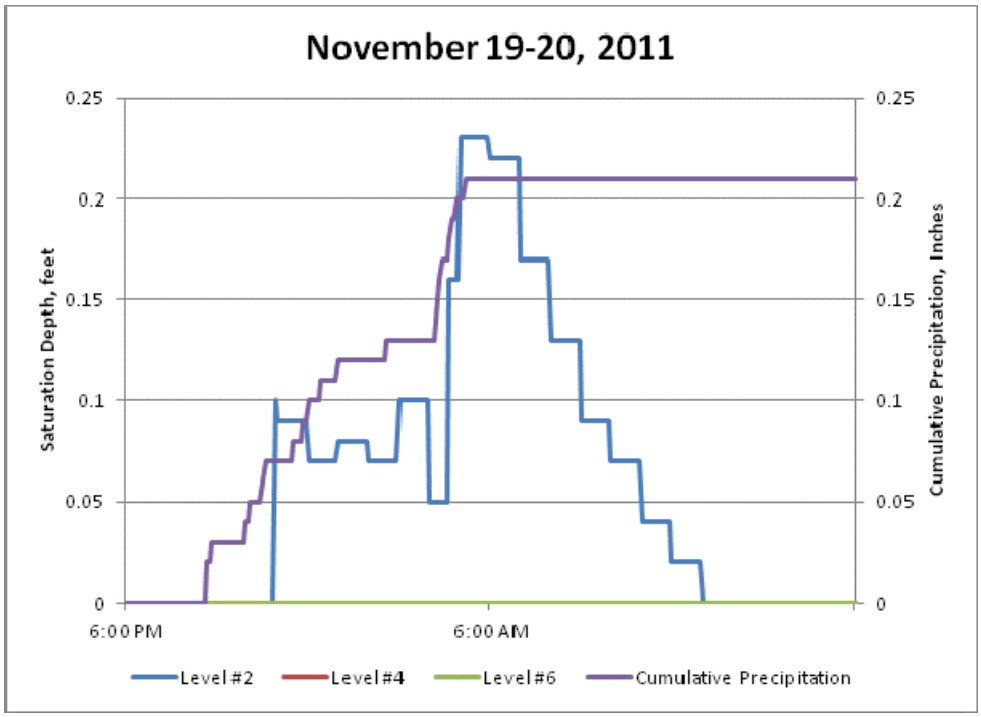
perforated pipe used in the overflow risers. This short-circuited the design intention, which is for runoff to percolate through the bioretention soil layer and be captured in a subsurface gravel layer before entering the perforated pipe underdrain and being conveyed to a buried-large-diameter-pipe storage vault. The perforated-pipe overflow risers were subsequently replaced with solid pipe. The repair was completed in time for capture of runoff from the season's largest storms during March and April 2012.

Results, Observations, and Insights

Pittsburg Site

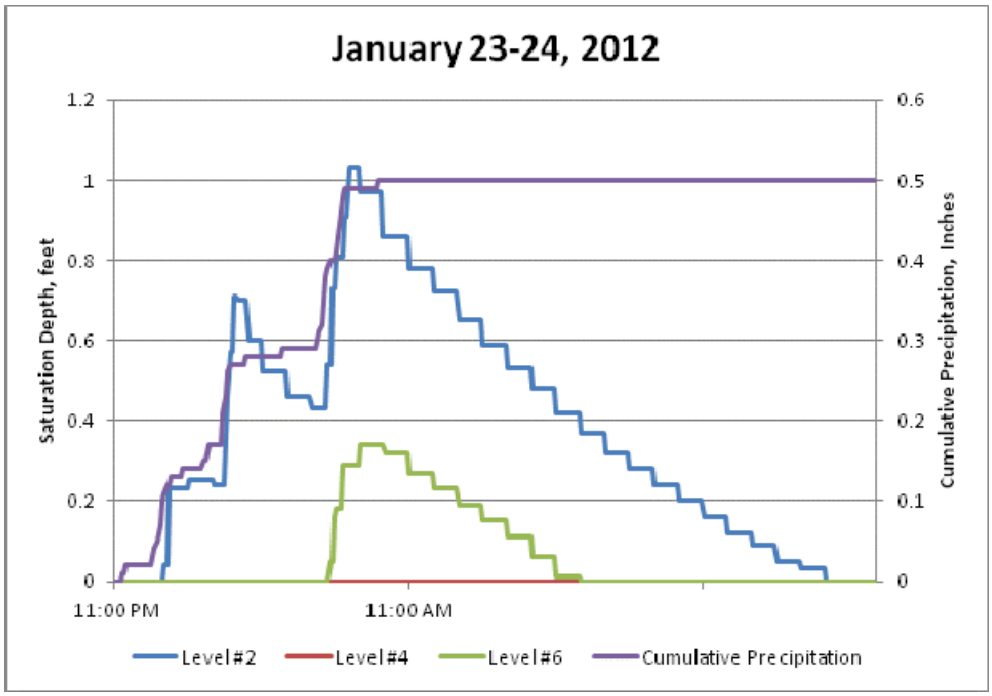
The three IMPs at the Pittsburg site are bioretention facilities. The surface and subsurface storage of each meets or exceeds the minimum criteria in the *Stormwater C.3 Guidebook.* In each, the underdrain discharge elevation is near the top of the subsurface storage (gravel) layer. IMP #2 has a sizing factor (IMP area/tributary equivalent impervious area) of 5%; IMP #4 has a sizing factor of over 8%, and IMP #6 has a sizing factor of over 7.5%.

Data for representative 2011-2012 rain events for the three Pittsburg IMPs is plotted below.

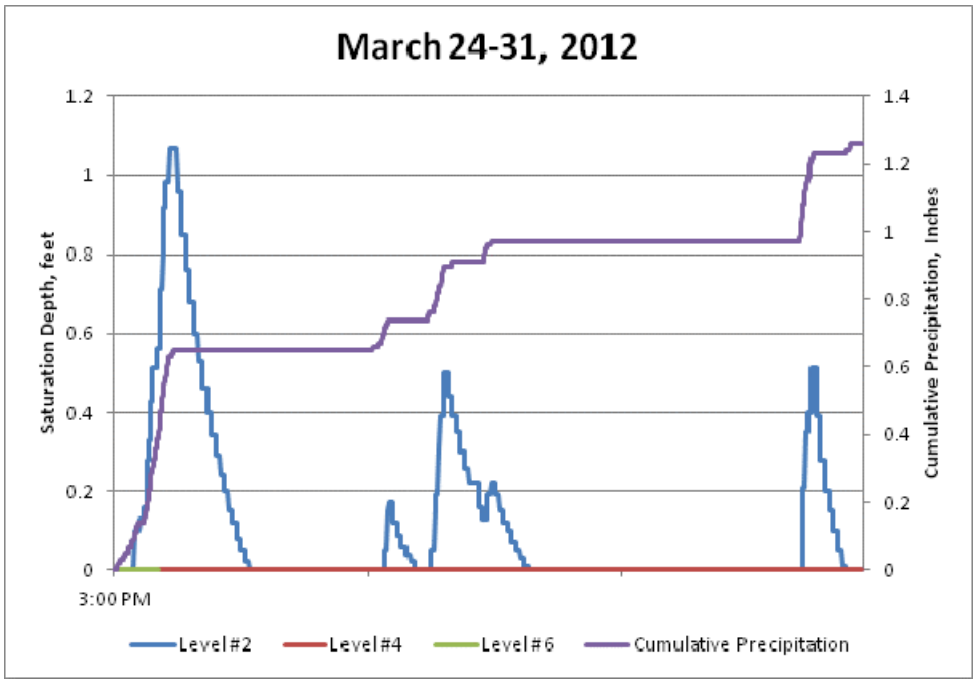


November 19-20, 2011, Pittsburg site: As discussed above, there was no discharge from any of the Pittsburg IMPs for WY (Water Year) 2011-2012.

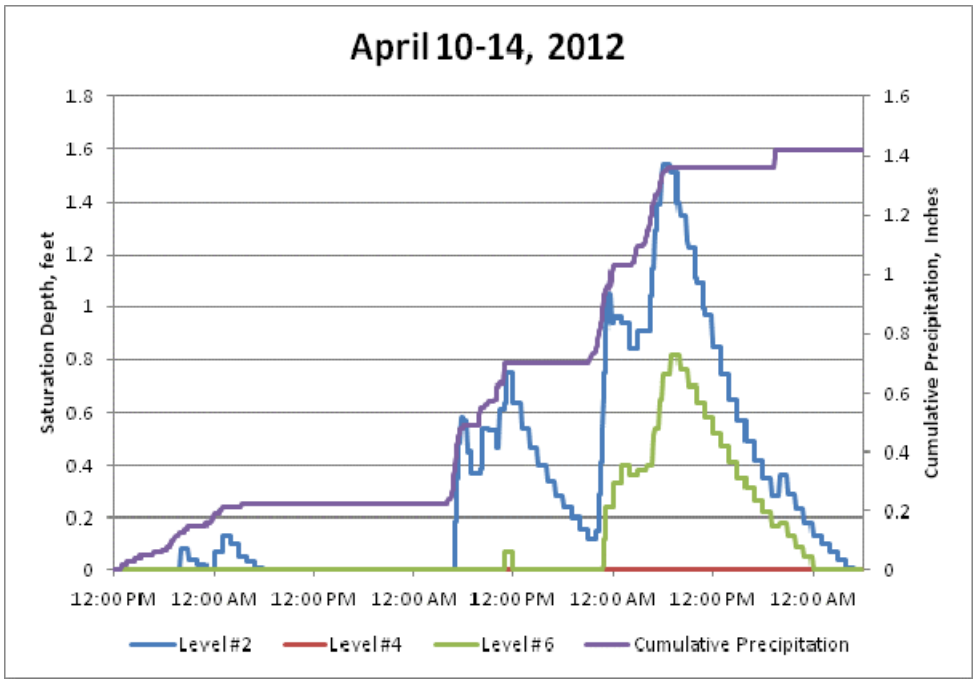
This graph shows the response of the three IMPs to a storm producing a little over 0.2 inches of rainfall in approximately 24 hours. The data indicate runoff entering the storage layer of IMP #4 and IMP #6 was infiltrated as quickly as it entered, resulting in no use of the storage. Runoff entering IMP #2 was captured in the bottom few inches of the storage layer and subsequently infiltrated.



January 23-24, 2012, Pittsburg site: Approximately one-half inch of rain fell in 12 hours. The gravel layer in IMP #2 became saturated to a depth of 1.0 feet. The gravel layer in IMP #6 became saturated to a depth of 0.3 feet. The saturation depth declined somewhat asymptotically, reflecting that the infiltration rate is affected by head. The time required to infiltrate one foot of storage was 19 hours, or an average 0.6 inches per hour. Taking into account the assumed porosity of the gravel (0.4) yields an average rate of 0.25 inches per hour. The rate in IMP #6 was similar (see graph above).



March 24-31, 2012, Pittsburg site: The graph shows the response (in IMP #2) to a total rainfall of 1.26 inches over week-long period. The response did not appear to be affected either by the lateness of the season (when it might be expected that native soils underlying the IMPs are more saturated) or by repeated wettings (note the three separate recovery periods).

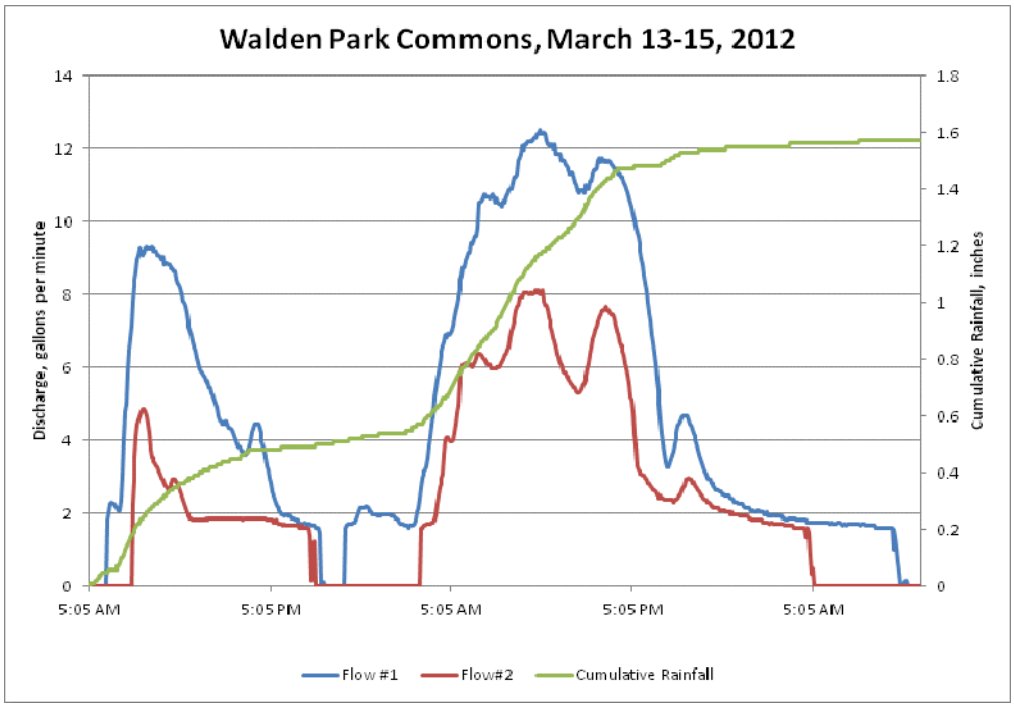


April 10-14, 2012, Pittsburg site: The graph shows the response to an event where there was an initial wetting followed by a rainfall of over an inch within 48 hours, including over half an inch with a few hours. The saturation depth in the gravel layer of IMP #2 rose briefly to as high as 1.54 feet.

Walnut Creek Site

The two IMPs at the Walnut Creek site are each large underground storage pipes that receive underdrain and overflow discharge from multiple bioretention facilities. The underground storage pipes, in turn, discharge to the municipal storm drain system through flow-control orifices. The storage pipe volumes and flow-control-orifice diameters were selected according to the criteria in the *Stormwater C.3 Guidebook.*

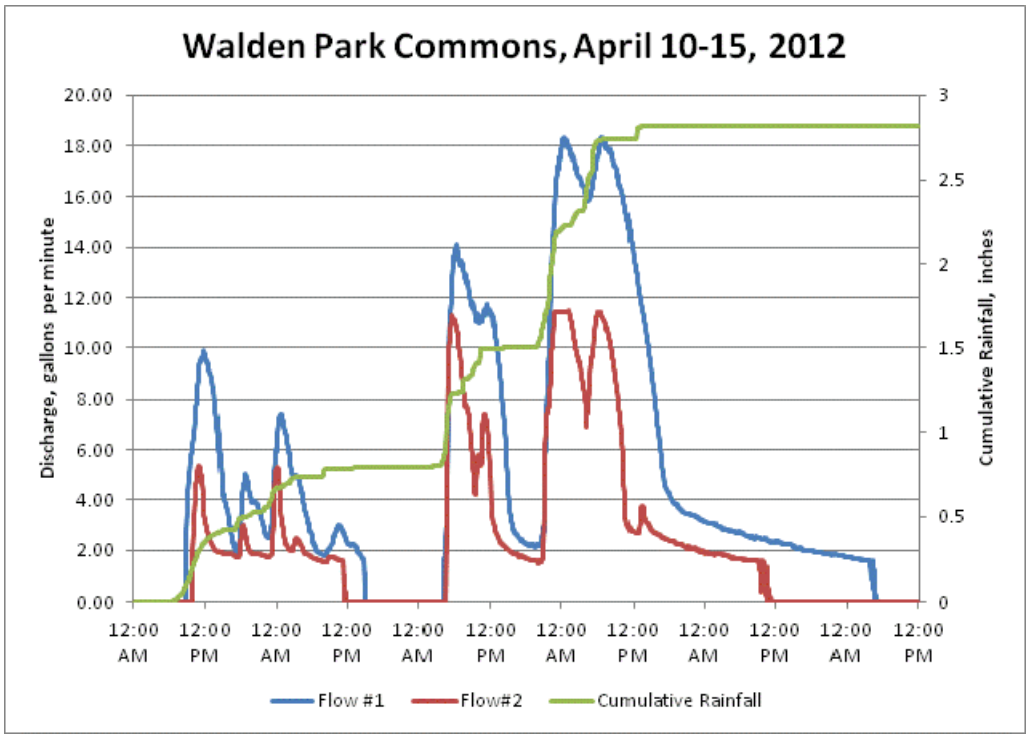
Notably, the *Guidebook* criteria specify underground storage be open to allow infiltration to underlying native soils; however, the storage pipes at the Walnut Creek site are closed and are not designed to allow infiltration. The bioretention facilities at the Walnut Creek site are open to allow infiltration; however, the gravel subsurface layer is designed for drainage rather than for storage.



March 13-15, 2012, Walnut Creek site: 1.6 inches of rain fell in 48 hours.

The peak discharge from IMP #1 was 12.4 gpm. This may be compared to a design maximum underdrain flow of 35.9 gpm (equivalent to two-tenths the calculated pre-project 2-year peak flow, or 0.2Q2). The peak discharge from IMP#2 was 8.1 gpm, which may be compared to the design maximum (0.2Q2) of 31.4 gpm.

The total volume discharged was approximately 16,400 gallons from IMP #1. This may be compared to a total runoff volume (rainfall depth x equivalent impervious area) of 41,663 gallons, indicating that approximately 60% of runoff was retained on-site for this storm and 40% discharged. A similar comparison for IMP #2 shows an estimated 8,222 gallons discharged vs. 37,545 gallons generated, or approximately 78% of runoff retained on-site and 22% discharged.



April 10-13, 2012, Walnut Creek site: 2.7 inches of rain fell in 72 hours.

The peak discharge from IMP #1 was 18.3 gpm, and the peak discharge from IMP #2 was 11.5 gpm. Total volume discharged from IMP #1was 38,213 gallons, which may be compared to a total runoff volume of 70,306 gallons (54% retained on-site). Total volume discharged from IMP #2 was 19,029 gallons, which may be compared to a total runoff volume of 63,053 gallons (70% retained on-site).

Conclusion

Based on this preliminary review of first-year data, the five test facilities are controlling flows as well as, or better than, was predicted by the model used for developing the IMP design criteria—including sizing factors—in the *Stormwater C.3 Guidebook.*

FINAL

Attachment 7.1

Contra Costa Clean Water Program
Advertising, Outreach & Media Schedule

8/25/2011

METHOD	COST
TV	$100,000
Cable	$100,000
Galavision	included in above
Outdoor/ Transit	$77,825
BART Posters	$26,000
Billboards	$22,425.00
Bus Ads	$29,400
ONLINE/ Mobile	$30,340
CBS.com (sanfrancisco.cbslocal.com)	$15,000
Facebook	$4,840
Contracostatimes.com	$7,000
Claycord.com	$3,500
110mag.com & 86mag.com	included with print buy
Print	$32,900
Contra Costa Times Front Page Flag	$12,000
Diablo Magazine	$15,000
110 Magazine + 86 Magazine	$5,900
Grassroots	$6,000
Bicycle Outreach	$6,000.00
Media Relations	$7,500
Youth Outreach	$1,330
Web Development	$5,000
Development Costs	$5,000.00
Production	$28,500
Billboards	$1,000
Transit Ads	$15,000
Bike Sign	$500
Revisions to TV	$12,000
Management	$38,905
TOTAL Paid Media	**$328,300.00**

FY 2011/12 “Litter Travels” Media Campaign Materials

Table of Contents

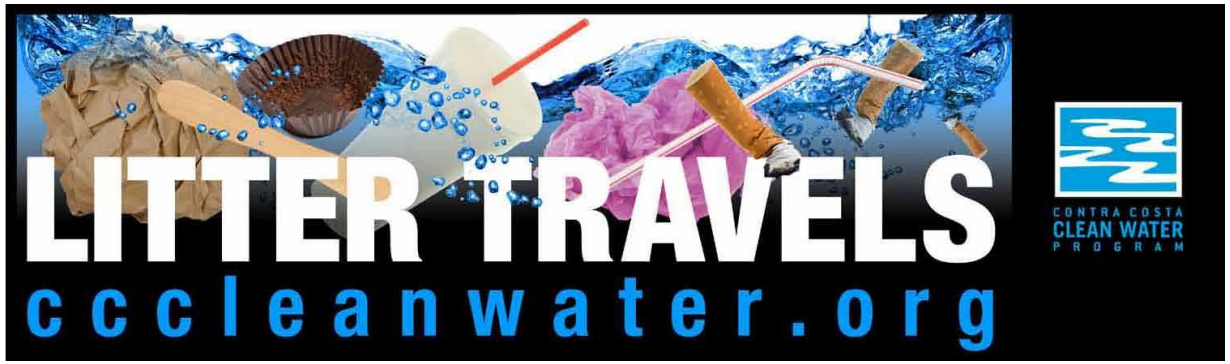
- TV 2
- Outdoor 3
- Transit 5
- Online 6
- Grassroots 8
- Print 9
- Website 10

TV

- Four :15 vignettes combined into six :30 spots
- New end slate

Outdoor

- Billboard



- Digital Billboard

Outdoor

- BART Posters

Transit

- Queens & Tails

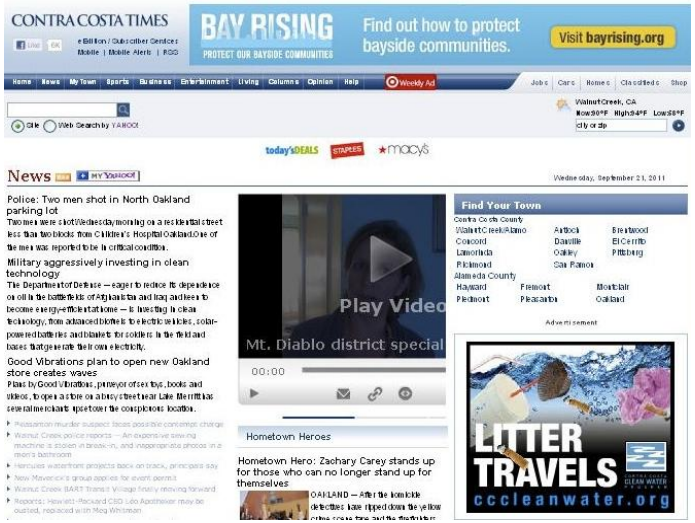
- Wrapped Bus

Online

- Online Banner Ads

Online

- Online Banner Ads

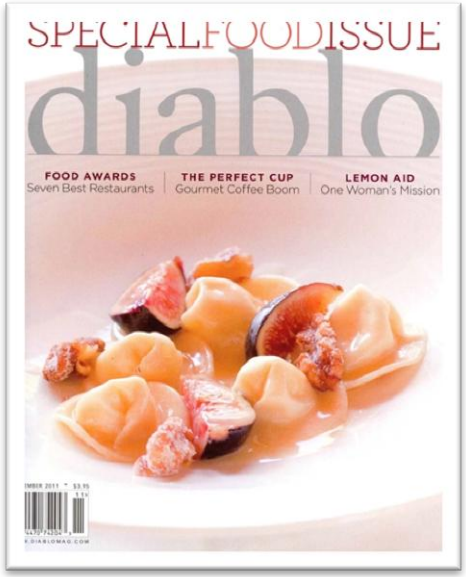


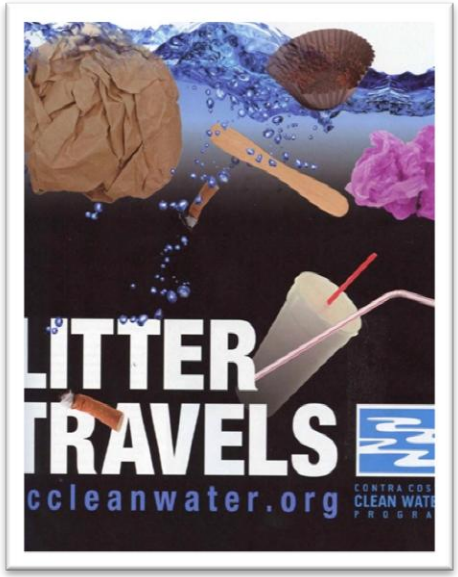
Grassroots

- Bicycle Outreach

Print

- Diablo Magazine, 110 & 86 Magazines





- Front Page Flags on the Contra Costa Times

Website

- Updates were made to the homepage of the program website

CCCleanwater.org

Litter Travels Campaign Overview: 8/26/11 – 4/2/12

Visitors Overview

Aug 26, 2011 - Apr 2, 2012

Advanced Segments | Email BETA | Export | Add to Dashboard

100.00% of total visits

Overview

Visits vs. Select a metric

Hourly | Day | Week | Month

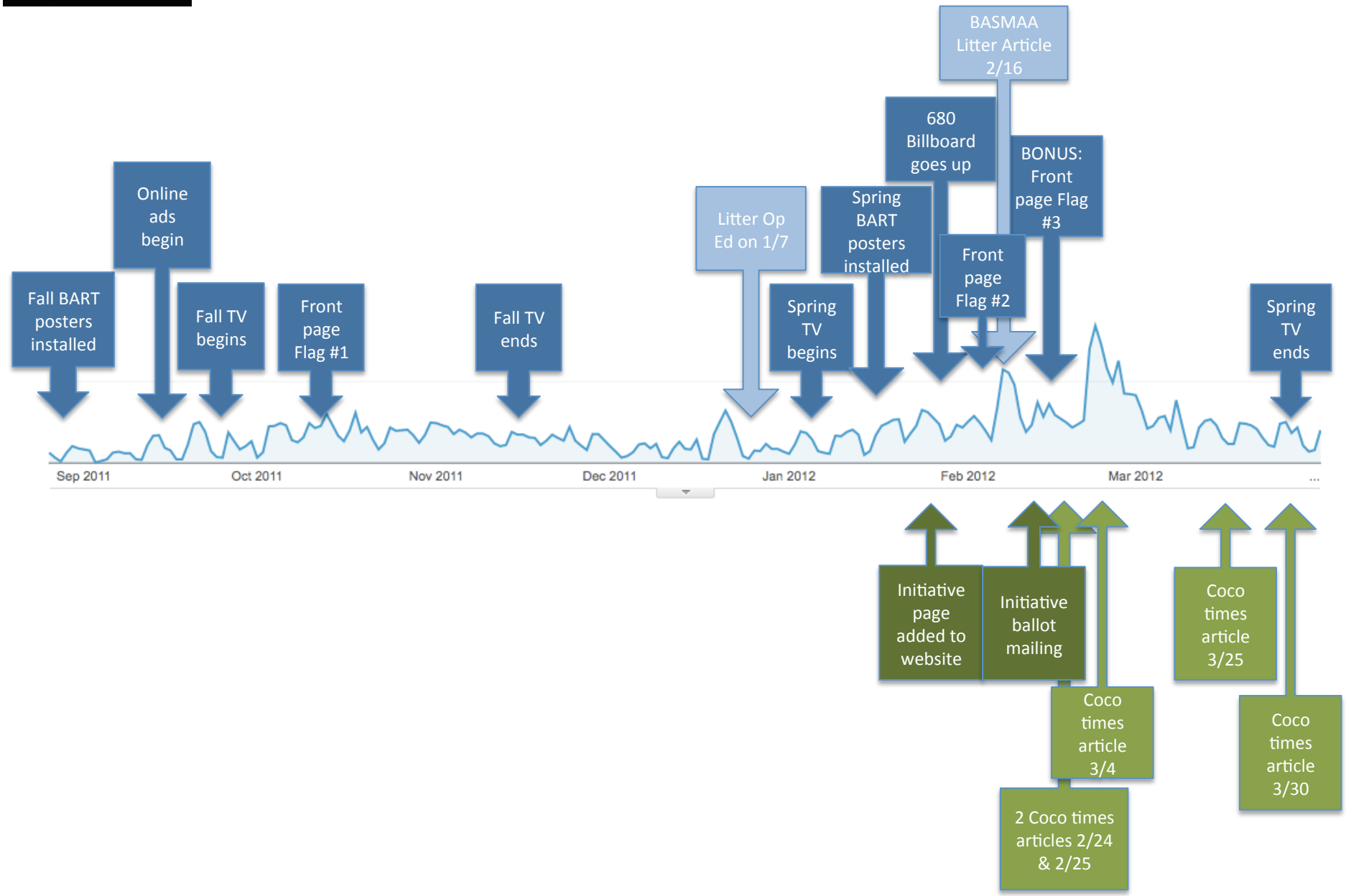
9,315 people visited this site

- **Visits: 12,049**
- **Unique Visitors: 9,315**
- **Pageviews: 29,230**
- **Pages/Visit: 2.43**
- **Avg. Visit Duration: 00:02:05**
- **Bounce Rate: 59.62%**
- **% New Visits: 74.90%**

74.89% New Visitor
9,024 Visits

25.11% Returning Visitor
3,025 Visits

Campaign Milestones

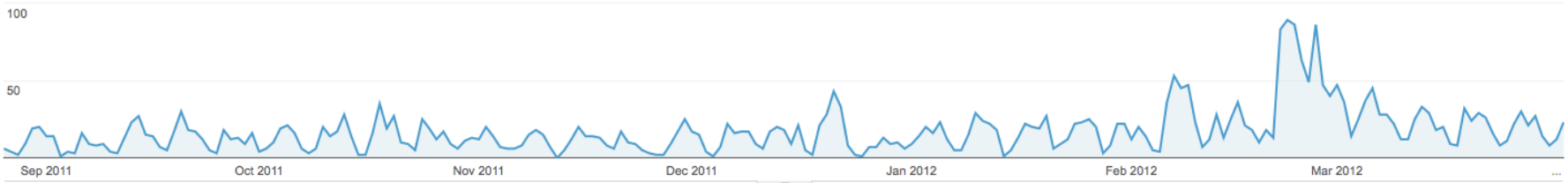


Traffic Sources Overview

12,049 people visited this site

- **31.66% Search Traffic**
  3,815 Visits
- **11.06% Referral Traffic**
  1,333 Visits
- **22.85% Direct Traffic**
  2,753 Visits
- **34.43% Campaigns**
  4,148 Visits

Keywords Overview



Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
3,815	3.03	00:03:05	60.37%	43.41%
% of Total: 31.66% (12,049)	Site Avg: 2.43 (25.00%)	Site Avg: 00:02:05 (47.97%)	Site Avg: 74.90% (-19.41%)	Site Avg: 59.62% (-27.20%)

Primary Dimension: Traffic Type Source Keyword Campaign Other

Plot Rows | Secondary dimension | Sort Type: Default | advanced

	Keyword	Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
1.	contra costa clean water program	824	3.96	00:04:22	49.88%	29.25%
2.	(not provided)	546	2.91	00:02:56	63.00%	41.76%
3.	ccleanwater.org	255	3.35	00:03:54	69.41%	34.51%
4.	contra costa county clean water program	155	3.83	00:04:27	50.32%	27.10%
5.	www.ccleanwater.org	128	3.57	00:04:21	84.38%	37.50%
6.	cccwp	82	3.85	00:02:56	19.51%	29.27%
7.	contra costa clean water	78	3.23	00:02:45	57.69%	34.62%
8.	contra costa county stormwater c.3 guidebook	40	2.15	00:01:51	65.00%	65.00%
9.	construction brochure	33	1.15	00:00:15	96.97%	84.85%
10.	construction brochure templates	33	1.24	00:00:31	100.00%	84.85%

Campaign Overview

Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
4,145	1.36	00:00:28	88.97%	83.11%
% of Total: 34.40% (12,049)	Site Avg: 2.43 (-43.80%)	Site Avg: 00:02:05 (-77.53%)	Site Avg: 74.90% (18.79%)	Site Avg: 59.62% (39.40%)

Primary Dimension: Source/Medium Other

Plot Rows | Secondary dimension | Sort Type: Default | advanced

	Source/Medium	Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
1.	Facebook / FacebookiPadAd16	1,517	1.24	00:00:19	95.39%	84.38%
2.	Claycord.com / Tile	698	1.12	00:00:12	80.80%	91.55%
3.	Comcast.com / Square	435	1.39	00:00:36	95.17%	74.71%
4.	Contracostatimes.com / Square	323	2.27	00:02:03	68.42%	75.54%
5.	cbs.com / Square	311	2.05	00:00:38	81.67%	63.34%
6.	Facebook / FacebookAd26	208	1.16	00:00:19	91.83%	90.38%
7.	Facebook / FacebookAd27	193	1.05	00:00:01	97.93%	95.85%
8.	Facebook / FacebookAd2	164	1.29	00:00:16	93.90%	84.15%
9.	Facebook / FacebookAd1	137	1.22	00:00:18	91.24%	83.21%
10.	Facebook / FacebookAd7	79	1.06	00:00:12	94.94%	94.94%

Campaign Overview cont.

Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
4,145	1.36	00:00:28	88.97%	83.11%
% of Total: 34.40% (12,049)	Site Avg: 2.43 (-43.80%)	Site Avg: 00:02:05 (-77.53%)	Site Avg: 74.90% (18.79%)	Site Avg: 59.62% (39.40%)

Primary Dimension: Source/Medium Other

Plot Rows | Secondary dimension | Sort Type: Default | advanced

	Source/Medium	Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
11.	cbs.com / Leaderboard	24	1.67	00:00:26	79.17%	62.50%
12.	Facebook / FacebookAd23	23	1.22	00:00:11	95.65%	78.26%
13.	Facebook / FacebookAd24	11	1.91	00:02:41	0.00%	63.64%
14.	Facebook / FacebookSurveyAd11	10	1.10	00:00:01	80.00%	90.00%
15.	Claycord / Banner	5	1.20	00:00:06	80.00%	80.00%
16.	Facebook / FacebookAd10	1	1.00	00:00:00	0.00%	100.00%
17.	Facebook / FacebookSurveyAd12	1	1.00	00:00:00	0.00%	100.00%
18.	Facebook / FacebookSurveyAd13	1	1.00	00:00:00	0.00%	100.00%
19.	Facebook / FacebookSurveyAd14	1	1.00	00:00:00	0.00%	100.00%
20.	Facebook / FacebookSurveyAd15	1	1.00	00:00:00	0.00%	100.00%

All Traffic Sources

Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
12,049	2.43	00:02:05	74.90%	59.62%
% of Total: 100.00% (12,049)	Site Avg: 2.43 (0.00%)	Site Avg: 00:02:05 (0.00%)	Site Avg: 74.90% (0.00%)	Site Avg: 59.62% (0.00%)

Primary Dimension: Source/Medium Source Medium Other

Plot Rows | Secondary dimension | Sort Type: Default | advanced

	Source/Medium	Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
1.	google / organic	3,107	2.98	00:03:02	60.41%	44.35%
2.	(direct) / (none)	2,753	3.08	00:03:06	75.70%	49.22%
3.	Facebook / FacebookiPadAd16	1,517	1.24	00:00:19	95.39%	84.38%
4.	Claycord.com / Tile	701	1.12	00:00:12	80.46%	91.58%
5.	Comcast.com / Square	435	1.39	00:00:36	95.17%	74.71%
6.	yahoo / organic	338	3.17	00:03:29	59.17%	39.35%
7.	Contracostatimes.com / Square	323	2.27	00:02:03	68.42%	75.54%
8.	cbs.com / Square	311	2.05	00:00:38	81.67%	63.34%
9.	co.contra-costa.ca.us / referral	283	3.89	00:03:33	63.25%	30.39%
10.	bing / organic	273	3.54	00:03:16	54.21%	36.26%

All Traffic Sources cont.

Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
12,049	2.43	00:02:05	74.90%	59.62%
% of Total: 100.00% (12,049)	Site Avg: 2.43 (0.00%)	Site Avg: 00:02:05 (0.00%)	Site Avg: 74.90% (0.00%)	Site Avg: 59.62% (0.00%)

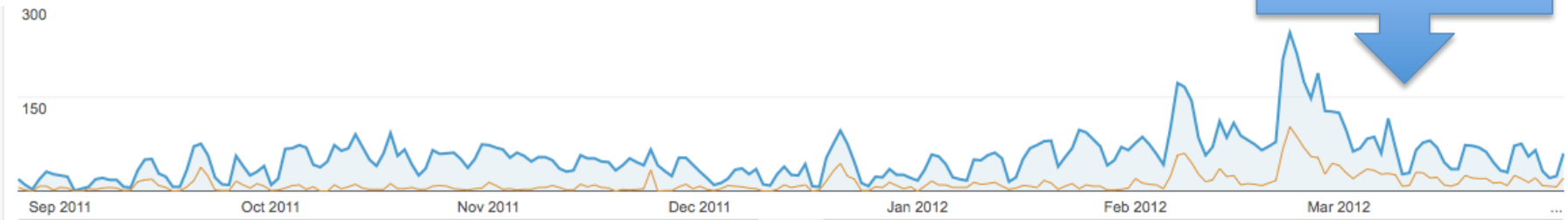
Primary Dimension: Source/Medium Source Medium Other

Plot Rows | Secondary dimension | Sort Type: Default | advanced

	Source/Medium	Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
11.	Facebook / FacebookAd26	208	1.16	00:00:19	91.83%	90.38%
12.	Facebook / FacebookAd27	193	1.05	00:00:01	97.93%	95.85%
13.	Facebook / FacebookAd2	164	1.29	00:00:16	93.90%	84.15%
14.	recroom.com / referral	149	1.52	00:00:44	82.55%	75.84%
15.	Facebook / FacebookAd1	137	1.22	00:00:18	91.24%	83.21%
16.	Facebook / FacebookAd7	79	1.06	00:00:12	94.94%	94.94%
17.	basmaa.org.dnnmax.com / referral	62	3.40	00:03:26	53.23%	22.58%
18.	sanfrancisco.cbslocal.com / referral	51	1.10	00:00:05	90.20%	94.12%
19.	video.sanfrancisco.cbslocal.com / referral	36	1.03	00:00:01	100.00%	97.22%
20.	eventbrite.com / referral	33	3.42	00:02:19	0.00%	36.36%

Direct Traffic vs. All Traffic

Orange line represents direct traffic, blue line represents ALL traffic



Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
12,049	2.43	00:02:05	74.90%	59.62%
% of Total: 100.00% (12,049)	Site Avg: 2.43 (0.00%)	Site Avg: 00:02:05 (0.00%)	Site Avg: 74.90% (0.00%)	Site Avg: 59.62% (0.00%)

Blue line represents all direct traffic

Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
2,753	3.08	00:03:06	75.70%	49.22%
% of Total: 22.85% (12,049)	Site Avg: 2.43 (27.02%)	Site Avg: 00:02:05 (48.31%)	Site Avg: 74.90% (1.06%)	Site Avg: 59.62% (-17.45%)

Primary Dimension: Source/Medium Other

Plot Rows | Secondary dimension | Sort Type: Default | advanced

	Source/Medium	Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
1.	(direct) / (none)	2,753	3.08	00:03:06	75.70%	49.22%

Direct Traffic – Top Landing Pages

	Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
Direct Traffic	**2,753** % of Total: **22.85%** (12,049)	**3.08** Site Avg: **2.43** (27.00%)	**00:03:06** Site Avg: **00:02:05** (48.31%)	**75.70%** Site Avg: **74.89%** (1.07%)	**49.22%** Site Avg: **59.62%** (-17.45%)

Primary Dimension: **Landing Page** Other

Plot Rows | Secondary dimension | Sort Type: Default | advanced

	Landing Page	Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
1.	/index.html	2,032	3.01	00:03:00	81.15%	47.05%
2.	/c3-guidebook.html	182	1.93	00:02:26	53.30%	64.84%
3.	/index_mob.html	118	2.85	00:02:24	88.14%	36.44%
4.	/c3.html	77	2.74	00:02:48	61.04%	32.47%
5.	/meetings.html	46	2.48	00:02:08	39.13%	65.22%
6.	/cccwp/index.html	35	1.89	00:03:37	51.43%	68.57%
7.	/car-wash.html	32	1.72	00:00:56	81.25%	68.75%
8.	/contact.php	30	1.40	00:01:06	50.00%	80.00%
9.	/clean-water-news.html	16	1.38	00:00:45	56.25%	81.25%
10.	/prevent-pollution.html	16	1.75	00:00:36	50.00%	75.00%

Direct Traffic – Top Landing Pages cont.

	Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
Direct Traffic	2,753 % of Total: 22.85% (12,049)	3.08 Site Avg: 2.43 (27.00%)	00:03:06 Site Avg: 00:02:05 (48.31%)	75.70% Site Avg: 74.89% (1.07%)	49.22% Site Avg: 59.62% (-17.45%)

Primary Dimension: Landing Page Other

Plot Rows | Secondary dimension | Sort Type: Default | advanced

	Landing Page	Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
11.	/staging/index.html	16	25.44	00:29:12	56.25%	43.75%
12.	/resident-faqs.html	15	2.80	00:02:12	73.33%	60.00%
13.	/materials.html	13	1.69	00:02:04	76.92%	61.54%
14.	/cccwp/trunk/index.html	9	6.00	00:06:53	66.67%	66.67%
15.	/construction-brochures.html	9	1.33	00:00:13	100.00%	77.78%
16.	/about.html	8	1.75	00:01:05	37.50%	50.00%
17.	/publications.html	8	1.88	00:01:58	75.00%	87.50%
18.	/city-contact-list.html	6	2.50	00:02:59	16.67%	0.00%
19.	/indexPROTO.html	6	3.83	00:10:24	0.00%	50.00%
20.	/business.html	5	3.80	00:03:12	20.00%	40.00%

Direct Traffic – Top Landing Pages cont.

	Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
Direct Traffic	2,753 % of Total: 22.85% (12,049)	3.08 Site Avg: 2.43 (27.00%)	00:03:06 Site Avg: 00:02:05 (48.31%)	75.70% Site Avg: 74.89% (1.07%)	49.22% Site Avg: 59.62% (-17.45%)

Primary Dimension: Landing Page Other

Plot Rows | Secondary dimension | Sort Type: Default | advanced

	Landing Page	Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
21.	/c3-workshops.html	5	1.40	00:00:03	80.00%	60.00%
22.	/links.html	5	1.20	00:01:09	100.00%	80.00%
23.	/_pdfs/index.html	4	2.75	00:01:00	100.00%	25.00%
24.	/c3-municipalities.html	4	3.75	00:02:01	75.00%	25.00%
25.	/members/index.html	4	3.25	00:02:54	0.00%	0.00%
26.	/permits.html	4	1.25	00:00:04	50.00%	75.00%
27.	/surveys-studies.html	4	2.75	00:10:58	25.00%	50.00%
28.	/watersheds.html	4	2.25	00:03:04	25.00%	25.00%
29.	/workshops.html	4	2.00	00:00:24	75.00%	75.00%
30.	/c3-water-boards.html	3	2.67	00:00:44	66.67%	66.67%

Direct Traffic – Top Landing Pages cont.

	Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
Direct Traffic	2,753 % of Total: 22.85% (12,049)	3.08 Site Avg: 2.43 (27.00%)	00:03:06 Site Avg: 00:02:05 (48.31%)	75.70% Site Avg: 74.89% (1.07%)	49.22% Site Avg: 59.62% (-17.45%)

Primary Dimension: Landing Page Other

Plot Rows | Secondary dimension | Sort Type: Default | advanced

	Landing Page	Visits	Pages/Visit	Avg. Visit Duration	% New Visits	Bounce Rate
31.	/school-programs.html	3	1.00	00:00:00	66.67%	100.00%
32.	/staging/index_mob.html	3	1.67	00:00:36	33.33%	66.67%
33.	/landscaping.html	2	2.00	00:09:33	50.00%	50.00%
34.	/recycle.html	2	1.00	00:00:00	100.00%	100.00%
35.	/sitemap.html	2	1.00	00:00:00	50.00%	100.00%
36.	/staging/household.html	2	34.00	00:23:02	0.00%	0.00%
37.	/staging/materials.html	2	44.50	00:44:01	50.00%	50.00%
38.	/automobile.html	1	11.00	00:01:47	0.00%	0.00%
39.	/budget-finance.html	1	1.00	00:00:00	0.00%	100.00%
40.	/c3-resources.html	1	3.00	00:01:09	0.00%	0.00%

Campaign Comparison

11/12 Campaign (Including initiative traffic)	**10/11 Campaign** (Excluding freebie traffic)	**09/10 Campaign**
– 12,049 visits – 9,315 unique visitors – 29,230 page views – 2.43 pages per visit – 59.62% bounce rate – 2.05 average time on site – 74.90% new visitors	– 8,757 visits – 6,823 unique visitors – 20,331 page views – 2.12 pages per visit – 51.22% bounce rate – 0.68 average time on site – 83.94% new visitors	– 19,869 visits – 16,540 unique visitors – 38,058 page views – 1.92 pages per visit – 75.52% bounce rate – 1.00 average time on site – 81.69% new visitors
Ad budget: $328,300	**Ad budget: $192,093.30**	**Ad budget: $304,976**

LITTER TRAVELS
CONTRA COSTA CLEAN WATER PROGRAM
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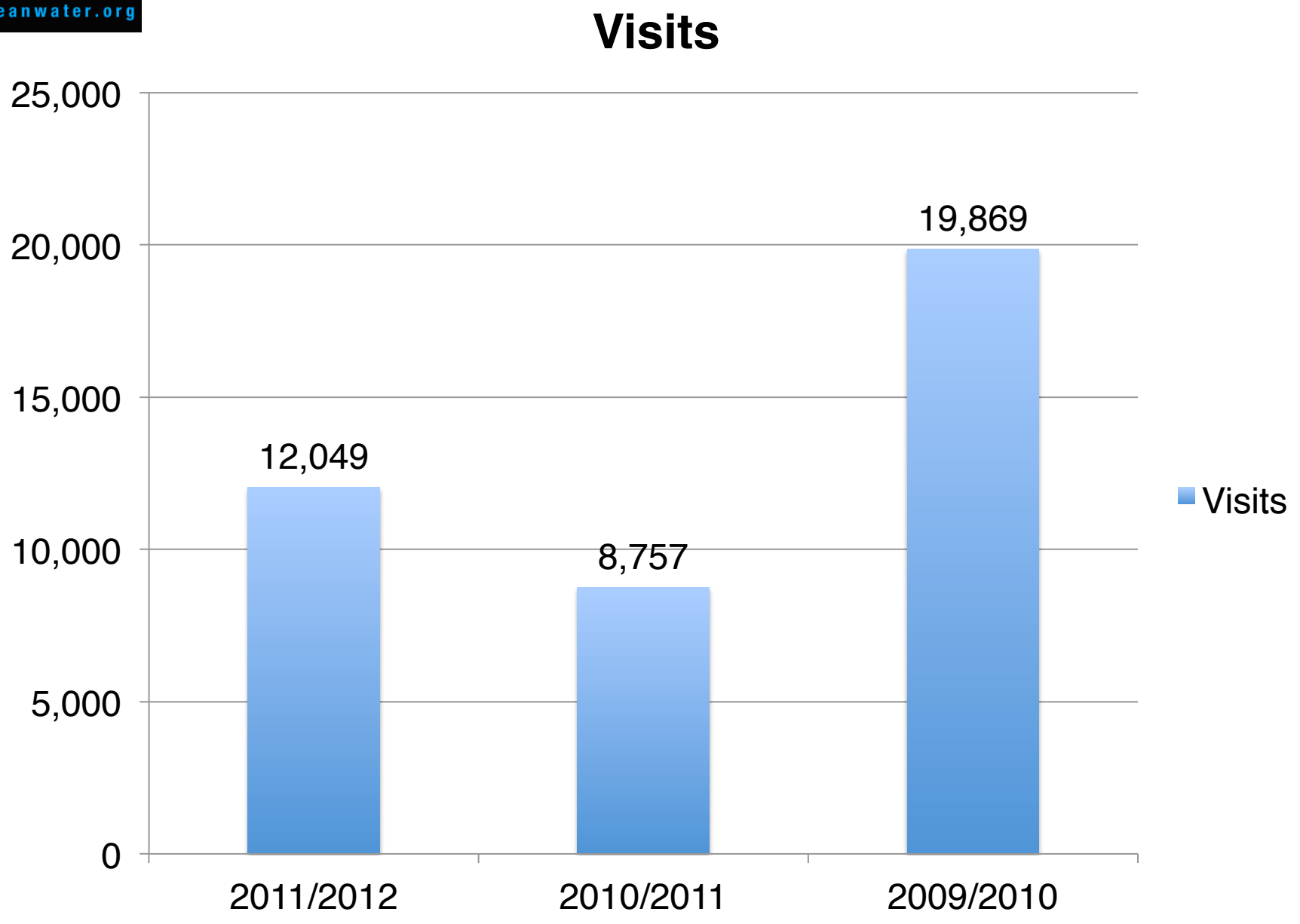

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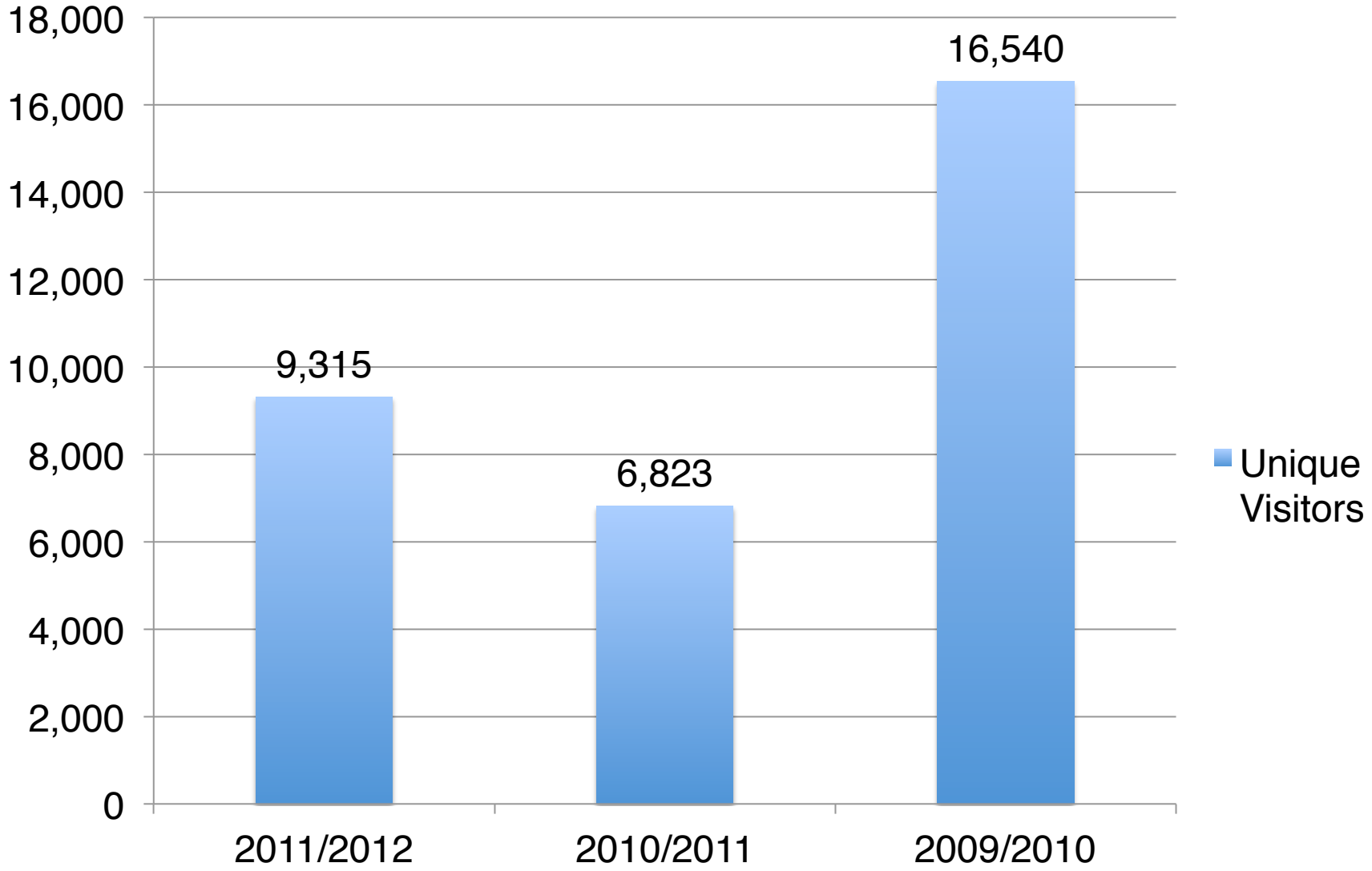
Unique Visitors



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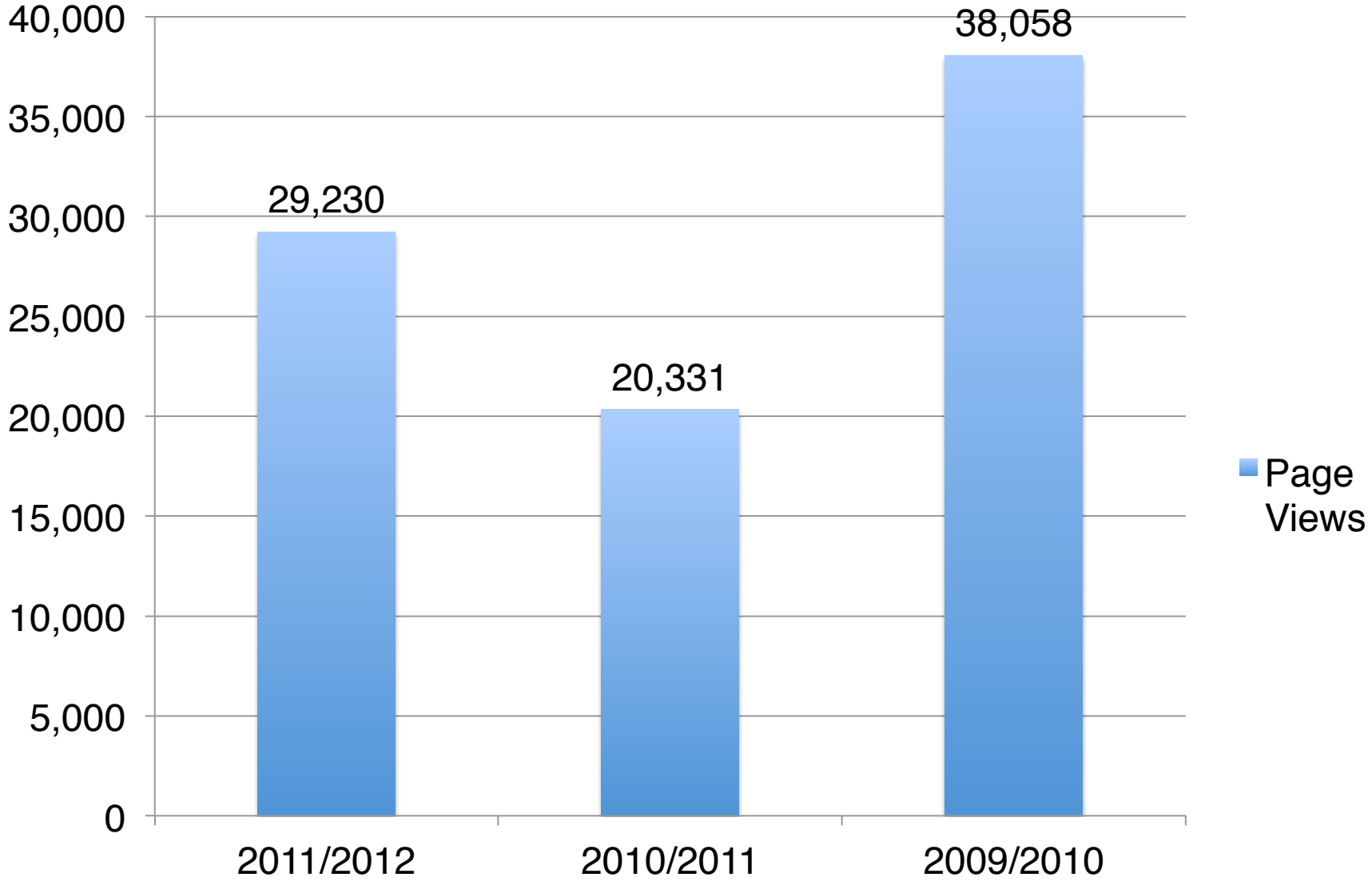

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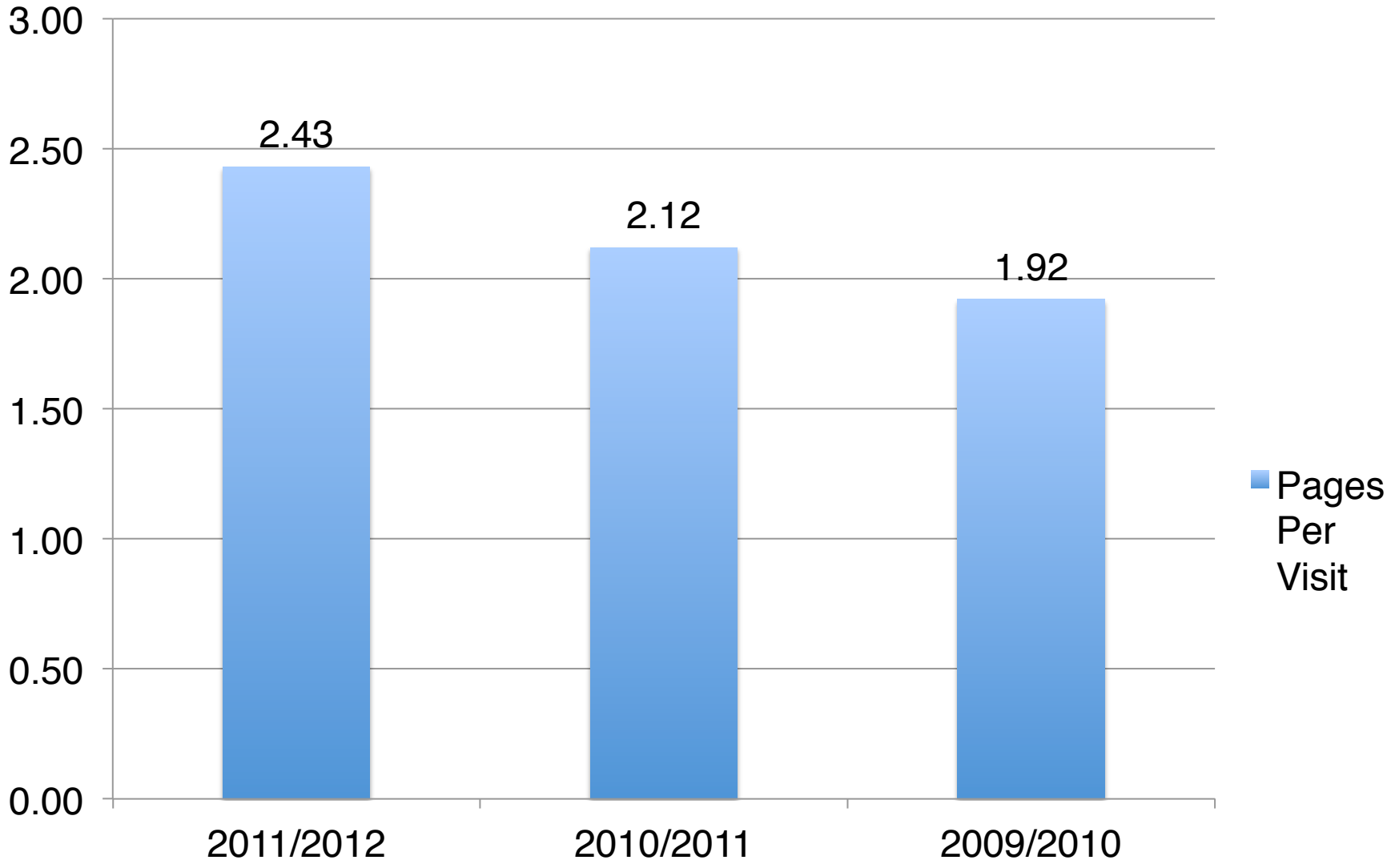
Pages Per Visit



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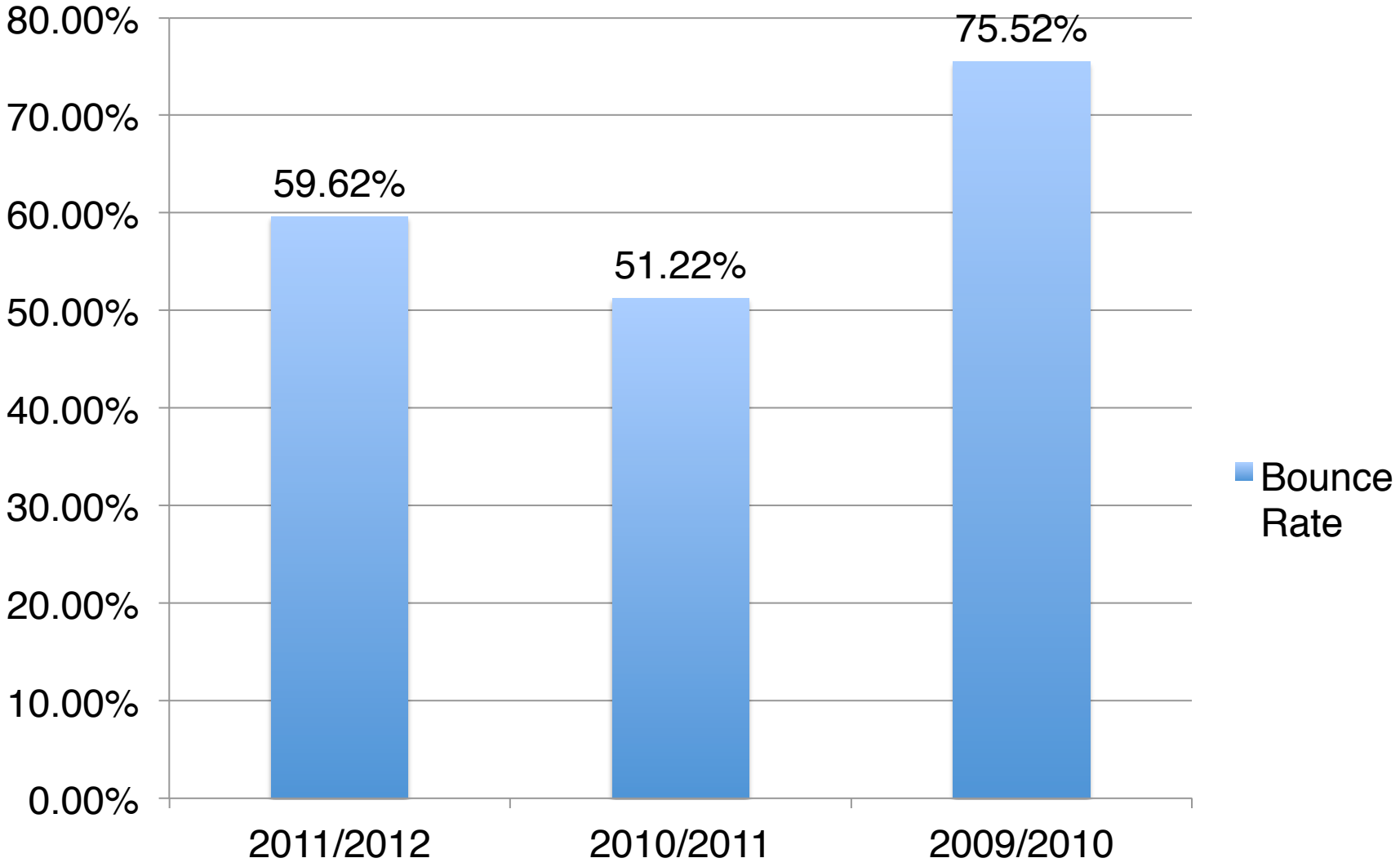
Bounce Rate



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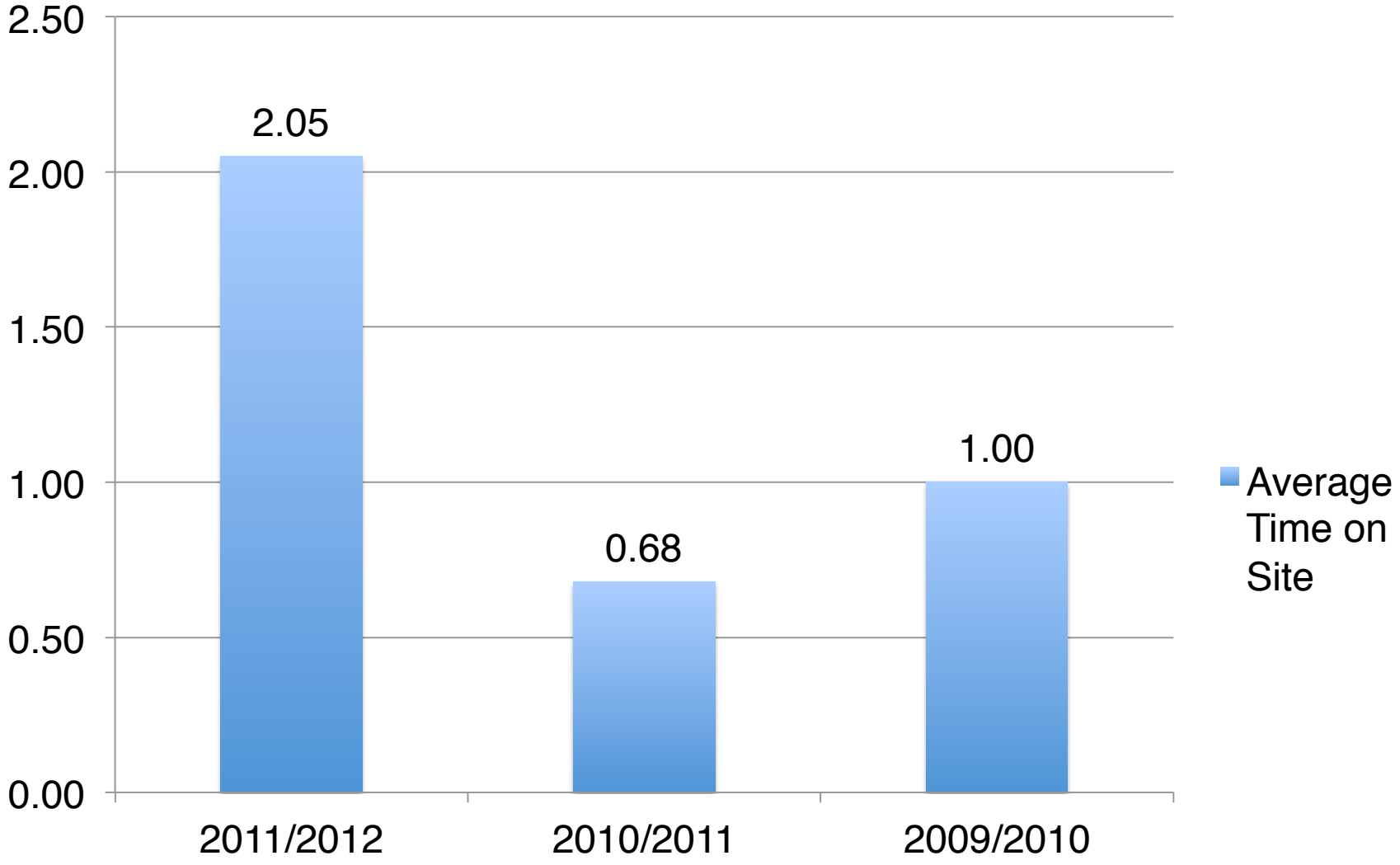
Average Time on Site



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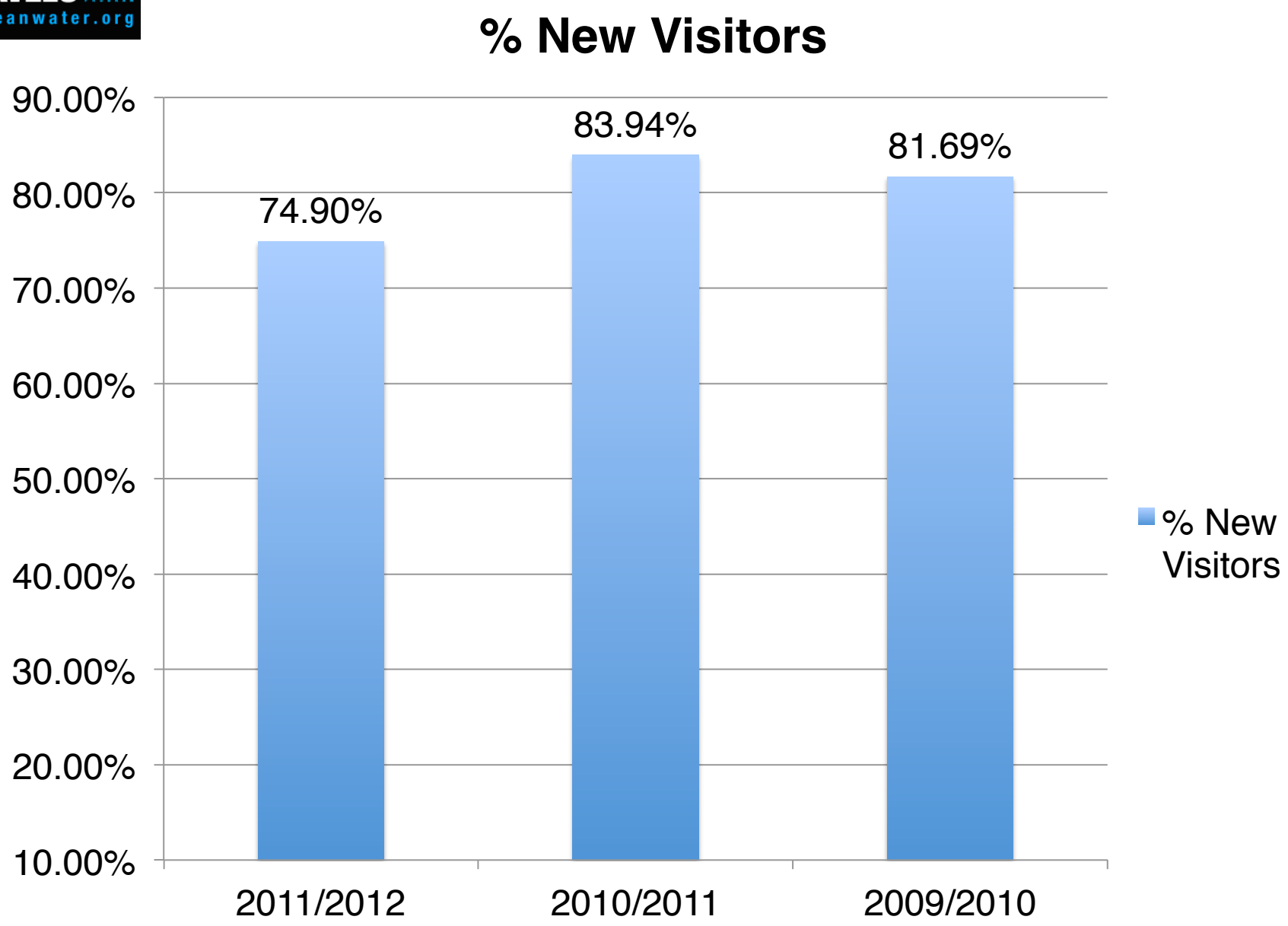

Bringing Back the Natives Garden Tour
Sunday May 6, 2012

Summary

- 41 gardens were showcased on the Tour
- 60 talks and demonstrations were given
- 200 volunteers made the tour possible
- there were 6,095 registrants
- $11,000 worth of natives sold through the Native Plant Sale Extravaganza
- 14,257 garden visits were made
- 744,000 page requests made on the garden tour website in the last year

What do you want to learn from the tour?	2012 Responses
How to select native plants	72%
How to reduce water use	51%
How to garden for wildlife	51%
How to reduce or eliminate pesticide use	30%
How to replace a lawn with a garden	30%
How to compost	19%

Information taken from evaluations
98% rated the tour "Excellent" or "Very Good."
62% were repeat visitors
38% were attending the tour for the first time

Behavior Change
75% of repeat registrants said they had changed their gardening practices because of their participation in the Bringing Back the Natives Garden Tour.

19% of respondents had incorporated natives into their gardens (thereby reducing herbicide use and conserving water)
17% were encouraging wildlife with plant choices
16% had grouped plants by water needs and incorporated drought-resistant plants into their gardens
14% had increased the density of plantings to out-compete weeds (reducing herbicide use and conserving water)
12% had begun mulching
10% were tolerating some insect damage
9% had amended their soil

8% had reduced the size of their lawn
7% had reduced pesticide use
6% had installed efficient irrigation
5% were composting
4% were grasscycling
4% had reduced the amount of hardscape in their gardens.

Repeat visitors were highly motivated to make changes in their gardens. When asked what they planned to do:
36% planned to increase the density of plantings to out-compete weeds
28% to group plants of similar water needs
21% to install efficient irrigation
20% to encourage wildlife
18% to reduce the size of their lawn
18% to incorporate native plants into their gardens
16% to amend their soil with compost
16% to minimize hardscapes
15% to tolerate some insect damage to plants
14% to mulch
10% to compost
8% to grasscycle
6% to reduce or eliminate pesticide use

First-time registrants
The tour was highly motivating to first time registrants.
45% planned to incorporate native plants into their gardens
44% responded that they planned to increase the density of plants, thus helping to outcompete weeds and reduce water use
40% planned to group plants by water needs
40% planned to incorporate drought-resistant plants into their gardens
39% planned to encourage wildlife
29% to reduce the size of their lawns
29% to install efficient irrigation
24% amend their soils
21% planned to mulch
22% planned to tolerate some plant damage
18% planned to reduce the amount of hardscape in their gardens
17% to compost
15% planned to reduce or eliminate pesticide use

Bringing Back the Natives Garden Tour

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San Pablo CA 94806
(510) 236-9558

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http://www.BringingBackTheNatives.net

Final Report

Why a Native Plant Garden Tour?
The spring 2012 Bringing Back the Natives Garden Tour was held in order to showcase pesticide-free, water-conserving gardens that reduce solid waste, provide habitat for wildlife, and contain 60% or more native plants.

The tour enlists local residents to demonstrate by example that seasoned and novice gardeners can garden with good results without the use of synthetic chemicals, and with minimal supplemental water, while providing food, shelter, and nesting areas for wildlife. Garden hosts show that it is possible to implement sustainable garden practices and still have beautiful places for people to relax in and enjoy. The goals of the Bringing Back the Natives Garden Tour are to motivate attendees to eliminate pesticide use, reduce water use, generate less solid waste, and provide habitat for wildlife in their own gardens.

Once established in the garden setting, California native plants need little or no summer water, surviving naturally with only fall-to-spring rainfall. In addition to being water-conserving, California natives are hardy; they do not require the use of pesticides and fertilizers, as many non-natives do. Native plants need less pruning than many non-natives, such as lawn, ivy, or cotoneaster, thus generating less green waste. Natives also provide the best habitat for birds, butterflies, beneficial insects, and other forms of wildlife.

A four-year study of water use, green waste generation, maintenance hours, and maintenance labor costs between a traditional garden and a California native plant garden was conducted by the City of Santa Monica. (See http://www.smgov.net/Departments/OSE/Categories/Landscape/Garden-Garden.aspx). The results of this study showed that the native garden used one tenth of the water that the traditional garden did; generated less than 40% of the green waste; took 20% of the time to maintain; and cost 75% less to maintain than the traditional garden.

Bringing Back the Natives Garden Tour gardens contain minimal or no lawn. This is of particular value since the majority of the chemicals purchased by homeowners support lawn care, and the majority of water used in home gardens is applied to lawns. According to the 2000 U.S. Fish and Wildlife Service's Division of Environmental Contaminants publication, "Homeowner's Guide to Protecting Frogs—Lawn and Garden Care," homeowners use up to 10 times more chemical pesticides per acre on their lawns than farmers use on crops. In

addition, half of the water used by the average household is applied to the landscape—with most of that water being applied to keep turf green. Only 5 of the gardens included on the tour had any lawn at all, and these were reduced in size to 10% to 20% of the gardened area.

2012 Bringing Back the Natives Garden Tour
The Eighth Annual Bringing Back the Natives Garden Tour, which took place on Sunday, May 6, 2012, showcased forty one gardens located in seventeen cities and unincorporated areas in Alameda and Contra Costa counties (Alameda, Albany, Antioch, Berkeley, Castro Valley, Concord, El Cerrito, El Sobrante, Fremont, Hayward, Lafayette, Livermore, Martinez, Moraga, Oakland, Orinda, Pittsburg, Pleasanton, Richmond, San Leandro, San Lorenzo, San Ramon, and Walnut Creek). Unfortunately, the side-by-side gardens in Kensington, owned by a mother and her son, had to withdraw from the Tour at the last minute, due to family illness.)

A variety of gardens were featured on the tour. The gardens ranged from Al Kyte's 40 year old wildlife habitat garden to a number of gardens that had been recently installed, and from a five acre lot in the hills to small front gardens in the flats. Tour gardens contained everything from local native plants to the horticulturally available suite of natives from throughout California. A third of the gardens were designed and installed by owners, and the rest were designed and installed by professionals. Ninety percent of the gardens were landscaped with between 70% to 100% native plants. A third of the gardens on this year's tour were offered by former registrants who had attended a previous Bringing Back the Natives Garden Tour and become inspired to transform their own garden.

Native Plant Sale Extravaganza
In additional to the May 6 tour day, on which forty one gardens were open for viewing, the Native Plant Sale Extravaganza took place throughout the week-end of May 5 and 6.

During the Native Plant Sale Extravaganza a number of native plant nurseries—some not normally open to the public, and others open only for limited hours—were open from 10:00–5:00. Bringing Back the Natives Garden Tour registrants took advantage of this opportunity to shop for unique or hard-to-find native plants that are not normally available in most nurseries. This year nine nurseries took part in the Extravaganza, selling natives at eleven locations on the day of the Tour. Nearly $11,000 worth of natives were sold over the course of the week-end.

Number of registrants, volunteers, and garden visits
The tour received overwhelming interest from the public; this year there were 6,095 registrants. The bulk of the registrants (5,744) registered for the tour in advance, and on-line. On the day of the tour an additional 351 people visited the same day walk-in registration sites, which were set up in Berkeley, Castro Valley, Concord, El Cerrito, Livermore, Moraga, Oakland, and Richmond.

This year 14,257 garden visits were made on the day of the tour. See the end of this report for a list of the number of visitors counted at each garden.

Nearly 200 volunteers either worked at gardens for a half-day shift on the day of the tour, or helped with tour preparation and clean-up, contributing more than 800 hours of time to the tour. The 41 hosts put in countless hours preparing for the tour, and more than 300 hours on the day of the event.

Garden Talks
More than 60 garden talks and demonstrations were given throughout the day on a plethora of subjects. Talk topics included how to: remove a lawn; select, plant, and care for natives in general, and select natives for specific areas; design a simple, low-maintenance native plant garden; how to attract bees; improve soil so as to have a healthier garden; choose appropriate natives; design and install a native plant garden; create a low-maintenance native plant garden; control weeds without using herbicides; water efficiently; maintain a native plant garden; design a native hillside garden; design and install a native garden yourself; garden for wildlife in general, and native bees and butterflies in particular; and how to control erosion, among other topics.

The website
The website, http://www.BringingBackTheNatives.net, was extremely popular, receiving nearly 750,000 page requests over the course of the year.

The website contains numerous photographs of all of the gardens that have ever been on the tour (information on prior tours remains accessible on the website for reference), extensive garden descriptions, plant lists for each garden, and some garden-specific bird, butterfly, mammal, reptile, and amphibian lists, as well as resource information on how to garden with California natives. The resource information includes contact information for landscaper designers with gardens on the tour, a list of Easy-to-Grow East Bay Natives, lists of nurseries that carry native plants, lists of reference books, "How I got started gardening with native plants" essays by several of the host gardeners, and more.

In order to attract hosts and volunteers, and to thank them for their time, four Garden Soirees—free, private tours of native plant gardens—were held in 2012. Garden Soirees offer host gardeners and volunteers the opportunity to see tour gardens that they would otherwise miss. They also create a feeling of camaraderie between hosts and volunteers, and provide a venue for people who are both knowledgeable and passionate about gardening with natives to meet and exchange information.

Misc. details
Thirty one of the gardens were at least partially wheelchair accessible. Sixteen of the gardens were certified by the National Wildlife Federation as Backyard Wildlife Habitat Gardens.

Tour Partnerships
The Bringing Back the Natives Garden Tour created partnerships with a variety of organizations that share common values—that chemical-free and water conserving gardening preserves water quality and quantity, and creates wildlife habitat. The list of major sponsors and supporters of this year's tour includes a flood control district, two county stormwater programs, three water districts, four cities and an unincorporated area, and a private foundation. The list of tour sponsors is provided below.

Sponsors of the 2012 tour

$15,000
Alameda County Flood Control and Water Conservation District

$10,000
Contra Costa Clean Water Program

$4,000
Contra Costa Water District

$3,000
Contra Costa Watershed Program

$2,800
JiJi Foundation

$2,500
County Clean Water Program (Alameda)

$2,000
Bay Area Water Supply and Conservation Agency
California Native Plant Society (East Bay Chapter)
City of Richmond

$1,500
City of El Cerrito

$1,000
City of Antioch
City of Pittsburg
Zone 7 Water Agency

Host Gardeners
The gardens selected to take part in the tour are chemical-free and water-conserving landscapes that provide habitat for wildlife. Hosts were chosen because of their willingness to be on site on the day of the tour to explain first-hand the techniques they use in their gardens, and their enthusiasm for, and

commitment to, educating others about how to garden in environmentally sensitive ways.

Host gardener recruitment began in the spring of 2011 for the 2012 tour. Potential candidates completed an application, and applicants who met the criteria received a site visit. Host criteria were as follows:

- Gardener must reside in Alameda or Contra Costa County.
- Gardener must use organic and/or natural techniques for pest control rather than synthetic pesticides.
- Garden must demonstrate water conservation techniques. Examples include mulches, groundcover plants, drip or soaker hose irrigation, and the use of plants that do not require excessive watering during the dry part of the growing season.
- Gardener must be a good ambassador for chemical-free, water-conserving gardening: enjoy educating the public; and have the knowledge base to employ natural gardening techniques and share this information with the public.
- Garden must provide food, shelter and nesting areas for wildlife.
- Garden must contain 60% or more California native plants.
- No invasive plants are found in the garden.

Host's gardening experience ranged from native plant novices to professional landscape designers. All of the host gardeners were good ambassadors for natural gardening techniques.

Host Comments from the 2012 evaluations:

- Things were so on track and organized—thank you. The tour guide was *really* well done, the raise in attendance is impressive and it's heart-warming to see the increase of mainstream people who are interested in natives and natural gardening. Your recommendation to create and display a poster make a critical difference. Everyone looked at it. LOTS of people wanted to know about sheet mulching. We had so many enjoyable interactions with people of all ages. The scheduling of the talks worked very well (11:00 & 12:00, and 2:00 & 3:00), and so did the two talk topics "How to convert your lawn into a native garden" and "How to convert your lawn into a native meadow". It was as festive as a garden party. The friendliness and quality of attendees was terrific. They were curious and on the tour to learn about their particular interests. There were many more Livermore attendees this year than in 2010, too. Great local people. We had great weather and even though color peaked the week before in Livermore, there was enough of it, and the garden looked charming.
- We had about 200 people in attendance. The students sold $500 worth of native plants from our nursery. We've never done anything like that before. It was a wonderful experience for the students and visitors. We

were told all day how great the students were in the tours that they gave, and how much visitors learned. We want to do this every year if possible. It was thrilling.

Alan Fishman, San Lorenzo High School teacher

- The Bringing Back the Natives Garden tour is educational and inspirational for thousands of people. It's just right.
- It was a great day, we had a lot of visitors.....all very happy!
- Kudos, thanks, and praise to Kathy Kramer for all she does to keep the Native Garden Tour going. She's providing a great service to help people learn about native plants and their use in gardens.
- This is what I heard from tour visitors: "Makes me resolved to kill my lawn - to just go do it!" "I plan to be on the tour in two years." The water sources for birds are so cool." The garden looks beautiful with all those flowers in bloom." And, "I really like this kind of garden; it's what I want."
- Thank you for organizing this tour. So many people are interested in this kind of gardening but just don't know where to start. It's very inspirational!

Volunteer Comments from the 2012 evaluations:

- The garden I volunteered at was great - lots of native plants and all of them were labeled. The owner was very helpful and friendly - even inviting visitors back in a few months to see the some plants that were not yet in bloom. Her rainwater barrels were a great idea and she had information to share regarding how it was done. She had costs posted for converting her front yard to native plants and other useful info.

- I enjoyed the enthusiasm of the garden owner, fellow volunteers, and garden visitors.

- I've learned a great deal about plants in the two years I've volunteered.

- Welcoming people to the garden was very rewarding. I enjoyed helping my host set up and place the plant labels. We had perfect weather and I was in the shade! I enjoyed seeing the joy and wonder on the faces of the visitors. The host was extremely knowledgeable and quite willing to share her expertise. I've learned much from her.

- Many people who came to our site are planning to get rid of their grass, so the tour provided a great resource and encouragement for them.

- It was an honor to participate in the Tour. Thank you.

- I really admire how effectively planned and run the event is each year. It's wonderful and fun to be a part of each tour.

Tour Survey and Evaluation
Two surveys were offered to the tour's pre-registered participants. The first was available as part of the registration process. Below are some statistics taken from this survey.

The 2012 tour attendees were highly motivated to learn new gardening techniques. When asked what they would like to learn from the tour the majority of respondents (72%) wanted to learn how to select native plants; 51% wanted to learn how to conserve water; 51% wanted to learn how to garden for wildlife; 30% percent wanted to learn how to reduce pesticide use; 30% wanted to learn how to remove their lawns; and 19% wished to learn about composting.

What do you want to learn from the tour?	2012 Responses
How to select native plants	72%
How to reduce water use	51%
How to garden for wildlife	51%
How to reduce or eliminate pesticide use	30%
How to replace a lawn with a garden	30%
How to compost	19%

Evaluations
There was a return of 664 participant evaluations.

98% of those filling out the evaluations rated the tour "Excellent" or "Very Good."

This year 62% of the registrants were repeat visitors, and 38% were attending the tour for the first time.

Motivation and Behavior Change
The registrant evaluations were split up into two groups—those who had attended the tour before, and those who had not. The data for Repeat Registrants and First-Time Registrants was tabulated separately. Both of these categories are discussed below.

Repeat Registrants
75% of registrants who had attended a previous Bringing Back the Natives Garden Tour, and who filled out the evaluation form, said they had changed their gardening practices because of their participation in the Bringing Back the Natives Garden Tour.

The first column below shows the percentages of the repeat registrants who changed their gardening behaviors after attending the Bringing Back the Natives Garden Tour. The second column shows the percentage of repeat registrants who plan to change their gardening behaviors.

Evaluations of repeat registrants from the 2012 tour showed that after attending a prior Bringing Back the Natives Garden Tour: 19% of respondents had incorporated natives into their gardens (thereby reducing herbicide use and conserving water); 17% were encouraging wildlife with plant choices; 16% had grouped plants by water needs and incorporated drought-resistant plants into their gardens; 14% had increased the density of plantings to out-compete weeds (reducing herbicide use and conserving water); 10% were tolerating some insect damage; 12% had begun mulching; 9% had amended their soil; 8% had reduced the size of their lawn; 7% had reduced or eliminated pesticide use; 6% had installed efficient irrigation; 4% were grasscycling; 5% were composting; and 4% had reduced the amount of hardscape in their gardens.

Repeat visitors were highly motivated to make changes in their gardens. When asked what they planned to do: 36% planned to increase the density of plantings to out-compete weeds; 28% to group plants of similar water needs; 21% to install efficient irrigation; 20% to encourage wildlife; 18% to reduce the size of their lawn; 18% to incorporate native plants into their gardens; 14% to mulch; 9% to minimize hardscapes; 10% to compost; 16% to amend their soil with compost; 15% to tolerate some insect damage to plants; 8% to grasscycle; and 6% to reduce or eliminate pesticide use.

How do you manage your garden? (This information was taken from evaluations filled out by repeat registrants.)

ITEM	Began after participation in a previous BBTN Tour	Plan to do this
1. Reduce/eliminate insecticide/ herbicide use.	7%	6%
2. Increase the density of plantings to out-compete weeds.	14%	36%
3. Encourage birds, butterflies, etc. with plant choices, food, shelter, and water.	17%	20%
4. Tolerate some insect damage to plants.	10%	15%
5. Incorporate native plants into our garden.	19%	18%
6. Group plants of similar water		

needs.	16%	28%
7. Incorporate drought-resistant plants into our garden.	13%	14%
8. Install efficient irrigation (such as drip, timers, soaker hoses).	6%	21%
9. Grasscycle (leave grass clippings on the lawn).	4%	8%
10. Reduce the size of our lawn.	8%	18%
11. Mulch with leaves, grass, wood chips, etc.	12%	14%
12. Amend soil with compost.	9%	16%
13. Minimize hardscapes (patios, decks).	4%	9%
14. Compost yard waste and kitchen scraps at home.	5%	10%

First-time registrants
The tour was highly motivating to the first time registrants who completed the evaluation. 45% planned to incorporate native plants into their gardens; 44% of first-time registrants responded that they planned to increase the density of plants, thus helping to out-compete weeds and reduce water use; 40% of first time registrants planned to group plants by water needs; 39%planned to encourage wildlife; 40% planned to incorporate drought-resistant plants into their gardens; 29% planned to reduce the size of their lawns; 27% to install efficient irrigation; 21% planned to mulch; and 24% to amend their soils; 19% to compost kitchen scraps and yard waste; 17% planned to tolerate some insect damage; 15% planned to reduce or eliminate pesticide use; and 18% planned to reduce the amount of hardscape in their gardens.

How do you manage your garden? (These are responses from first-time registrants.)

ITEM	Plan to
1. Reduce/eliminate insecticide/herbicide use.	15
2. Increase the density of plantings to out-compete weeds.	44
3. Encourage birds, butterflies, etc. with plant	39

choices, food, shelter, and water.	
4. Tolerate some insect damage to plants.	17
5. Incorporate native plants into our garden.	45
6. Group plants of similar water needs.	40
7. Incorporate drought-resistant plants into our garden.	40
8. Install efficient irrigation (such as drip, timers, soaker hoses).	27
9. Grasscycle (leave grass clippings on the lawn).	7
10. Reduce the size of our lawn.	29
11. Mulch with leaves, grass, wood chips, etc.	21
12. Amend soil with compost.	24
13. Minimize hardscapes (patios, decks).	18
14. Compost yard waste and kitchen scraps at home.	19

Number of visitors at each garden, and total number of garden visits made

	# AM visitors	# PM visitors	Total Visitors
BAYSIDE CITIES			
Alameda			
Michelle Minor and Milt Friedman	62	72	134
Albany			
Noel Plummer	177	158	335
Leslie Zander	167	213	380
Berkeley			
California Native Bee Garden			402
Naomi Janowitz	162	227	389
Mardi and Jeff Mertens	152	227	379
Glen Schneider	236	293	529
Castro Valley			
Mary Ashby and Bob Beggs	163	172	335
Mary Cooper	108	124	232
Cindy Simons	103	134	237
El Cerrito			
Donna Bodine	155	146	301
Nalani and Anna Heath-Delaney	247	208	455

El Sobrante			
Karen Anderson	72	40	112
John Conry	65	69	134
Hayward			
Christine Wiseman	161	123	284
Kensington			
Paul, Cecile, and Harold Weaver			0
Oakland			
Janette Bachmann and Mary Pellerin	204	194	408
Joanna and Andrew Katz	267	268	535
Alan Harper and Carol Baird	304	320	624
Rita Hurault	168	144	312
Holly and Joe Maffei	313	264	577
Dan Rademacher and Tamara Schwarz	184	178	362
Richmond/Point Richmond			
Rick and Monica Alatorre			180
Rollin and Pam Coville	109	141	250
Joan Underwood	128	158	286
San Leandro			
Gerry and Howard Isham	68	84	152
San Lorenzo			
San Lorenzo High School			200
INLAND CITIES			
Antioch			
Valerie and Harry Thurston	48	20	68
Concord			
Judith Sherwood	208	207	415
Laura Spain	152	167	319
Lafayette			
Claire and William Gilbert	306	423	729
Mary Jennings and Michael Jennings	303	305	608

Livermore			
Cindy and David Angers	152	99	251
Christine and Tim Boczanowski	151	152	303
Elise and Mike McFarland			292
Louann Tung	180	129	309
Moraga			
Al Kyte	259	194	453
Orinda			
Elizabeth O'Shea and Richard Howard	301	315	616
Pleasanton			
Ward and Pat Belding	153	173	326
Colleen Clark	153	173	326
San Ramon			
Diane Griffiths	112	72	184
Walnut Creek			
Erik and Shellie Jacobson	263	271	534
TOTAL	6516	6657	14,257*

* The number of morning and afternoon visits does not equal the number of total visits, as some gardens reported only total visits; not the breakdown.

When planning for a year, plant corn. When planning for a decade, plant trees.

When planning for life, train and educate people.
(Chinese proverb)

Below are comments from garden tour attendees, either taken from registrant evaluation forms, or received via e-mail.

- This is an exceptional event that has convinced me to change my planting and gardening habits. I am on the slow course of change, but most importantly, my thinking has changed. I am very appreciative of you and all the volunteers who make this event possible.

- We got lots of good ideas...and we're definitely looking for them. This is the year we finally do the front yard, which has degraded. We want less grass (won't eliminate, but may go with native mowable) and are looking at

designers using the resources on your site. Thanks so much for organizing such a great event!

- I like the focus on bringing more native California plants back, getting away from lawns, and using less water.

- Very well organized. Nice variety of gardens. Enthusiastic owners and guides. Overall very educational and pleasurable experience.

- Great job. Thanks to everyone! Love the web site too, especially the numerous sources for landscape designers and plants.

- It was delightful.

- I'm totally inspired & hope to have my garden in order, perhaps for the 2014 tour.

- I hope to put mine on the tour in the future!

- Every garden I visited exceeded my expectations, and the hosts were very pleased to answer questions. I really appreciate their willingness to share their gardens!

- This tour was very well organized! The communication was excellent! People were friendly and enthusiastic.

- This year I invited our friends to have breakfast and then we carpooled around to view the gardens. It was a fun event I plan to do now each year.
- I'm just so impressed with the brochure, coupled with on-line information (i.e. plant lists), and the enthusiasm of all the volunteers.

- We'd love to see how some of the more recent gardens will look in another year - as plants grow into the areas planted. Thank you for putting this together! Both our neighbors & my husband & I truly enjoyed the tour & cannot wait to do it again next year.

- I look forward to the tour every year and invite new friends to join me. Thanks for the wonderful day and all your hard work to make it such an educational and fun event.

- I have been looking at the pictures on your website for over a year, and it has given me hope and ideas for my own native garden (which I will be starting from scratch, once the blackberries and ivy have been clipped into submission). I am so grateful to have had the opportunity to look at such beautiful gardens today! Thank you for organizing this wonderful event!

- I love that you have plant lists for the gardens on-line and that the garden descriptions list what designers/nurseries may have been used. I love that you can buy plants at some gardens & that some gardens have talks.

- I like the variety of gardens: sizes, professionally done, done by homeowners, new gardens, old gardens. It's also nice to have access to the person who owns or installed the garden during the tour.

- Each of the gardens I visited had something wonderful to offer. Seeing the natives in domesticated habitats was inspiring, and the printed guide was excellent. This was my first tour and I look forward to next years' event!

- I love this tour because I get so many good ideas that I can use in my garden. On this tour I learned that I can replace my grass with one that uses 50% less water.

- This was my 3rd tour and each time I've attended with someone new (who is always impressed).

- I love your tour; it's helpful, inspiring and fun. Thank you for doing this year after year.

- I have been attending the Natives Tour for the past 3 years I believe, and it is now my favorite tour. I really enjoy learning about ways to utilize more natives in my planting, and natives and drought tolerant are ALL I plant now. The volunteers you have are friendly and helpful, and the home owners and gardeners in the respective gardens are GREAT resources.

- Very friendly staff/volunteers at each of the sites we visited. Each one made themselves very accessible.

- I'm grateful for this opportunity to visit native gardens and learn more.

- You did a terrific job organizing the tour! The tour booklet is a masterpiece of well-organized and useful information.

- The booklet was fantastic.

- Seeing the various gardens and the types of plants used, and how they look/bloom/space taken, has really inspired me to further develop my proposed plant list for future plantings. The native plant sales were a wonderful bonus! This is such an inspirational tour, I continue my push to make my yard more and more native. I only allow food and natives, and I got some great ideas from this tour. Keep up the good work!

- The tour is an inspiration and an affirmation to those committed to low water use, and gardening with native plants. Thanks for maintaining this tradition, which has become an annual event for me and friends.

- We learned something new from each and every one of the gardens we visited.

- Every garden we visited had some aspect that stood out to us and was worth doing in our own yards.
- Every garden I visited exceeded my expectations and the hosts were very pleased to answer questions. I really appreciate their willingness to share their gardens!
- Overall the tour is great--so many friendly people and people willing to share anything that will help someone just starting out to renovate a large yard. Just seeing the amazing variety of native plants used throughout all the gardens is inspiring!

- We enjoyed the Native Bee garden in Berkeley. A research assistant got us excited about how many native bees there were and what plants they liked. We'll definitely come back to that one next year. Who knew some bees lived singly in the ground? I was astonished. And I did not know native bees preferred native plants. Well, now I do, and I will definitely be planting natives!

- I think the tour is very organized. The booklet that arrived ahead of time was very helpful in planning our tour and during the tour. I will use the resources listed in the booklet (designers, nurseries) in the future.

- The tour reinforced my plan to go native as much as possible. It helped to see completed gardens instead of just imagining them. People were very friendly and helpful.

- I truly enjoyed the tour overall, and the gardens I was able to see. The book you sent in the mail allowed me to plan out my stops in advance, and to visit the gardens that were similar to mine. I was very impressed with the entire experience!!! Thank you!

- We were glad to have well informed people to talk to and we plan to use a lot more natives.

Contra Costa Monitoring and Assessment Program

Summary of Benthic Macroinvertebrate Bioassessment Results (2011)

Prepared for:
Contra Costa Clean Water Program
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FINAL July 17, 2012

Preface and Acknowledgements

Many volunteers have assisted in collecting the bioassessment data described in this report.
In 2011, participating groups included:

- Friends of the Alhambra Creek Watershed
- Friends of Marsh Creek
- San Pablo Watershed Neighbors Education and Restoration Society (SPAWNERS)
- Friends of Orinda Creek
- Friends of the Creeks
- Friends of Five Creeks
- Friends of Mt. Diablo Creek Watershed
- Friends of Pinole Creek Watershed
- Students from Los Medanos College

The Volunteer Creek Monitoring Program is jointly managed by the Contra Costa County Department of Conservation and Development and the Contra Costa Clean Water Program.
Program guidance and input have been provided by the Contra Costa Volunteer Monitoring Advisory Committee and by members of the Contra Costa Clean Water Program's Monitoring Committee.

This report is based on the "Preliminary Assessment of Aquatic Life Use Condition in Contra Costa Creeks; Summary of Benthic Macroinvertebrate Bioassessment Results (2001-2006)", dated June 22, 2007, prepared for the Contra Costa Clean Water Program by Chris Sommers and others at Eisenberg, Olivieri, and Associates (EOA) of Oakland, CA. Some of the content of that report, including background and information related to the development of the preliminary Contra Costa County Benthic Index of Biotic Integrity (B-IBI), is included herein.

The assessments described and results presented in this report should be considered preliminary and non-regulatory in nature. Results are based on limited data analyses and may be revised in the future as new analytical tools are developed.

Recording notes in W Fork Grayson Creek, May 2011

Title page photo: Samplers in Kirker Creek, April 2011

Executive Summary

The Contra Costa Monitoring and Assessment Program (CCMAP) has monitored fresh water benthic macroinvertebrate (BMI) communities as the lead indicator of the condition of aquatic life uses in Contra Costa County water bodies since 2001. Volunteer monitors began to assist the Contra Costa Clean Water Program (Program) in conducting bioassessments in 2005, and the Contra Costa Volunteer Creek Monitoring Program took over primary responsibility for the collection of bioassessment data in 2007.

BMIs are composed primarily of insect larvae, mollusks, and worms. BMIs are an essential link in the aquatic food web, providing food for fish and consuming algae and aquatic vegetation. These organisms are also sensitive to disturbances in water and sediment chemistry and physical habitat, both in the stream channel and along the riparian zone. They are considered to be useful as integrative indicators of in-stream biotic health.

During the 11-year period, 2001-2011, CCMAP bioassessment monitoring was performed at over 140 sites, representing 20 of the 29 major watersheds in Contra Costa County, with over 400 samples analyzed for benthic macroinvertebrate (BMI) community composition.

In 2011, monitoring was performed at 12 creek sampling stations, within eight watersheds in Contra Costa County. To provide a measurement of Aquatic Life Use condition at these stations, a preliminary Benthic Index of Biotic Integrity (B-IBI) score was calculated for each station. The B-IBI score is based on a set of metrics computed from the raw BMI taxonomic data, according to the approach developed previously for creeks in Contra Costa County. The B-IBI scores were then attributed to aquatic life use condition categories (poor, marginal, fair, good, or very good), based on a standardized grading system that assigns specific ranges of B-IBI scores to the categories.

Because only eight identified benthic macroinvertebrates were tallied for the SPA070 site (San Pablo Creek), a B-IBI score was not calculated for this site. Based on the B-IBI scores calculated from the other 11 bioassessment stations, the majority of creek stations sampled in Contra Costa County scored in the good (four stations) or fair (five stations) categories, with one site each scoring in the very good and poor categories. Because of the relatively low number of sites monitored, the 2011 results cannot be reliably extrapolated as being more broadly representative of Contra Costa County watersheds.

New Zealand mudsnails (*Potamopyrgus antipodarum*) were present at the WAL050 site (Grayson Creek) in 2011, and dominated the BMI assemblage at that site, with 54% of the individuals identified.

BMI community composition and the resulting B-IBI scores vary both spatially throughout Contra Costa County (due to differences in geographical factors, including land use, underlying geology, and topography) and temporally (due particularly to annual and seasonal differences in climate and weather, especially hydrological factors). Analysis was performed to assess both temporal and spatial variation in B-IBI scores over the 11-year period of bioassessment monitoring.

Annual variability in average IBI scores is attributable to a number of factors, including antecedent rainfall and other climatological conditions, as well as monitoring site selection for that year. Prior analysis of the 2006-09 BMI metrics indicated that annual rainfall amount and antecedent spring rainfall amount may affect average BMI community composition in a given

year. Additional, detailed analysis conducted with the 11-year (2001-2011) data set indicated that certain climatological factors (prior 30-day rainfall total, cumulative seasonal rainfall to date, and prior 30-day average high temperature) did not correlate well with site-specific and date-specific B-IBI scores. The effects of these climatological factors on BMI community composition seem to be overwhelmed by the spatial differences among sites at any given time.

Selected geographical factors that may influence benthic community composition at bioassessment monitoring sites throughout Contra Costa County were evaluated using average site B-IBI scores from the 11-year (2001-2011) data set. This analysis confirmed that elevation correlates significantly with mean site B-IBI score, with higher average B-IBI scores generally occurring at higher elevations. This may reflect prevailing land use, as the degree of urbanization tends to decrease with increasing elevation in Contra Costa County. The various effects of urbanization (changes in hydrology, riparian vegetation, creek substrate, and water quality) may be reflected therefore in the correlation of B-IBI scores with elevation.

A group of volunteers after a sunny day in Rodeo Creek (Spring, 2009)

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1.0 INTRODUCTION

Bioassessment monitoring has been performed in Contra Costa County creeks under the Contra Costa Monitoring and Assessment Program (CCMAP) since 2001. From 2001 to 2011, prior to the implementation of regionally-coordinated bioassessment monitoring in 2012 under the terms of the Municipal Regional Stormwater NPDES Permit, the CCMAP was the principal monitoring activity of the Contra Costa Clean Water Program (CCCWP)[1], serving to fulfill monitoring requirements in the Joint Municipal NPDES Permits (Permits) issued to the Contra Costa County stormwater permittees by the San Francisco Bay and Central Valley Regional Water Quality Control Boards (Water Boards). Beginning in 2007, all bioassessment data were collected through the efforts of the Contra Costa Volunteer Creek Monitoring Program. During 2007-09 and 2011 the volunteer effort was coordinated and led by Contra Costa County staff; in 2010 the volunteer data collection team was led in the field by Scott Cressey, a professional fisheries biologist. This report summarizes the methods and results of bioassessment data collection in 2011 under the CCMAP, as well as the cumulative results from 2001-11.

1.1 OVERVIEW OF MONITORING PROGRAM

1.1.1 Contra Costa Monitoring and Assessment Program

The CCMAP was created to assess the condition of beneficial uses in individual creeks in Contra Costa County and identify likely stressors. The CCMAP entails a tiered monitoring approach designed to help answer core management questions (shown in Table 1), and to help facilitate the overall goal of protecting beneficial uses in Contra Costa creeks by reducing discharges of pollutants in urban runoff.

Table 1. Five core management questions that guide the implementation of the Contra Costa Monitoring and Assessment Program (CCMAP).
1. What is the condition/status of beneficial uses in Contra Costa receiving waters?
2. What is the extent and magnitude of current or potential receiving water problems?
3. What is the relative stormwater contribution to the receiving water problem(s)?
4. What are the sources to stormwater that contribute to receiving water problem(s)?
5. Are conditions in receiving waters getting better or worse?

The first phase of the CCMAP was initiated in 2001 in the program's pilot watershed, Alhambra Creek. Lessons learned from this pilot effort were used to refine the CCMAP bioassessment monitoring in subsequent years, with monitoring performed in many other watersheds, involving dozens of creeks throughout Contra Costa County.

1.1.2 Contra Costa Volunteer Creek Monitoring Program

In 2003, the CCCWP submitted a grant application to the State Water Resources Control Board in collaboration with the Contra Costa Watershed Forum[2] to create a citizen-based watershed monitoring and assessment program (i.e., Volunteer Creek Monitoring Program). The overall goal of the Volunteer Creek Monitoring Program is to aid in protecting and restoring the San Francisco Estuary and its tributaries in Contra Costa County. The Volunteer Creek Monitoring Program is jointly managed by the Contra Costa County Department of Conservation and Development and the Contra Costa Clean Water Program.

[1] The Contra Costa Clean Water Program is comprised of the County of Contra Costa, all nineteen of the county's incorporated cities, and the Contra Costa County Flood Control & Water Conservation District (i.e., Co-permittees).
[2] The Contra Costa Watershed Forum is an open committee of private individuals and public agency staff that seeks to identify common principles among parties involved in creek and watershed issues, and promotes actions that promote the transformation of local water resources into healthy, functional, attractive, and safe community assets.

1.0 INTRODUCTION

1.2 BENTHIC MACROINVERTEBRATES AS INDICATORS OF AQUATIC LIFE USE CONDITION

From among the various options available, the Program selected fresh water benthic macroinvertebrate (BMI) communities as the lead indicator of aquatic life use condition for Contra Costa water bodies.

BMIs are composed primarily of insect larvae (as illustrated in Figure 1), plus mollusks and worms. They are an essential link in the aquatic food web, providing food for fish and consuming algae and aquatic vegetation (Karr and Chu, 1999).

The presence and distribution of BMIs can vary across geographic locations based on elevation, creek gradient, and substrate (Barbour et al., 1999). These organisms are sensitive to disturbances in water and sediment chemistry, and physical habitat, both in the stream channel and along the riparian zone.

Because of their relatively long life cycles (approximately one year) and limited migration, BMIs are particularly susceptible to site-specific stressors (Barbour et al., 1999). They are therefore considered to be useful as integrative indicators of in-stream biotic health.

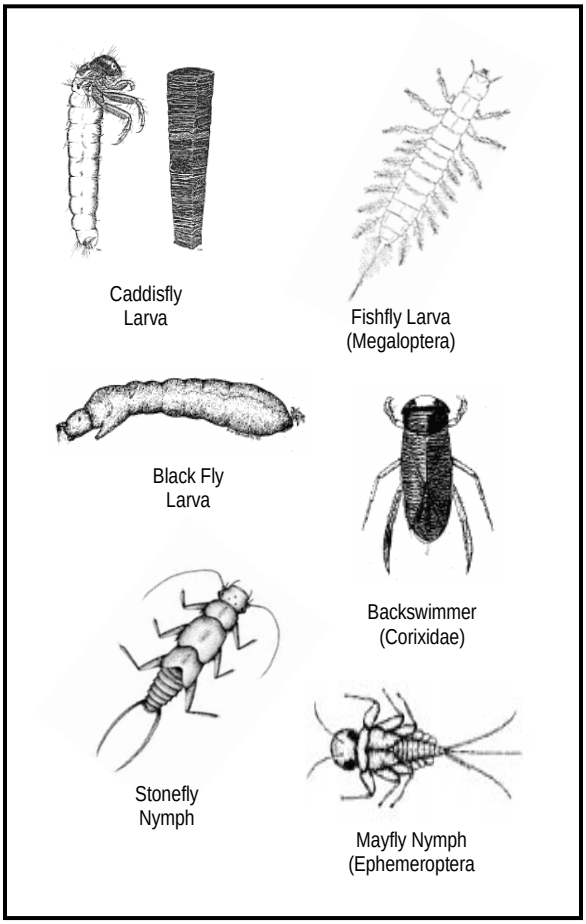


Figure 1.Examples of benthic macroinvertebrates (BMIs) used by the Contra Costa Clean Water Program as indicators of aquatic life use condition.

Mayfly hatch in upper Marsh Creek

2.0 METHODS AND APPROACH

2.1 CONTRA COSTA WATERSHEDS AND SAMPLING STATIONS

Contra Costa County is divided into 29 major watersheds with approximately 1,295 miles of creeks flowing through them (Contra Costa CDD, 2003). Some watersheds have no creeks or only small creeks with ephemeral water flow. Other larger watersheds have been broken into smaller sub-watersheds for planning purposes. Additionally, a few of the watersheds in the southern portion of the County make up the headwaters of major watersheds in Alameda County. Major watersheds, their respective land areas, and miles of creeks (including tributaries) within each watershed are presented in Table 2; watersheds monitored in 2011 are highlighted.

Table 2.Watershed areas and lineal creek distances within the major watersheds of Contra Costa County

Watershed Name	Watershed Area (mi^2)	Creek Length (mi)
1. Alamo Creek/Tassajara Creek (Upper Alameda Creek Watershed)	41.2	101
2. Alhambra Creek	16.7	48.1
3. Baxter Creek	8.64	14.44
4. Cerrito Creek	2.07	5.82
5. Brushy Creek	37.1	45.9
6. Carquinez Area Drainages	10.3	27
7. Cayetano Creek (Upper Alameda Creek Watershed)	6.9	14.1
8. Concord	8.7	0
9. East Antioch Creek	11.4	8.7
10. Garrity Creek	6.2	4.1
11. Grayson Creek (Walnut Creek Watershed)	24	25.4
12. Kellogg Creek	32.6	67.6
13. Kirker Creek	17.4	43.7
14. Las Trampas Creek (Walnut Creek Watershed)	26.9	64.1
15. Marsh Creek	93.8	167.2
16. Mt. Diablo Creek	38.2	80
17. Peyton Slough (Alhambra Creek Watershed)	6.4	8.1
18. Pine Creek/Galindo Creek (Walnut Creek Watershed)	31.5	60
19. Pinole Creek	15.2	46.6
20. Refugio Creek	4.9	9.2
21. Rheem Creek	2.8	3.4
22. Rodeo Creek	10.4	31.6
23. San Leandro Creek/Moraga Creek	20.6	53.8
24. San Pablo Creek	43.6	108.6
25. San Ramon Creek (Walnut Creek Watershed)	54	136.7
26. South San Ramon Creek (Upper Alameda Creek Watershed)	13.1	26.2
27. West Antioch Creek	12.8	26.5
28. Wildcat Creek	11	22.2
29. Willow Creek and Coastal Drainages	23.6	44.8
Total	632.0	1294.9

Note: Watersheds where bioassessments were conducted in 2011 are shaded.

2.0 METHODS AND APPROACH

Contra Costa County watersheds are presented graphically in Figure 2 (following page). Specific information on the locations of the 2011 CCMAP sampling stations is presented in Table 3. Photographs of the sites monitored in 2011 are included in Appendix A.

Table 3. Benthic Macroinvertebrate (BMI) Bioassessment Stations Monitored in 2011.

Code	Waterbody	Location	Latitude	Longitude
Alhambra Creek Watershed				
ALH050	Alhambra Creek	Martinez Adult School	38.0005	122.12978
Grayson Creek Watershed				
WAL050	Grayson Creek	Diablo Valley College	37.96694	122.06664
WAL090	WF Grayson Creek	Grayson Lane and Buttner Road	37.94763	122.09476
WAL130	NF Murderers Creek	Brookwood Park	37.93447	122.09472
Kirker Creek Watershed				
KIR115	Kirker Creek	Kirker Creek Apts	37.99067	121.89485
Marsh Creek Watershed				
MSH130	Upper Marsh Creek	County Detention Center	37.89722	121.86031
MSH140	Upper Marsh Creek	210 Tumbleweed Court	37.88522	121.86527
Mount Diablo Creek Watershed				
MTD100	Mitchell Creek	Oak Street	37.9357	121.93886
Pinole Creek Watershed				
PNL029	Pinole Creek	Pinole Library Demonstration Garden	37.99246	122.28441
San Pablo Creek Watershed				
SPA-70	San Pablo Creek	El Portal Rd at St. Joseph's Cemetery	37.96278	122.33278
SPA110	Wilkie Creek	Santa Rita Road by De Anza School	37.96883	122.29048
San Ramon Creek (Walnut Creek Watershed)				
WAL670	San Ramon Creek	Zephyr Circle	37.80003	122.97701

Riffles in Upper Marsh Creek, May 2011

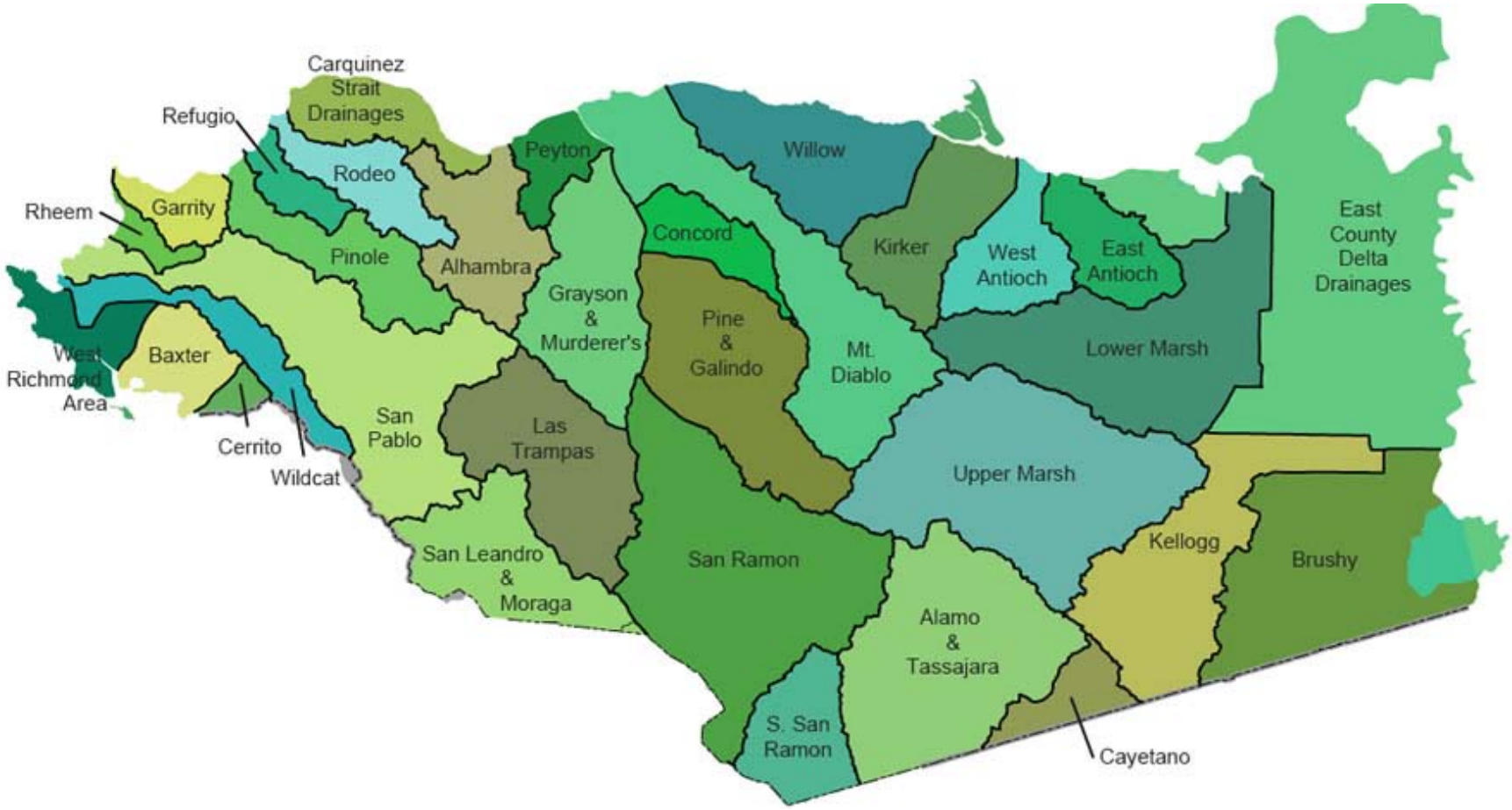


Figure 2. Contra Costa County Watersheds

2.2 BIOASSESSMENT METHODS

From 2001 to 2006, the California Stream Bioassessment Procedure (CSBP) for wadeable streams (CDFG 1999 and 2003) was consistently used to collect BMI samples in Contra Costa County. Beginning in 2007, the CSBP was replaced by new SWAMP Bioassessment Procedures, established in February 2007 (Ode, 2007). The principal change in protocols concerns the switch from a targeted-riffle composite (TRC) sampling method to a reach-wide benthos (RWB) method of sampling. The RWB procedure is an objective method of selecting sub-sampling locations because it does not target specific habitat types.

2.2.1 Field Procedures

CCMAP field personnel followed the revised (2007) SWAMP protocols beginning in 2007. In accordance with the SWAMP protocols, the standard sampling layout consists of a 150-m reach (length measured through the thalweg) divided into 11 equidistant transects.

Ambient water chemistry measurements are first taken at the downstream end of the reach. These measurements include temperature, pH, specific conductance, dissolved oxygen and alkalinity. Next, the "bug team" proceeds upstream, collecting BMI samples at every transect, using the method described below.

The bug team is followed by the physical habitat ("PHAB") team (see section 2.3), who record observations on physical characteristics of the stream reach, as well as biological habitat characteristics. The dominant land use and land cover in the area surrounding the reach are recorded, along with evidence of recent flooding, fire, or other disturbances that might influence bioassessment samples. Photographs of the reach are taken at downstream, mid-reach, and upstream locations. Reach slope and sinuosity are measured using surveying techniques from the upstream location, looking downstream. See the sample field data sheet (Appendix B) for details on the observations recorded by the PHAB team. See Appendix C for completed field sheets used during actual sampling.

Above: A Friends of the Creek volunteer displays the tools of the trade

The BMI samples are collected using a 500-µ mesh D-frame kick-net for kick-sampling. Taking a "kick" sample consists of placing the net on the stream bottom; placing any heavy organisms found in the sampling area into the net; rubbing stones within the sampling area in front of the net to remove all attached animals; kicking and dislodging substrate under large, heavy rocks to displace BMIs into the net; and finally, digging fingers 10 cm into the substrate in the sampling area to gather any other organisms. If the current is slow, the sampling procedure for slack water habitats is used, which involves more vigorous kicking during which the net is swept over the disturbed substrate for 30 seconds to collect all organisms. At each transect a one-square-foot area of stream bed is sampled.

The RWB method requires taking 11 sub-samples with the D-net, one at each transect. The bug team alternates the horizontal location of the BMI sample within the transects as they move upstream, starting at 25% of the wetted width from the right bank for the first transect, then at mid-stream for the next, then at 25% of the wetted width from the left bank, and so on. The BMI sub-samples are collected within the kick-net as the team moves upstream to form a spatial composite sample for the entire reach. After the upstream sample has been collected from the 11th transect, the contents of the net are transferred into a 500-mL or 1000-mL wide-mouth plastic sample jar with 95% ethanol for analysis.

2.2.2 Laboratory Procedures

Bioassessment Services, Inc. (BSI) was contracted to perform the biological identifications and related analysis. BSI hired a subcontractor to first "pick" (or remove) BMIs from the contents in the sample jars. This entailed rinsing the sample bottle contents through a No. 35 standard testing sieve (0.5 mm brass mesh), and transferring the sieved sample into a tray marked with twenty 25cm^2 grids. Then, all material was removed from one randomly-selected grid at a time and placed into a Petri dish for inspection under a stereomicroscope (at 10x). All macroinvertebrates from the grid were separated from the surrounding detritus and transferred to vials containing 70% ethanol and 2% glycerin. This process was continued until 500 organisms were removed from each station's composite sample. The picked samples were then delivered to trained aquatic entomologists.

The bioassessment entomologist responsible for identifying the organisms from the picked samples and analyzing the results (enumeration and grouping according to taxa, and developing the associated metrics) was Tom King of BSI. Mr. King participates in the Southwest Association of Freshwater Invertebrate Taxonomists (SAFIT)organization (formerly the California Bioassessment Laboratories Network) and is approved for BMI sample analysis by the California Department of Fish and Game (CFDG) Aquatic Bioassessment Laboratory. BMIs were identified to standard taxonomic levels as established by the CDFG (typically genus for insects and order or class for non-insects), using standard taxonomic references.

Bioassessment results (i.e., taxa lists) were provided to County staff in Excel spreadsheets, and the five relevant metrics were then used to compute the IBI scores for each site, according to the preliminary Contra Costa IBI methodology described above.

2.3 PHYSICAL HABITAT ASSESSMENT METHODS

As part of the revised SWAMP bioassessment protocols published in February 2007, physical habitat assessment methods and field forms were provided by SWAMP's Clean Water Team. The format of the field forms was modified slightly by the Clean Water Team in response to requests by the Volunteer Creek Monitoring Program, and the resulting modified SWAMP forms were used by volunteer personnel in the field. The field form is shown in Appendix B.

As indicated in the SWAMP protocols, measurements of in-stream and riparian habitat and ambient water chemistry always accompany bioassessment samples. Physical habitat measurements are made at the transects established during BMI collection. For each transect the wetted stream width, bankfull width, and height were measured, along with various other parameters.

The various items are compiled and given a reach-wide score, with a higher score indicating a more robust and healthy physical habitat.

A summary of physical habitat scores and water quality field measurements for all bioassessment stations monitored in the current year is provided in Appendix D.

Left: Volunteer sampler moving upstream in Alhambra Creek, May 2011

2.4 DATA QUALITY ASSESSMENT

The CCMAP and Volunteer Creek Monitoring Program comply with quality control and assurance procedures described in the Quality Assurance Project Plan (QAPP) developed for the Volunteer Creek Monitoring Program (updated 4/7/2009), which in turn is comparable with data quality assessment procedures implemented by the State of California's Surface Water Ambient Monitoring Program (SWAMP). The QAPP identifies data quality acceptance criteria (i.e., data quality objectives) related to the accuracy, precision, completeness, comparability, sensitivity, and representativeness of data collected. Based on these criteria, duplicate samples are collected and analyzed annually for 10% of stations sampled, and the results are assessed for precision. Precision is assessed by calculating the percent of species similarity between original and duplicate samples. Additionally, accuracy is measured by annually re-analyzing 10-20% of samples by an independent taxonomist. The independent taxonomy QA/QC analysis was conducted by the Aquatic Bioassessment Laboratory at California State University, Chico. Results of the 2009 data quality assessments are summarized in Appendix E.

2.5 ANALYSIS AND INTERPRETATION METHODS

2.5.1 Benthic Macroinvertebrate Metrics

According to Barbour *et al*. (1999), a metric is "a measure of the biota that changes in a predictable way with increased human influence." For the CCMAP, a variety of metrics are calculated for each sample to allow interpretation of BMI taxonomic data received from the entomologist. Metrics can be categorized into five main types:

- Richness Measures (total number of distinct taxa);
- Composition Measures (distribution of individuals among taxonomic groups, which includes measures of diversity);
- Tolerance/Intolerance Measures (reflects the relative sensitivity of the assemblage to disturbance);
- Functional Feeding Groups (shows the balance of feeding strategies in the aquatic assemblage);
- Abundance (estimates total number of organisms in a sample).

2.5.2 Benthic Index of Biotic Integrity

An Index of Biotic Integrity (IBI) is an analytical tool that reduces complex information about biological community structure into a simple numerical value, based on a variety of biological characteristics, including metrics such as those listed above. Typically, metrics from each of these categories are used to develop a multi-metric IBI for a particular region of interest (e.g., Western U.S., Northern California, or Contra Costa County) to assess the biological condition in creeks.

The Bay Area Macroinvertebrate Bioassessment Information (BAMBI) network[3] has begun to develop a provisional regional benthic IBI (B-IBI) for San Francisco Bay Area Creeks, using data collected from Contra Costa, Alameda, Santa Clara, San Mateo, Napa, Marin, Sonoma and Solano counties. The Bay Area B-IBI was originally scheduled to be completed in 2007; the actual completion date is unknown.

Contra Costa B-IBI

As a preliminary step in developing the B-IBI for San Francisco Bay Area creeks, data from Contra Costa County were used to test metrics used in Southern and/or Northern California B-IBIs (Ode et al., 2005; Rhen and Ode, 2006) for applicability in the Bay Area. This involved comparisons of benthic conditions from "reference" sites vs. non-reference sites.

[3] BAMBI is a network of scientists, watershed managers, regulators and community members interested in using biological communities as indicators of stream health in the San Francisco Bay Area.

Reference Station Selection

Reference stations are sections of creeks that have "reference conditions" representing the desired state of stream health for a region of interest. Definitions of the term "reference condition" range from the pristine, undisturbed state of a stream, to merely the "best available" or "best attainable" conditions in a region. Because practical considerations limit our ability to find minimally disturbed sites, in regions like the San Francisco Bay Area, it is necessary to select sites that represent the "best attainable" or "least disturbed condition" condition in a heavily human-impacted ecosystem. Once candidate reference stations have been identified, these are used to characterize the range of biotic conditions expected for minimally disturbed sites. Deviation from this range can then be used as an indication that non-reference stations may be impacted by human activity.

In Contra Costa County information about minimally impacted conditions at selected "reference" stations was developed to supplement data collected at BMI monitoring sites. Using "best professional judgment" and qualitative physical habitat scores, a pool of potential reference stations (~30) was initially selected. From those, the 11 stations listed in Table 4 were selected on a preliminary basis to represent reference conditions in Contra Costa County. Three of those stations (MSH130, MSH140, and MTD100) were monitored during the 2011 bioassessment monitoring.

Table 4. Reference stations selected during the development of the preliminary B-IBI for Contra Costa County.

Water Body	Station Code	Location
Upper Marsh	543MSH170	Upper Marsh Creek 4.8 miles above Curry Creek
Upper Marsh	543MSH160	Upper Marsh Creek 3.8 miles above Curry Creek
Upper Marsh	543MSH150	Curry Creek between 1st and 3rd bridges near mouth
Upper Marsh	543MSH140	Marsh Cr. below Curry Cr. at Tumbleweed Ct.
Upper Marsh	543MSH130	Marsh Creek at Detention Center
Kellogg	543KEL040	Kellogg Creek at 0.3 miles above Mallory Creek
Mallory	543KEL030	Mallory Creek 0.25 mile above road, upper site
Mallory	543KEL020	Mallory Creek 900 feet above road, lower site
Kellogg	543KEL010	Kellogg Creek just above Los Vaqueros Reservoir
Las Trampas	207WAL420	Las Trampas Creek below Valley Hill Road
Mitchell	207MTD100	Mitchell Creek at Oak Street

Variation in BMI assemblages due to natural factors (such as elevation) can affect the development and interpretation of IBI scores. These factors were not fully evaluated during the development of the Preliminary B-IBI for Contra Costa County. The process of identifying these reference conditions is currently underway in the development of the B-IBI for San Francisco Bay Area creeks.

Metrics Screening and Selection for Use in IBI

Appropriate metrics for the derivation of the preliminary Contra Costa B-IBI were selected to match the 11 metrics used in the development of B-IBIs for Northern and Southern California, which were derived following United States Environmental Protection Agency recommendations (Barbour *et al*. 1999, Hughes *et al*.1998, McCormick *et al*. 2001). Each of the 11 metrics was tested for its power to discriminate between reference and test stations. Based on the results of this screening process, the following five "core" metrics used in the Northern and/or Southern California B-IBIs were also selected for inclusion in the preliminary Contra Costa B-IBI:

1. EPT Richness(Cumulative # Ephemeroptera + Plecoptera + Trichoptera taxa)
2. Percent Noninsect Taxa
3. Diptera Richness (# taxa)
4. Predator Richness (# taxa)
5. Percent Collector Individuals

Defining Scoring Ranges of Core Metrics

Metric scoring ranges were defined using techniques described in Hughes *et al*. (1998) and McCormick *et al*. (2001). Statistical properties of the distribution of metric scores for both reference and test stations were used to define cutoffs for each of the 5 metrics selected using the following criteria: 1) any station with a metric value of less than the 5th percentile of the test stations was assigned a "0" score, and 2) any site with a metric value of greater than the 25th percentile of the reference stations was assigned a "10" score. The range between these values was divided into 9 equal portions and assigned values between 1 and 9. Table 5 presents the scoring ranges for the five metrics included in the preliminary Contra Costa County B-IBI.

Table 5. Scoring ranges for the five metrics included in the preliminary Contra Costa County Benthic-IBI and scoring categories that define biotic condition.

IBI Sub-score	Cumulative EPT Taxa	% Non-Insecta Taxa	Diptera Taxa	Predator Taxa	% Collectors
10	>9	0-17	> 5	> 9	0-78
9	9	18-22		9	79-80
8	8	23-28	5	8	81-82
7	7	29-33		7	83-85
6	6	34-39	4	6	86-87
5	5	40-44		5	88-89
4	4	45-50	3	4	90-91
3	3	51-55		3	92-94
2	2	56-61	2	2	95-96
1	1	62-66		1	97-99
0	0	>66	< 2	0	100

B-IBI Scoring Categories (sum of five metric sub-scores from above):

Very Good	Good	Fair	Marginal	Poor
50-43	42-35	34-23	22-11	10-0

Calculation of the B-IBI

For each monitoring event, the five selected core metrics are assigned IBI sub-scores for each site, using the scoring categories defined in Table 5, and the B-IBI score for each site is calculated by simply summing the component metric sub-scores. The resulting B-IBI scores are then assigned to scoring categories that define thresholds of relative biotic condition as shown at the bottom of Table 5. For the preliminary Contra Costa B-IBI the scoring categories were established by first using the 25th percentile of reference stations to set the boundary between the "Good" and "Fair" scoring ranges. Then the top end of the scale was divided into two equal sections ("Good" and "Very Good") and the bottom end of the scale was divided into three equal sections ("Fair", "Marginal" and "Poor").

3.0 RESULTS

3.1 COUNTY-WIDE OVERVIEW – BMI RESULTS

During 2011, nearly 5,000 individual macroinvertebrate organisms were taxonomically identified from the 12 sampling stations in the eight Contra Costa County watersheds monitored. These organisms comprised 62 distinct BMI taxa. These numbers are all substantially lower than in prior years, when many more sites were monitored. Because the 12 sites monitored in 2011 also were selected on a non-random basis, the 2011 data are not considered to be representative of benthic faunal conditions throughout Contra Costa County generally.

Table 6 provides an overview of the distribution of the 2011 BMI identification results by major taxonomic grouping. A complete list of taxa identified in Contra Costa County samples in 2011 is included in Appendix F.

Table 6. Percentages of all organisms identified within various BMI groups (2011).

GROUPS OF BENTHIC MACROINVERTEBRATES IDENTIFIED	% OF ALL ORGANISMS
Aquatic Insects/Spiders/Crustaceans (Arthropoda)	**85.96%**
Aquatic Insects:	
True Flies (Diptera)	40.15%
Mayflies (Ephemeroptera)	37.83%
Stoneflies (Plecoptera)	1.21%
Caddisflies (Trichoptera)	1.11%
Dragonflies and Damselflies (Odonata)	0.89%
Beetles (Coleoptera)	0.65%
Amphipoda	0.93%
Ostracoda	2.59%
Arachnoidea	0.57%
Megaloptera	0.04%
Snails and Clams (Mollusca)	**6.10%**
Flat Worms (Platyhelminthes)	**4.83%**
Segmented Worms (Annelida)	**3.11%**

3.1.1 Most Dominant Taxa

For the 12 sites monitored in 2011, nearly 70% of the organisms identified belonged to one of five taxa indicated in Table 7. As in prior years, Baetis, in the Ephemeroptera taxonomic family, was the most commonly identified single taxon, at 32%. Dipterans (true flies) were the most common taxonomic family identified, as seen in Table 6. However, the 2011 taxonomic results were less dominated by Dipterans than in prior years; from 2008 to 2011 the frequency of Dipteran identifications declined from 57% to 40%. Chironomids (non-biting midges; a family within the Dipteran order), represented nearly 24% of the BMIs identified in 2011, a somewhat lower abundance than in previous years, when they routinely represented 30% or more of all organisms identified (per EOA, 2007). Chironomids are closely related to mosquitoes (Culicidae) and biting midges (Ceratopogonidae), and are usually the most abundant macroinvertebrate group in natural freshwater habitats (Epler, 2001).

The relative occurrence of Oligochaetes (worms) declined from being the number-one-ranked taxa identified in 2010, to relatively low levels, as previously seen in 2008 and 2009. Oligochaetes are aquatic segmented worms, common in most freshwater habitats. Many aquatic worms can tolerate low dissolved oxygen and may be found in large numbers in organically polluted habitats.

3.0 RESULTS

Table 7. Five most frequently identified BMI taxa identified in samples collected in 2011.

TAXON	TAXONOMIC GROUP	TOLERANCE VALUE (0-10)*	% OF ALL ORGANISMS
Baetis	Ephemeroptera	5	32.7%
Simulium	Diptera	6	13.6%
Orthocladiinae	Diptera	5	10.1%
Tanytarsini	Diptera	6	8.0%
Potomopyrgus antipodarium	Mollusca	8	5.3%
		Total	**69.6%**

*Tolerance values range from 0-10, 0 = the least tolerant and 10 = the most tolerant to stress (e.g., pollution).

3.1.2 Functional Feed Groups (FFGs)

BMI taxa are classified into functional feeding groups (FFGs) based on their feeding mechanisms. FFGs include collector-gatherers, collector-filterers, scrapers, shredders, and predators. The relative distribution of these FFGs within creeks can provide an indication of ecosystem health. Without a relatively diverse variety of food types (e.g., fine and coarse particulate organic material, algae and other BMIs), certain FFGs may predominate, indicating an imbalance in BMI community structure, and reflecting stressed conditions.

Collector-filterers and collector-gatherers depend upon fine particulate organic matter (FPOM) for their primary food resource. Filterers obtain fine suspended material from the water column, while collector-gatherers, also called deposit-feeders, generally gather fine materials, including plant, animal, and fungal detritus, from the surfaces of substrates. Scrapers (grazers) depend upon attached periphyton (i.e., algae and associated flora and fauna) that develops on submerged substrates for their primary food resource. Shredders depend upon coarse particulate organic matter (CPOM) for their primary food resource. CPOM is any material greater than about 1 mm in diameter; examples include twigs, leaves, fruits and flowers of terrestrial or aquatic vegetation. Lastly, predators attack living prey organisms; often other BMIs.

Generalists, such as collector-gatherers and collector-filterers, have a broader range of acceptable food materials than specialists (Cummins and Klug 1979), and thus are more tolerant to stressors that might alter availability of certain food types. Specialized feeders, such as scrapers, shredders and predators, are typically considered to be more sensitive types of BMIs and are generally well represented in healthy streams.

While several specialized FFGs are represented in the Contra Costa County BMI data, the 2011BMI samples are dominated by generalist FFGs (see 2011 distribution, Figure 3), with 80% of identified organisms in the collector-gatherer and collector-filterer categories in 2011. While the 2011 results are based on samples from just 12 sites, the 2011 pattern is similar to that observed in recent years.

3.0 RESULTS

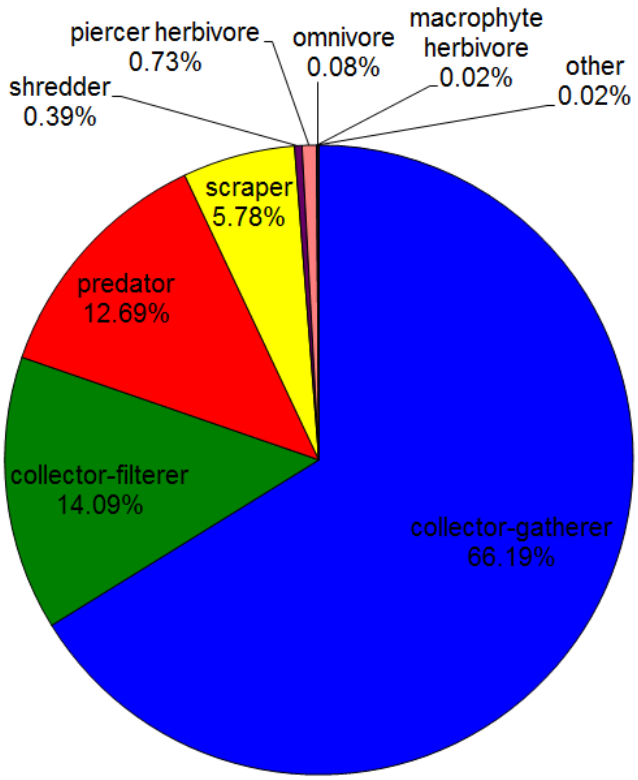


Figure 3. Percentages of organisms identified in functional feeding groups in 2011.

3.2 CURRENT CONDITION OF BENTHIC AQUATIC LIFE IN CONTRA COSTA COUNTY CREEKS

Using the preliminary B-IBI scoring ranges developed for Contra Costa County, B-IBI scores were calculated for 11 of the 12 creek sampling stations monitored in 2011. Because only eight identified benthic macroinvertebrates were tallied for the SPA070 site (San Pablo Creek), a B-IBI score was not calculated for this site. Based on the B-IBI scores calculated from the other 11 bioassessment stations, the majority of creek stations sampled in Contra Costa County scored in the good (four stations) or fair (five stations) categories, with one site each scoring in the very good and poor categories, as shown in Figure 4.

To assess the general condition of aquatic life uses on a watershed scale, average B-IBI scores were calculated for the eight Contra Costa watersheds monitored during 2011, using the average score of stations monitored within the watershed boundaries (Figure 5). The individual metrics and scores used to calculate the B-IBI scores are presented in Appendix G.

Because of the relatively small number of sites monitored in 2011, the 2011 B-IBI scores presented in this report alone are not considered to be representative of the full range of benthic faunal conditions in Contra Costa County.

3.0 RESULTS

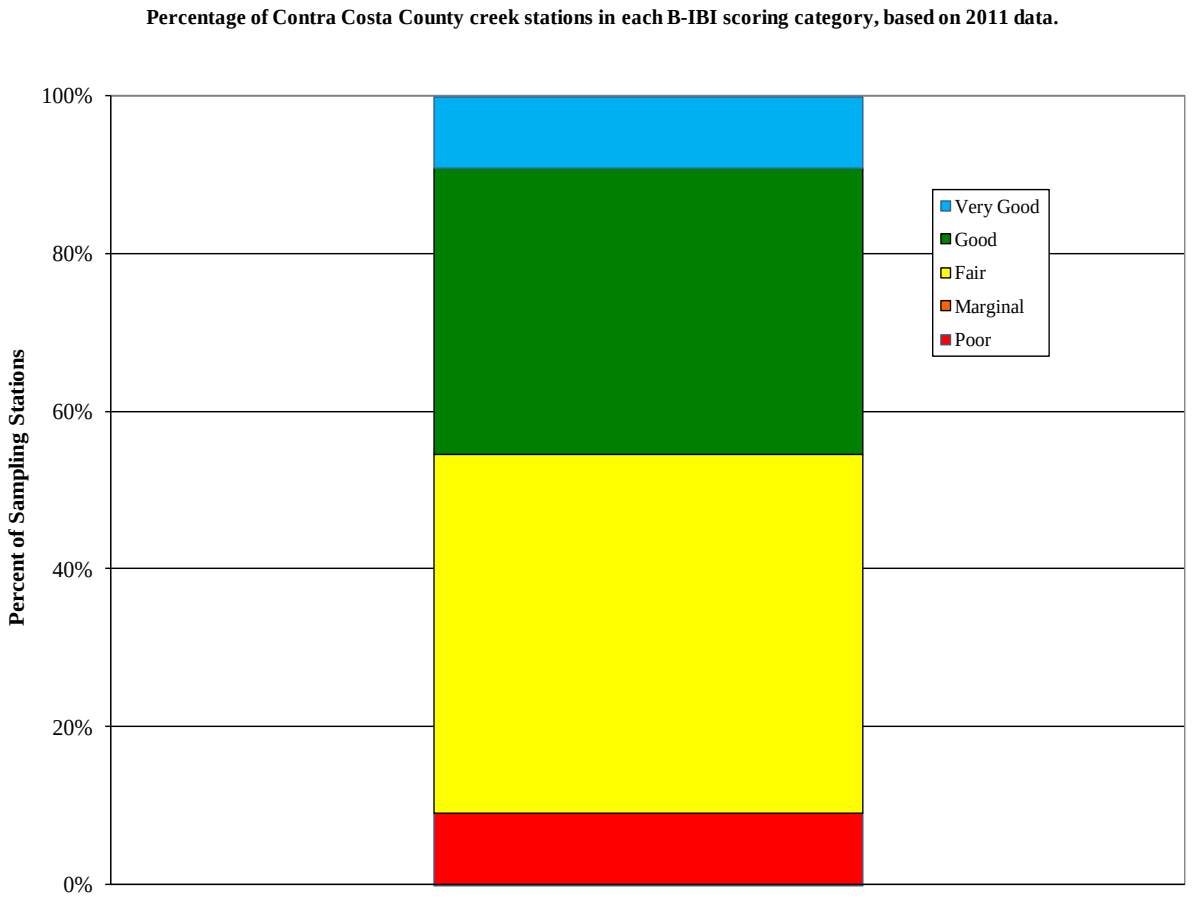


Figure 4. Percentage of Contra Costa County creek stations in each B-IBI scoring category, based on 2011 data.

3.0 RESULTS

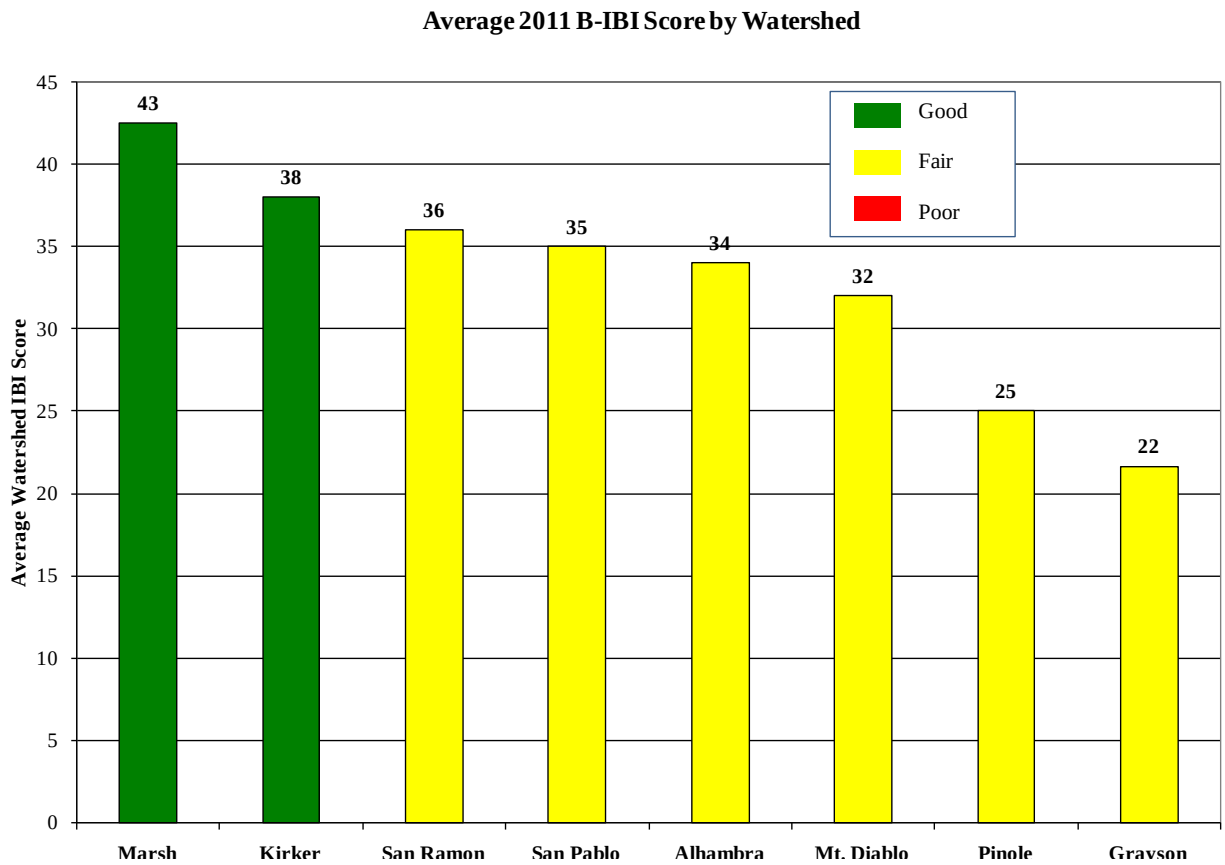


Figure 5. Average 2011 B-IBI Score by watershed

Note: the Grayson and San Ramon sites are located within the Walnut Creek watershed.

13.3 POTENTIAL FACTORS AFFECTING BMI COMMUNITY COMPOSITION

BMI communities can be affected by a variety of natural factors (e.g., elevation, hydrology, in-stream and riparian physical habitat quality, food availability, and predation) and anthropogenic factors (e.g., urbanization, impoundments, water quality effects, and introduced invasive species). BMI community composition and the resulting B-IBI scores vary both spatially throughout Contra Costa County (due to differences in geography, including land use, underlying geology, and topography) and temporally (due particularly to annual and seasonal differences in climate and weather). Some analysis was performed to assess both spatial and temporal variation in B-IBI scores over the 11-year period of bioassessment monitoring.

3.3.1 Temporal Variation

In prior years, the CCMAP attempted to standardize to some degree the monitoring approach, to minimize the variability due to the annual selection of monitoring locations. This was done by collecting samples from a relatively large number of sites each year, selecting sites from a variety of creeks and watersheds throughout the County, selecting specific sites on a recurring basis to obtain results for consecutive years, and by consistently collecting samples during the same time of year in each annual cycle. Nonetheless, several unavoidable factors contribute to year-to-year variations in average B-IBI scores, as discussed below.

3.0 RESULTS

In Contra Costa County, bioassessments are conducted once annually during the late spring or early summer. Sampling occurs during this "index period" because benthic communities are typically at their most diverse and are highly abundant prior to emergence (i.e., before adult flight). Because samples are collected only during this one period annually, intra-annual (within year) variation is not addressed. However, the considerable degree of inter-annual (between years) variability confounds attempts to assess changes in the condition of aquatic life use indicators over time.

Collecting BMI samples in Grayson Creek, May 2011

3.3.1.1 Change in Sample Collection Approach

In February 2007, the Surface Water Ambient Monitoring Program issued new protocols for benthic bioassessment for use throughout the state of California. As described in Section 2.2.1, the new protocols required use of a reach-wide benthos (RWB) technique, rather than the targeted-riffle composite (TRC) method used previously. This change was implemented by the CCMAP in 2007. The 2007 BMI report (ARC, 2008) included an analysis as to whether the change in BMI data collection protocols may have had an effect on the resulting B-IBI scores.

The RWB technique might be expected to result in more samples from less-rich habitat, potentially leading to correspondingly lower B-IBI scores, because the riffle sites targeted in the TRC technique are considered to generally be the most desirable habitat type for benthic organisms. However, comparisons of B-IBI scores for sites that were sampled both in 2006 and 2007 supported the opposite conclusion (see Appendix H, 2007 data report (ARC, 2008)). Of 47 data pairs available for comparison, the 2007 B-IBI scores were *higher* than the 2006 scores in most cases. Average B-IBI scores for the

paired sites were 19.6 in 2006 and 27.0 in 2007;this difference was statistically significant. Similar trends were observed in comparisons of the average annual scores for the five individual metrics that comprise the IBI composite score, for sites monitored in both 2006 and 2007.

Overall, the test results indicated that benthic populations were on average healthier in 2007 compared to 2006, for those sites tested in both years, even though the RWB sampling approach was implemented in 2007. Other factors were apparently more influential in the year-to-year differences in IBI scores; the possible influence of hydrologic factors is discussed below.

Collecting BMI samples in Mitchell Creek (Mt. Diablo watershed), May 2011

3.3.1.2 Site Selection

Because all BMI monitoring sites cannot be monitored every year, the mix of sites selected for monitoring in any given year can affect the average annual BMI score for each monitored watershed and for the county-wide program as a whole. While an effort is made to select a representative mix of sites each year, this necessary selection process is a likely factor in average annual IBI score variation.

3.3.1.3 Climate and Weather

Differences in annual climate, particularly hydrological factors such as antecedent rainfall (rainfall that occurs in the period prior to sampling), may influence B-IBI statistics.

As shown in Table 8, both annual and spring rainfall amounts were substantially higher in 2005-06 than during any of the three subsequent years. The critical spring period (March-May) of 2006 received much higher rainfall than the spring periods of 2007 and 2008. The flushing effect of the higher 2006 spring

rainfall and resulting higher creek flows may have prevented establishment of diverse and populous benthic assemblages prior to the 2006 sampling period. The 2008-09 rainfall year was similar in total precipitation to the previous (2007-08) hydrologic year, but rainfall was substantially higher during the 2009 spring period than during the 2008 spring, when very little rainfall occurred.

Table 8. Comparison of Incident Rainfall, 2005 - 2009

Month	2005-06	2006-07	2007-08	2008-09
July	0	0	0	0
Aug	0	0	0	0
Sept	0	0	0.1	0
Oct	0.09	0.1	1.62	0.06
Nov	1.2	1.45	0.67	2.69
Dec	11.79	2.39	2.96	2.73
Jan	2.2	0.43	7.26	1.14
Feb	1.8	3.58	2.24	6.84
Mar	6.18	0.15	0.15	2.23
Apr	3.81	0.76	0	1.22
May	0.65	0.3	0	0.61
June	0	0	0	0
Year:	**27.72**	**9.16**	**15.00**	**17.52**
Spring:	**10.64**	**1.21**	**0.15**	**4.06**

Rainfall in inches at Concord Wastewater Plant
Spring period = March-May

For two three-year periods of BMI sampling (2006-2008 and 2007-09), average B-IBI scores and other metrics were compared for sites that were sampled consecutively in all three years (see ARC, 2009, and ARC, 2010). For the 2006-08 period, 24 sites were sampled consecutively in all three years, and in 2007-09, 15 sites were sampled consecutively in all three years. In the comparison of 2006 to 2007 results, the very wet spring in 2006 appears correlated with much lower IBI scores in comparison with the IBI scores obtained during the more normal water year in 2007.Overall, 2008 results tended to be intermediate between the 2006 and 2007 results, though the 2008 average IBI scores from these sites were much closer to the 2007 results than the 2006 results. This finding corresponds with the similarity in annual and spring rainfall amounts between 2007 and 2008, and the dissimilarity between those years and 2006. By contrast, the 2009 results tended to be similar to the 2007 results, and average IBI scores in both 2009 and 2007 were higher than the 2008 results. The very dry spring experienced in 2008 may have had a detrimental effect on overall (average) results.

This analysis indicates that a very wet water year and in particular a very wet spring may have a dramatically negative effect on BMI community composition, while a very dry spring may also have a negative effect.

To further test potential effects of climate on B-IBI scores, B-IBI scores accumulated during the 11-year period of bioassessment monitoring (2001-2011) in Contra Costa County were compared to three relevant climatological metrics:

- Rainfall amount in the 30 days prior to BMI sampling
- Season-to-date rainfall amount prior to BMI sampling
- Mean daily high temperature for 30 days prior to BMI sampling

As shown in Figures 6, 7, and 8, none of these factors are strongly correlated with B-IBI scores. In all three cases the site-to-site variability is much more prominent than any effect of the climatological feature evaluated.

3.0 RESULTS

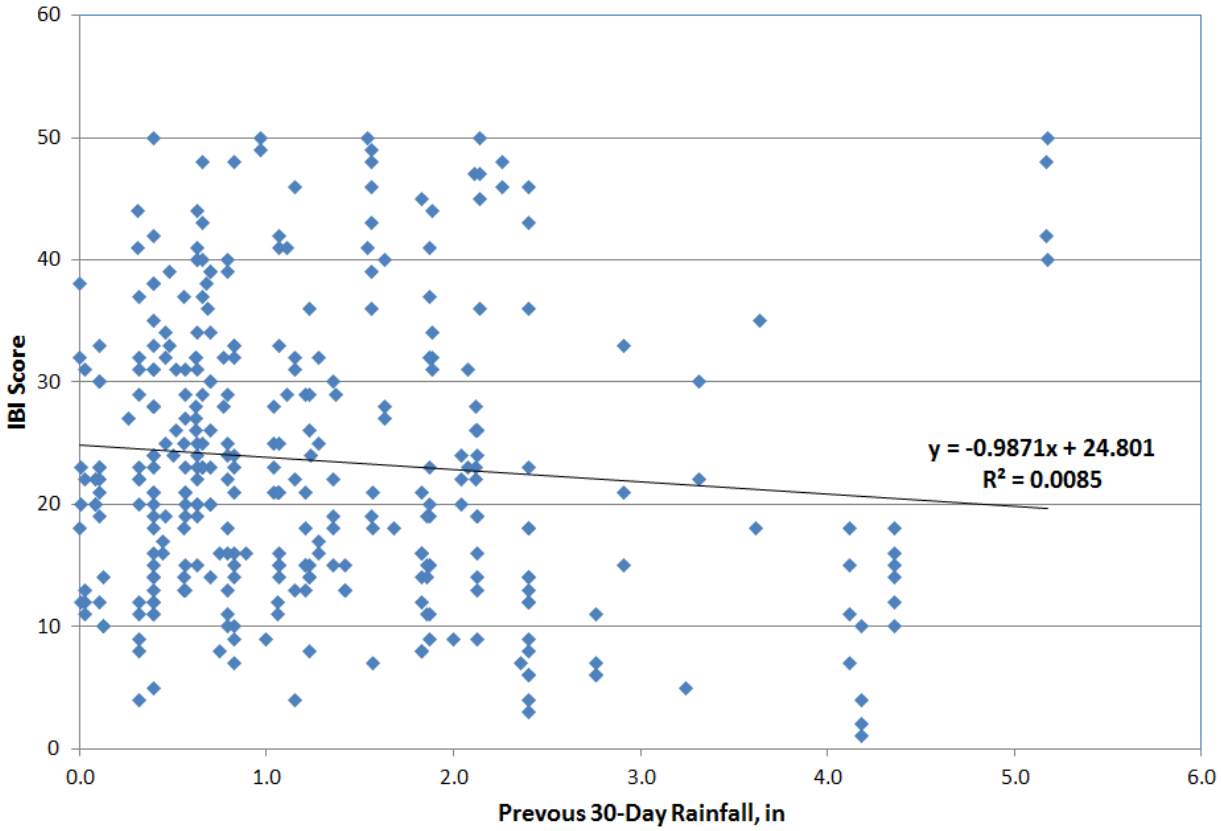


Figure 6. Correlation of 2001-2011 B-IBI Scores to 30 Day Prior Rainfall Amount

3.0 RESULTS

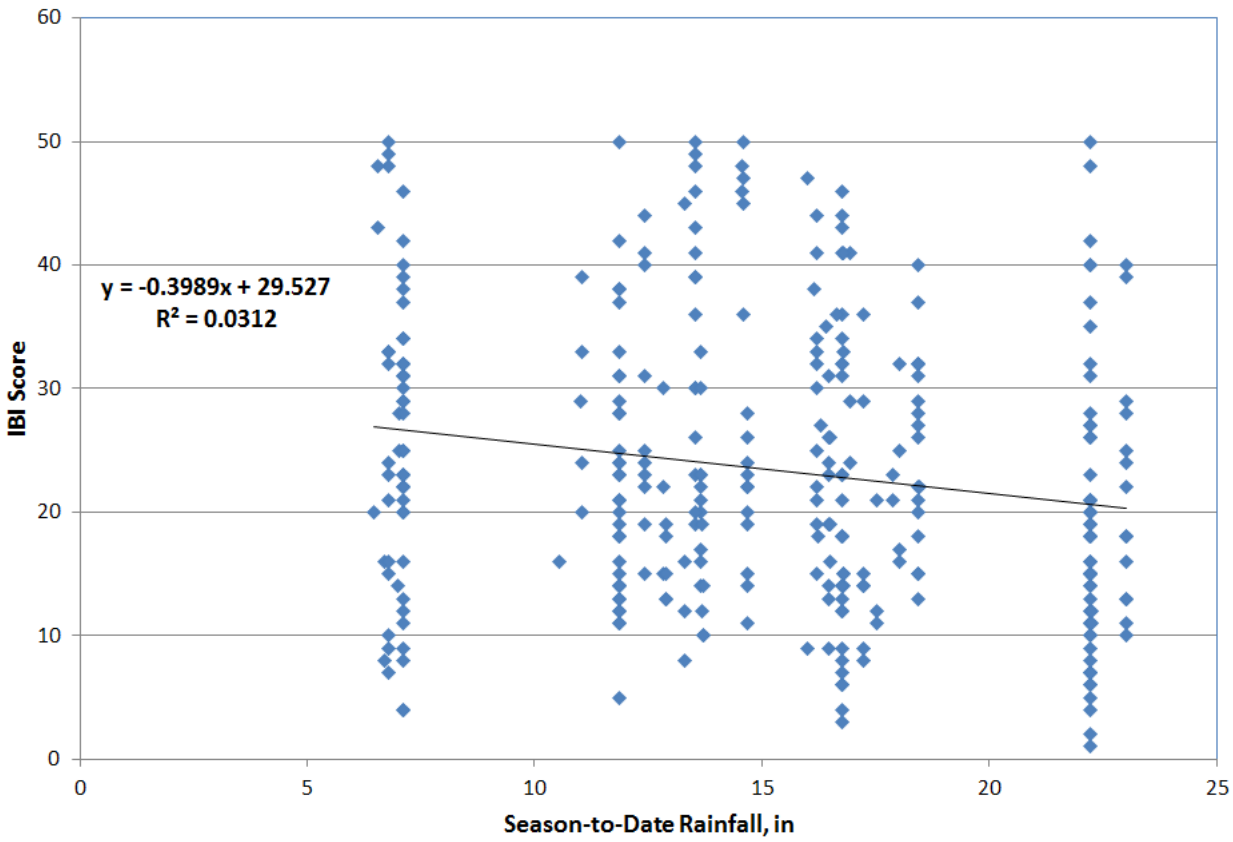


Figure 7. Correlation of 2001-2011 B-IBI Scores to Seasonal Cumulative Rainfall Amount

3.0 RESULTS

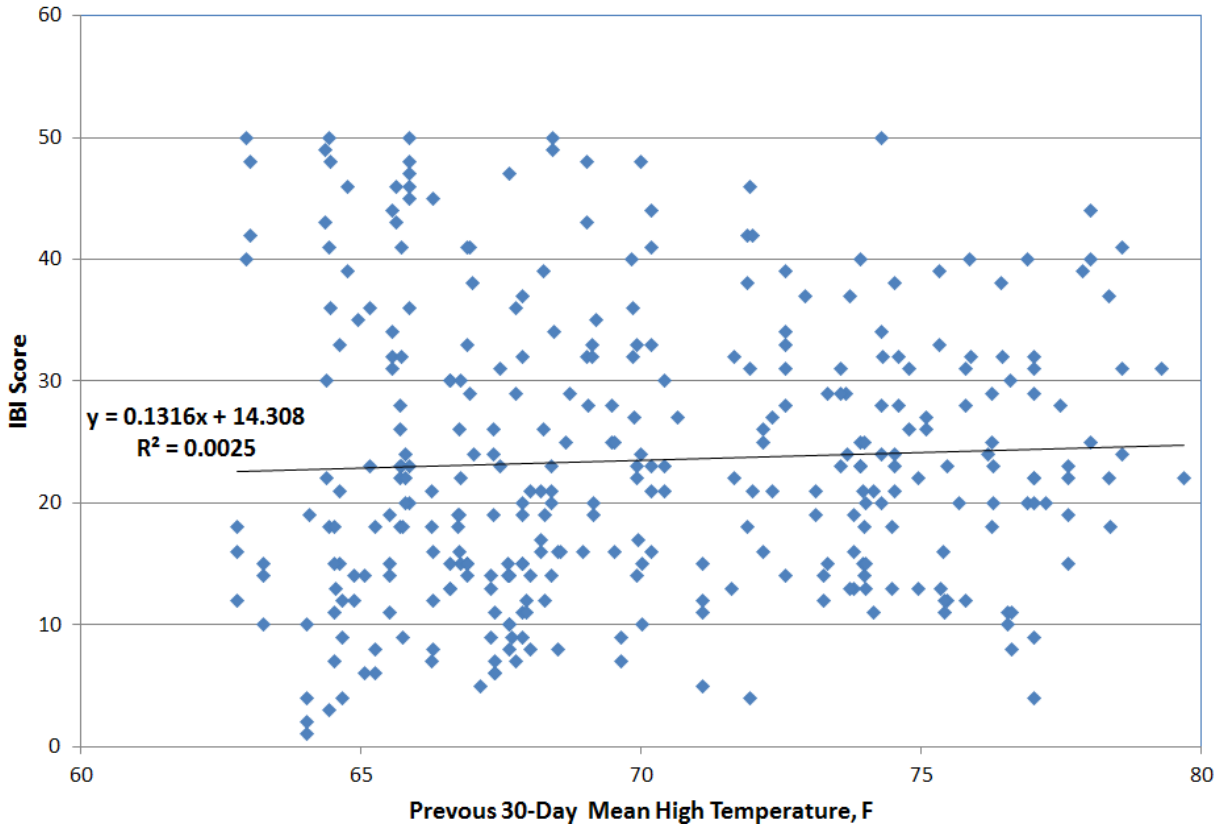


Figure 8. Correlation of 2001-2011 B-IBI Scores to 30 Day Prior Mean Daily High Temperature

3.3.2 Spatial Variation

Benthic community composition is affected by a variety of geographical features, including land use, underlying geology, and topography. Urbanization can affect the type and diversity of BMIs present at creek stations due to changes in hydrology, riparian vegetation, creek substrate, and water quality. Due to historical development patterns, urbanization in Contra Costa County typically decreases as elevation increases. In many watersheds, urbanization also decreases with increasing distance upstream from the creek mouth.

For recent years, BMI monitoring sites were characterized as being in "lower", "middle", or "higher" stream reach ranges, and the minimum, mean, and maximum B-IBI scores were compared for each group (see ARC, 2008, 2009, 2010). As shown in Figure 9, for the 2009 BMI sample results, the results of these comparisons support the idea that upper regions of watersheds tend to have higher B-IBI scores than lower regions. The mean and maximum in each category consistently increased from lower to middle to upper ranges of the watersheds tested in 2009. These spatial trends were consistent with those observed in the 2007 and 2008 data. (The number of sites sampled in 2011 was not sufficient to repeat this analysis with the 2011 data for this report.)

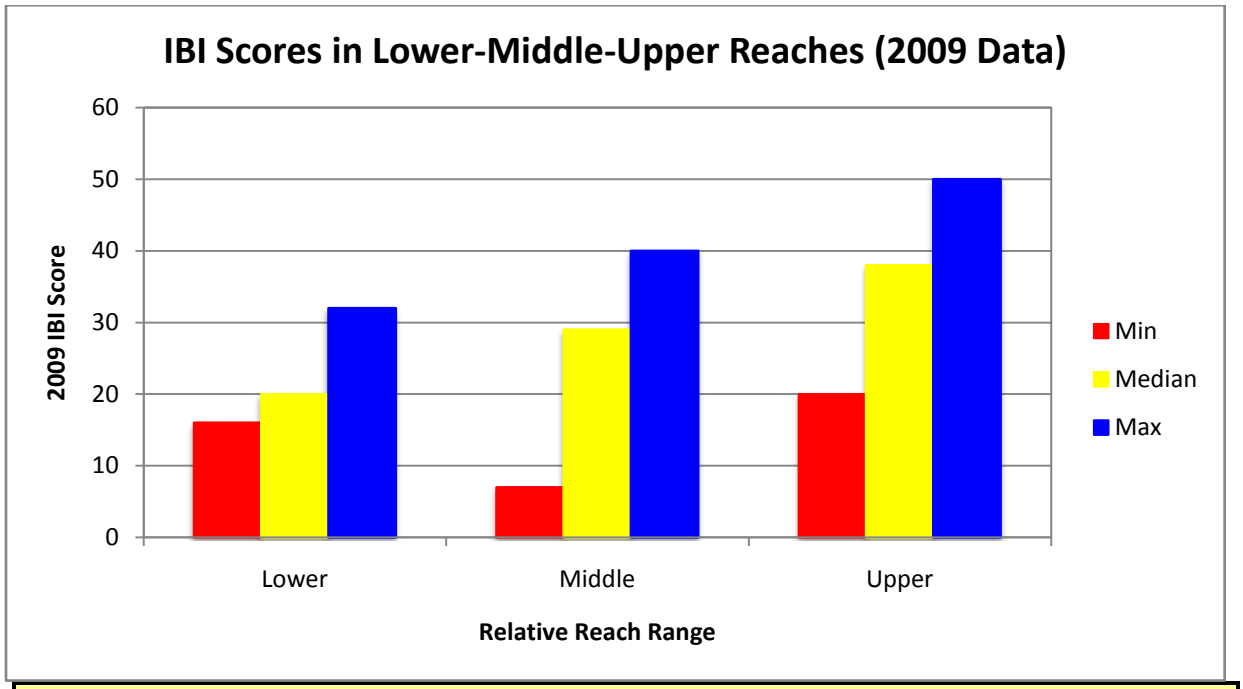


Figure 9. Comparisons of IBI Scores in Lower, Middle and Upper Creek Stations, 2009 Data

Using data from the cumulative 2001-2011 Contra Costa BMI data set, mean site B-IBI score was compared to site elevation (for those sites for which elevation is known with some certainty). As shown in Figure 10, the correlation is fairly strong, with average IBI score increasing with elevation.

To further test this relationship, the numerical portion of the site code was used as an analog for distance from the creek mouth, which in turn can be considered to be a potential indicator of urban influence (lower site codes generally occur in areas with higher development density). As shown in Figure 11, although the slope of the line indicates that, as expected, B-IBI score does increase with increasing distance from the creek mouth, site code was poorly correlated with mean site B-IBI score.

3.0 RESULTS

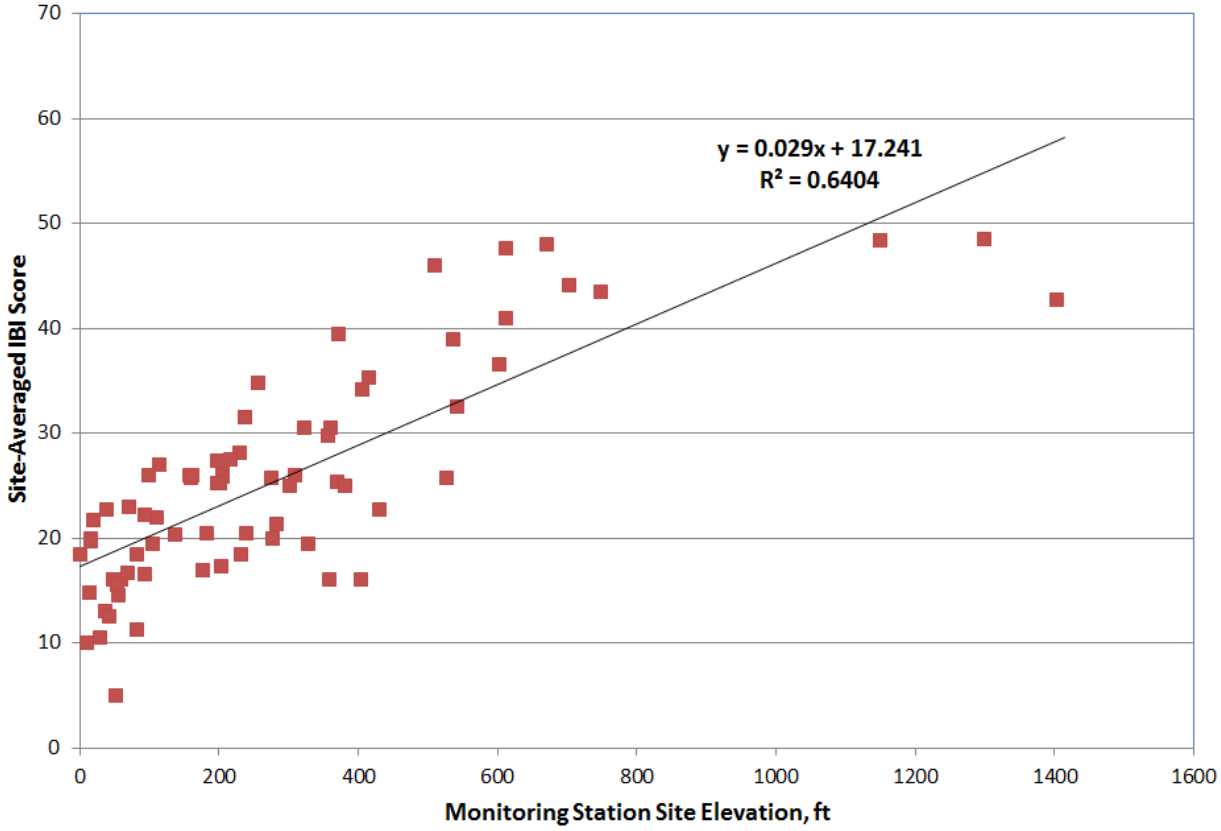


Figure 10. Correlation of 2001-2011 Mean Site IBI Scores to Site Elevations

3.0 RESULTS

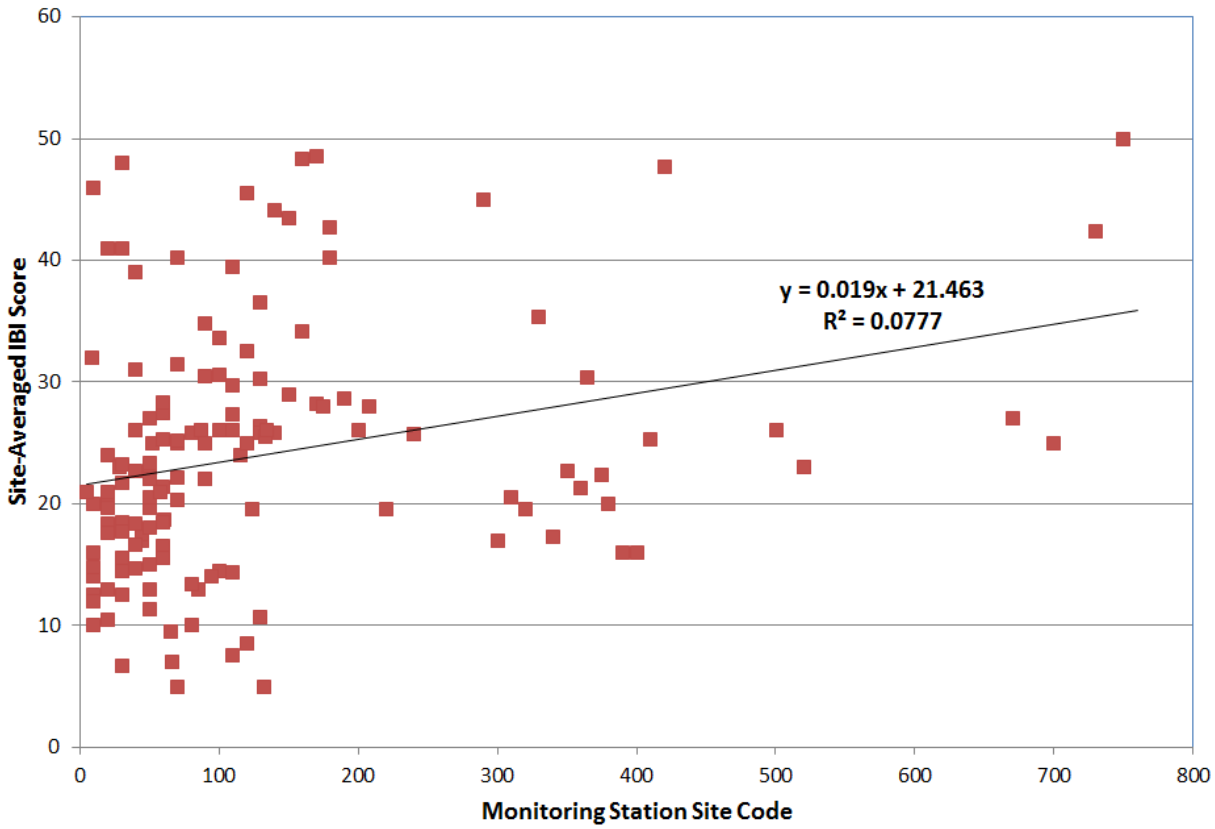


Figure 11. Correlation of 2001-2011 Mean Site IBI Scores to Numerical Site Codes

3.0 RESULTS

3.3.2 Reach-Scale Physical Habitat Quality

Physical habitat characteristics that may influence BMI assemblages include substrate composition and embeddedness, in-stream vegetation, channel alteration and canopy cover. These parameters were qualitatively assessed at each sampling station using the physical habitat assessment (PHAB) approach as provided in the 2007 SWAMP protocols, based substantially on procedures included in the U.S. Environmental Protection Agency's (EPA) Rapid Bioassessment Protocol (Barbour et al., 1999).

In 2007, 2008, and 2009, the PHAB scores were positively correlated with the B-IBI scores. The relationships each year were statistically significant, but the correlations were relatively weak. This analysis was not done for the 2010 or 2011 data due to the relatively small number of data points available. Physical habitat condition is typically affected by the degree of development within a watershed. Additional investigation should be done to further illuminate how specific physical habitat factors influence BMI populations.

3.3.3 Invasive Species

BMI assemblages also can be impacted by invasive species. This appears to have happened at the WAN080 site in West Antioch Creek. Whereas in 2006 the sample from this site was dominated by chironomids and planariads, in both 2007 and 2008 the sample was dominated by Hydrobiidae, the family to which the invasive New Zealand mudsnail belongs. Confirmation of the New Zealand mud snail identification was provided by scientists from several institutions. The B-IBI score for this site dropped from 15 in 2006 to 14 in 2007, and to 11 in 2008. The 2006-to-2007 decrease was also seen at site WAN060, downstream of the site impacted by the documented presence of the New Zealand mud snail (site WAN060 was not monitored in 2008). The WAN080 site received the lowest IBI score of the 47 sites tested in 2008, with no other site receiving a B-IBI score lower than 17. These sites were not tested in 2009 through 2011. However, for the first time, New Zealand mudsnails (Potamopyrgus antipodarum) were positively identified in a sample collected from a site on Baxter Creek (site BAX030) in 2009. The 2009 B-IBI score for this site was not negatively affected in comparison to previous years, however (see section 3.5.2; ARC, 2010), perhaps indicating that the invasive colonization may be in the early stages.

New Zealand mudsnails were detected in the WAL050 sample (Grayson Creek) in 2011. The mudsnails dominated that site, accounting for 261 of the 481 BMIs identified (54%).

3.4 WATERSHED-SPECIFIC OBSERVATIONS

For the watersheds monitored in 2011, this section includes graphical presentations of all BMI monitoring results from 2001-2011, to allow for assessments of both spatial and temporal variation. The charts are arranged by site within each watershed, proceeding from downstream on the left side to upstream on the right. This also follows the site numbering system, which runs from lower to higher numbers as one proceeds from downstream to upstream within each watershed.

As in previous years, several 2011 samples contained less than the expected 500 organisms, indicating relatively low abundance of BMI organisms at these sites. These samples were collected from the following sites:

ALH050
MSH130
SPA070*
SPA110
WAL090
WAL670

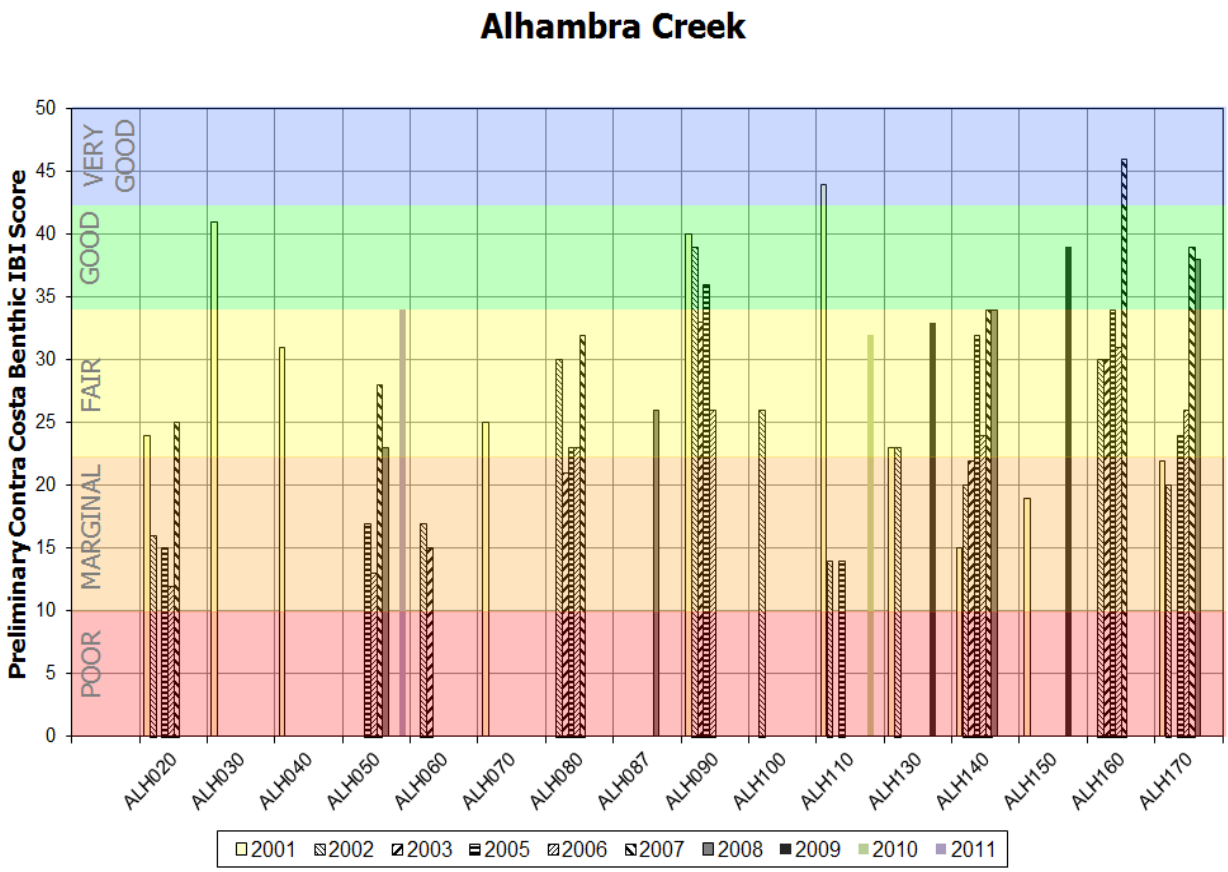
*The SPA070 site contained only 8 BMIs.

Low abundance at these sites could reflect inherently low abundance at the site, or sampling in recently wetted areas where there was insufficient time for invertebrate colonization.

3.0 RESULTS

3.4.1 Alhambra Creek Watershed

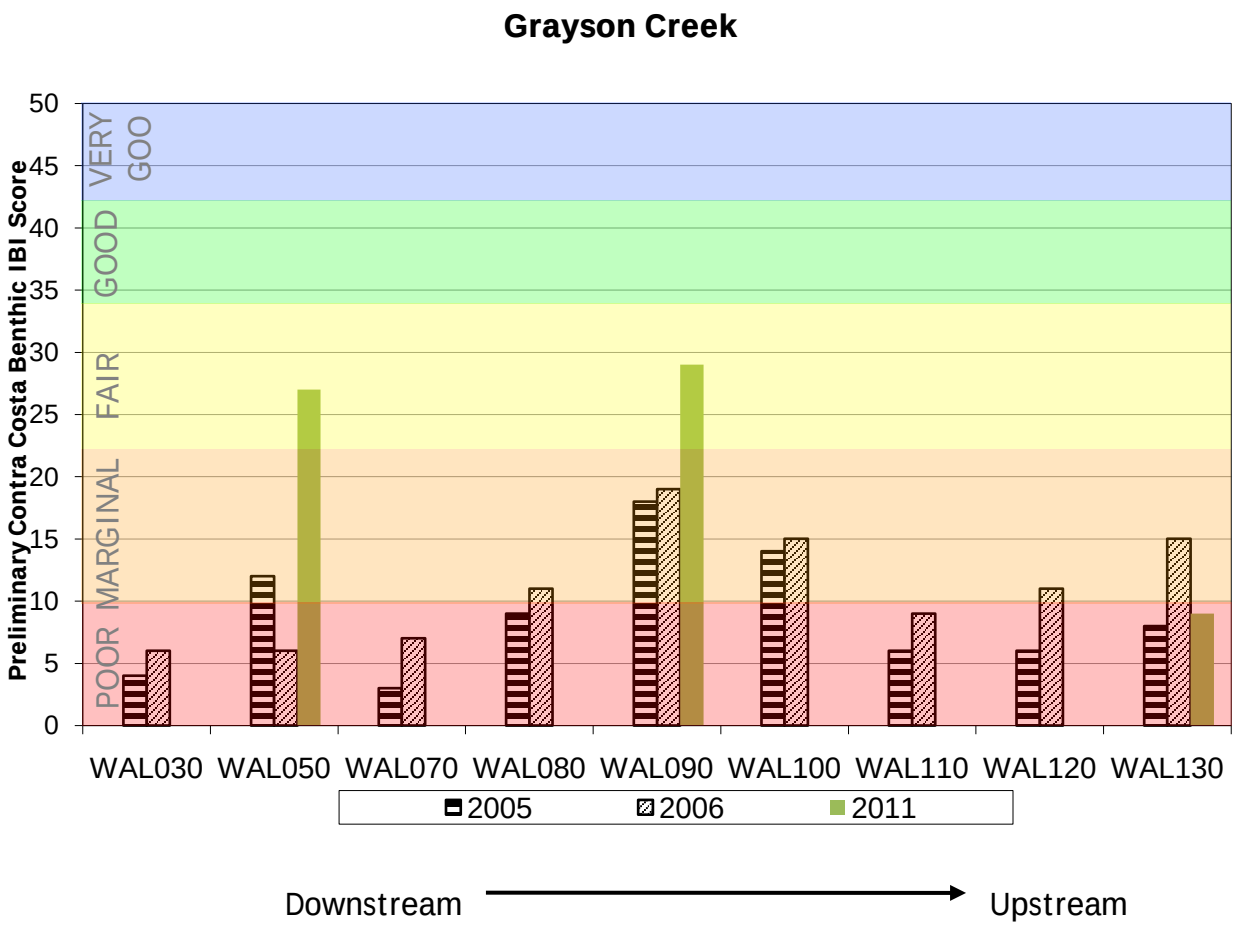
While there is some variation within the Alhambra Creek watershed, the general condition of aquatic life uses in creeks appears to be relatively good. The B-IBI scores range up into the Very Good category, and there are no scores in the Poor category. The overall quality of benthic aquatic life appears to improve somewhat while moving from downstream to upstream in the Alhambra Creek watershed, as illustrated by the B-IBI scores.



Downstream → Upstream

3.4.2 Grayson Creek Watershed

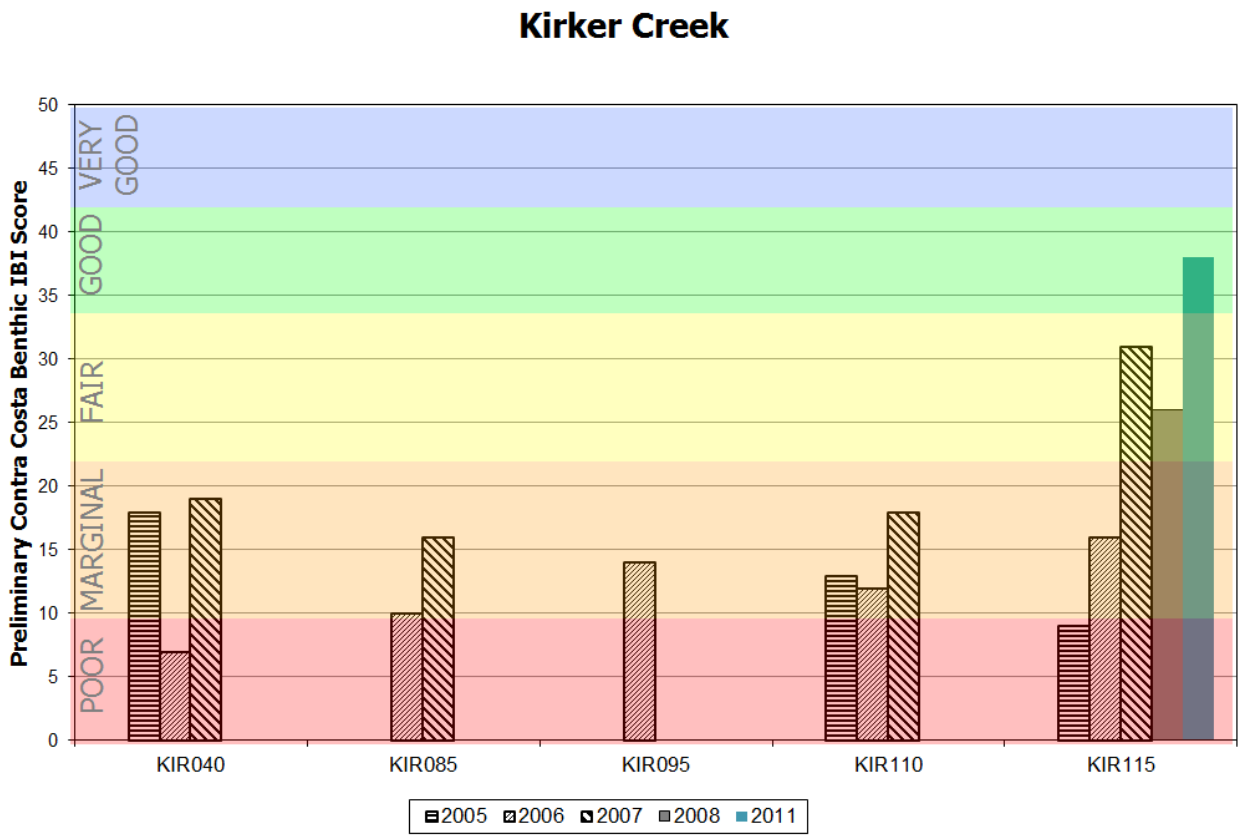
While the Grayson Creek sites have generally had relatively fewer monitoring events than some other Contra Costa watersheds, it is fairly evident that aquatic life conditions are of lower quality than most other watersheds, as evidenced by the relatively low B-IBI scores, typically ranging from Poor to Marginal. Two of the three scores obtained in 2011 were substantially higher than those measured in previous years. However, The New Zealand Mud Snail also was discovered at Site WAL050 in 2011 in large numbers (54% of BMIs at that site).



Note: the Grayson Creek watershed is located within the Walnut Creek watershed

3.4.3 Kirker Creek Watershed

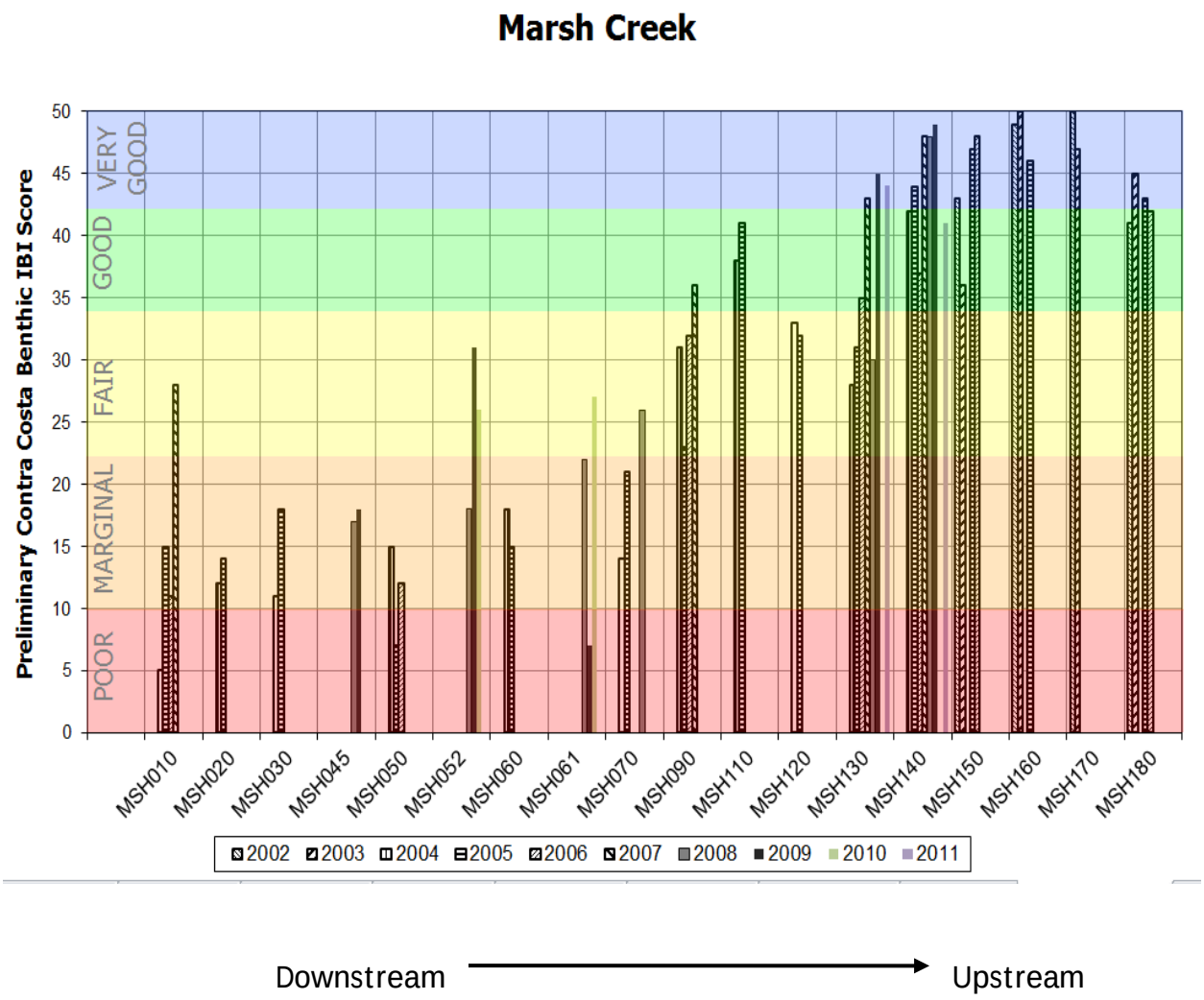
The Kirker Creek watershed also has had relatively few monitoring events at a fairly small number of sites, reflecting the moderate size of the watershed. In the lower to middle ranges of this watershed B-IBI scores fall into the Poor to Marginal categories, while at the farthest upstream station (Site KIR115), B-IBI scores have ranged up in the Very Good category. At that site the B-IBI scores also appear to be generally improving with time.



3.4.4 Marsh Creek Watershed

In contrast to the upper watershed, stations in the lower watershed consistently generally score in the poor to marginal categories, and are dominated by short-lived tolerant benthic macroinvertebrates that generally indicate stress on a system. The low scores at stations in the Lower March Creek watershed, located downstream of the Marsh Creek reservoir (below MSH090), are likely due to the reduced habitat complexity caused by the straightening of the channel and lack of riparian habitat. Additionally, the reservoir itself reduces the amount of large substrate (e.g., cobbles and boulders) that can be transported to the sections of the creek directly below the dam, and therefore likely reduces the diversity of BMI habitat available. Samples from these lower watershed sites also tend to have lower overall BMI abundance, as indicated by a total organism count of less than 500 individuals.

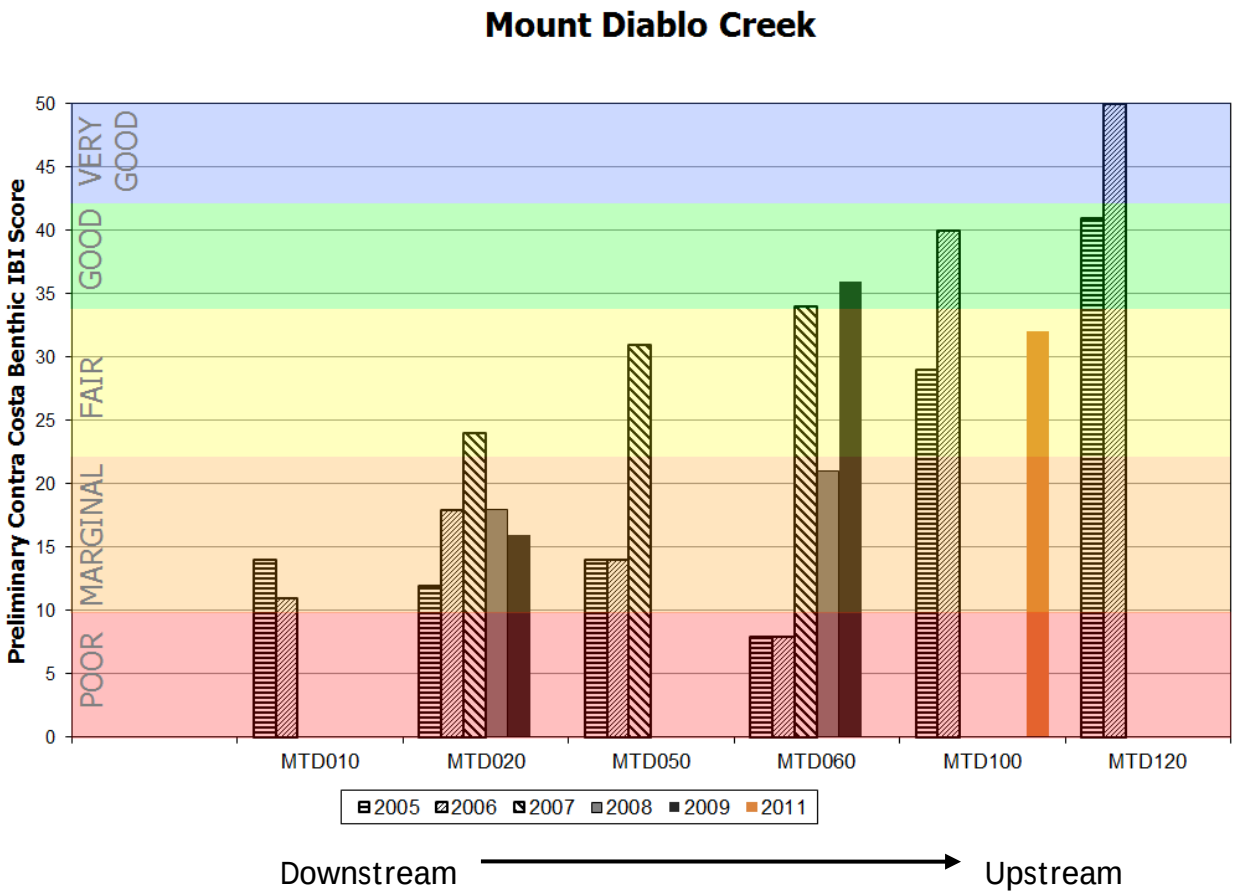
However, the sites in the Upper Marsh Creek watershed, above the dam (sites MSH090 and higher), range generally in the fair to very good categories. A mercury mine is located in the region between sites MSH130 and MSH140. IBI scores are typically higher in the upstream location (MSH140).



Note: Marsh Creek Reservoir is located between sites MSH070 and MSH090

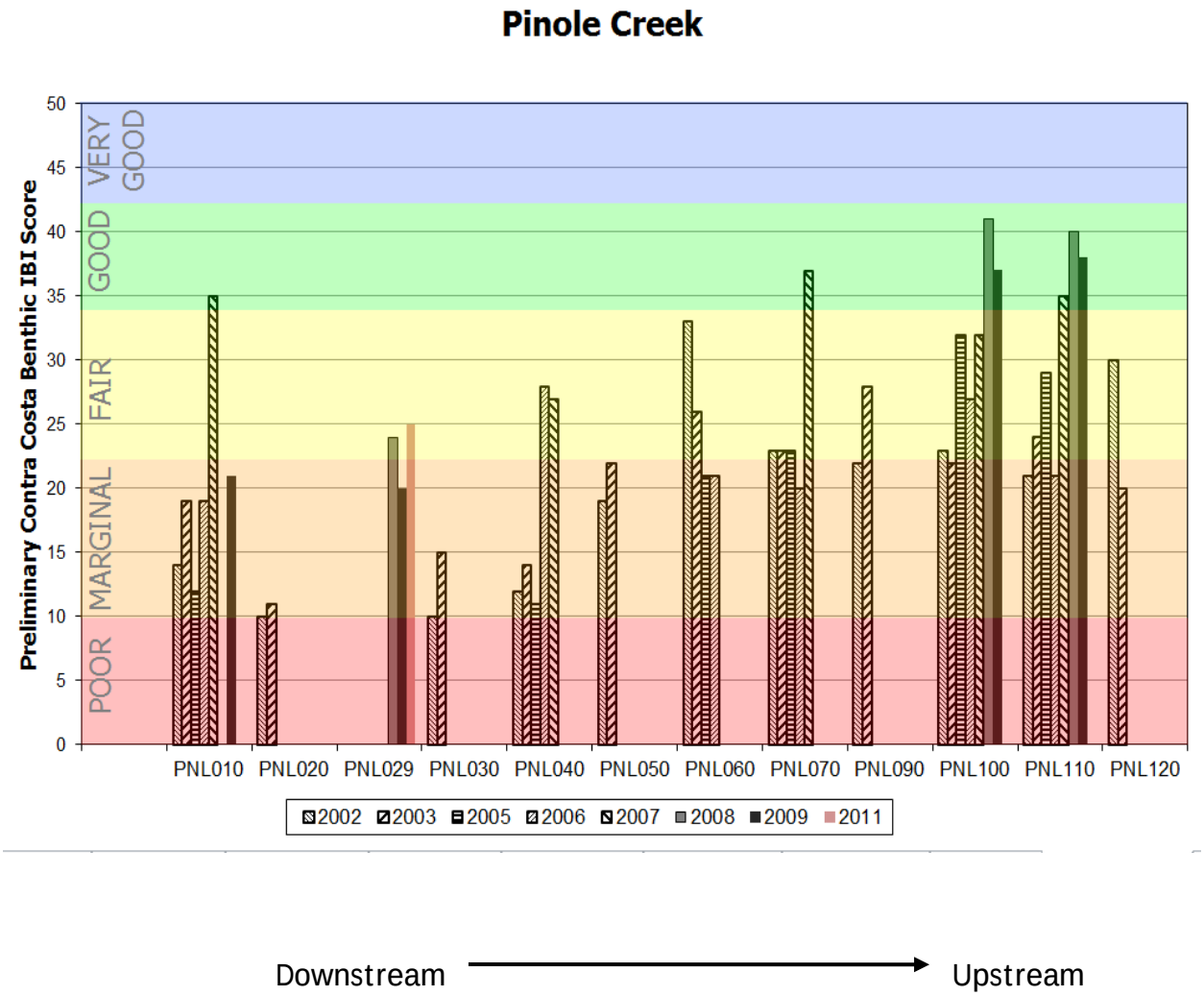
3.4.5 Mount Diablo Creek Watershed

Mount Diablo Creek watershed is a medium-sized watershed which has had relatively little monitoring activity in CCMAP. In this watershed there is a fairly clear progression from lower B-IBI scores in the lower watershed, ranging from Marginal to Fair, to higher scores in the upper watershed, ranging up to the Good and Very Good categories.



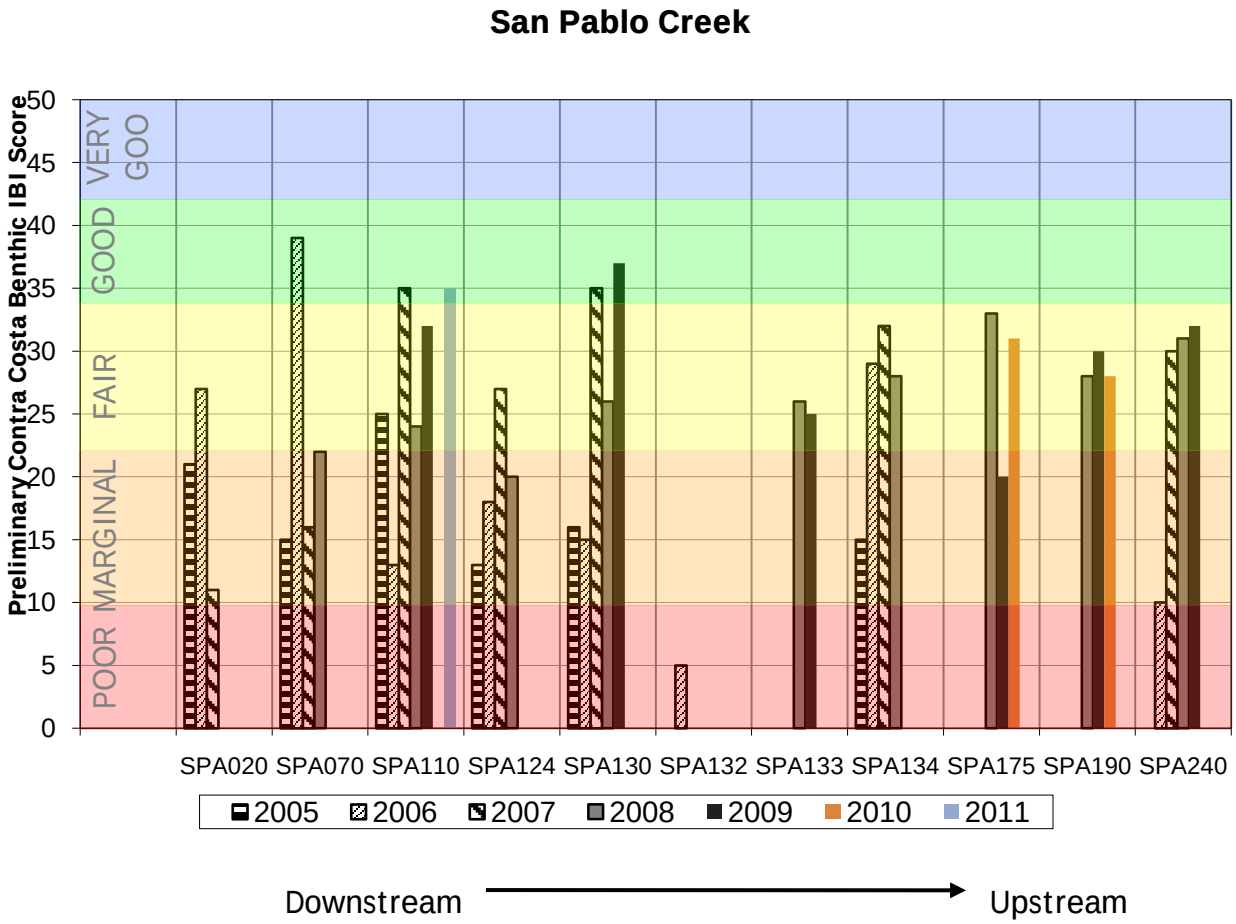
3.4.6 Pinole Creek Watershed

Pinole Creek is a watershed of moderate size that has received a good degree of monitoring activity since 2002. B-IBI scores have ranged generally from the Marginal to Good categories, with some tendency to exhibit improvement in scores moving from downstream to upstream.



3.4.7 San Pablo Creek Watershed

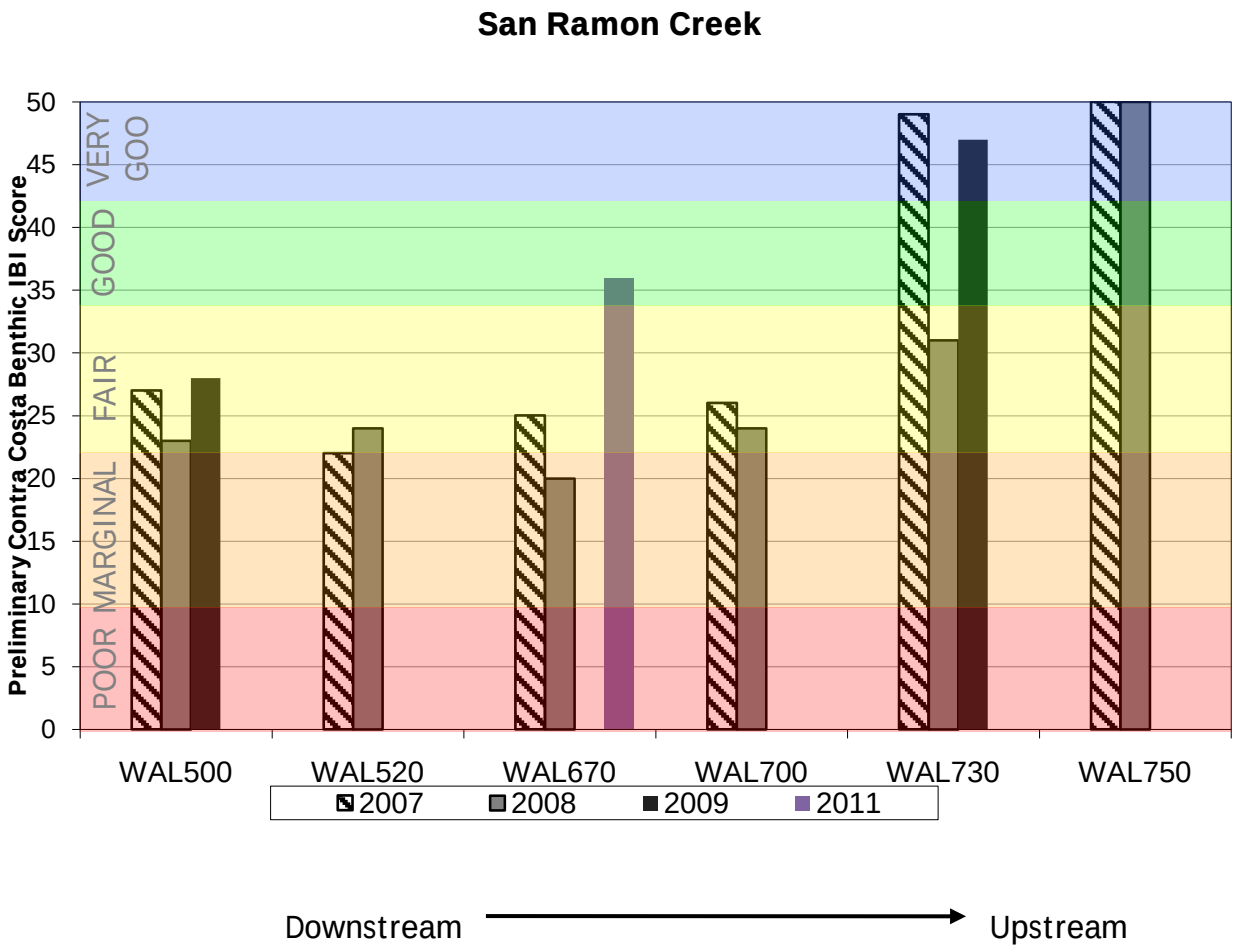
The condition of aquatic life uses in creek stations located in the San Pablo Creek watershed appears to be highly variable from site to site and year to year. In 2011, the sample from the SPA070 site exhibited extremely low overall BMI abundance, as indicated by a total organism count of only eight individuals. The reason(s) for this anomalously low BMI abundance are not known. The B-IBI score for this site was therefore not included in the plot or county-wide statistics for the 2011 data.



Notes:
San Pablo Reservoir is located between sites SPA134 and SPA175.
Due to a site coding error in 2008, the site previously labeled as SPA220 is in fact SPA175, and the site previously labeled as SPA228 is in fact SPA190; the 2008 data were relabeled accordingly in the graph above.

3.4.8 San Pablo Creek Watershed

The condition of aquatic life uses in creek stations located in the San Ramon Creek watershed is relatively good, relative to other watersheds in Contra Costa County. The upper watershed sites in particular exhibit high B-IBI scores, generally in the Very Good category.



Note: the San Ramon Creek watershed is located within the Walnut Creek watershed

3.0 RESULTS

3.5 CUMULATIVE RESULTS, 2001-2011

During the 11-year period, 2001-2011, bioassessment monitoring was performed at over 140 sites, representing 20 watersheds in Contra Costa County, with over 400 samples analyzed for BMI identification. Descriptive statistics (minimum, maximum, mean and median) were computed for each site sampled, for all B-IBI scores derived from BMI monitoring conducted during 2001-2011, along with the first and last year sampled, and the number of years sampled at each site; see Appendix H.

San Pablo Creek at Site SPA070, May 2011

Pinole Creek, May 2011

4.0 CONCLUSIONS AND RECOMMENDATIONS

During the 11-year period, 2001-2011, bioassessment monitoring was performed at over 140 sites, representing 20 of the 29 major watersheds in Contra Costa County, with over 400 samples analyzed for benthic macroinvertebrate (BMI) community composition.

In 2010 and 2011, the Contra Costa Volunteer Creek Monitoring Program conducted bioassessment monitoring at a reduced level compared to prior years, with monitoring performed at 12 creek sampling stations each year. To provide a measurement of Aquatic Life Use condition at these stations, a preliminary Benthic Index of Biotic Integrity (B-IBI) score was calculated for each station. The B-IBI score is based on a set of metrics computed from the raw BMI taxonomic data, according to the approach developed previously for creeks in Contra Costa County. The B-IBI scores were then attributed to aquatic life use condition categories (poor, marginal, fair, good, or very good), based on a standardized grading system that assigns specific ranges of B-IBI scores to those categories.

Because only eight identified benthic macroinvertebrates were tallied for the SPA070 site (San Pablo Creek), a B-IBI score was not calculated for this site. Based on the B-IBI scores calculated from the other 11 bioassessment stations monitored in 2011, the majority of creek stations sampled in Contra Costa County scored in the good (four stations) or fair (five stations) categories, with one site each scoring in the very good and poor categories. Because of the relatively low number of sites monitored, the 2011 results cannot be reliably extrapolated as being more broadly representative of Contra Costa County watersheds.

New Zealand mudsnails (*Potamopyrgus antipodarum*) were present at the WAL050 site (Grayson Creek) in 2011, and dominated the BMI assemblage at that site, with 54% of the individuals identified.

BMI community composition and the resulting B-IBI scores vary both spatially throughout Contra Costa County (due to differences in geographical factors, including land use, underlying geology, and topography) and temporally (due particularly to annual and seasonal differences in climate and weather, especially hydrological factors). Analysis was performed to assess both spatial and temporal variation in B-IBI scores over the 11-year period of bioassessment monitoring.

Annual variability in average IBI scores is attributable to a number of factors, including antecedent (preceding) rainfall and other climatological conditions, as well as monitoring site selection for that year. Prior analysis of the 2006-09 BMI metrics indicated that annual rainfall amount and antecedent spring rainfall amount may affect average BMI community composition in a given year.

Additional, detailed analysis conducted with the 11-year (2001-2011) data set indicated that certain climatological factors (prior 30-day rainfall total, cumulative seasonal rainfall to date, and prior 30-day average high temperature) did not correlate well with site-and-date-specific B-IBI scores. The effects of these climatological factors on BMI community composition seem to be overwhelmed by the spatial differences among sites at any given time.

Selected geographical factors that may influence benthic community composition at bioassessment monitoring sites throughout Contra Costa County were evaluated using average site B-IBI scores from the 11-year (2001-2011) data set. This analysis confirmed that elevation correlates significantly with mean site B-IBI score, with higher average B-IBI scores generally occurring at higher elevations. This result may reflect prevailing land use, as the degree of urbanization tends to decrease with increasing elevation in Contra Costa County. The various effects of urbanization (changes in hydrology, riparian vegetation, creek substrate, and water quality) may be reflected therefore in the correlation of B-IBI scores with elevation.

5.0 REFERENCES

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Wilkie Creek, May 2011

APPENDIX A – 2011 MONITORING SITE PHOTOGRAPHS

Photos from all sites monitored in 2011 (on CD-ROM)

APPENDIX B – SAMPLE PHYSICAL HABITAT (PHAB) FIELD DATA SHEET AND SWAMP STREAM CHARACTERIZATION FORM

CALIFORNIA DEPARTMENT OF FISH AND GAME
AQUATIC BIOASSESSMENT LABORATORY

WATER POLLUTION CONTROL LABORATORY
REVISION DATE-- MAY 1999

PHYSICAL HABITAT QUALITY
(California Stream Bioassessment Procedure)

WATERSHED/ STREAM: _____ DATE/ TIME: _____

COMPANY/ AGENCY: _____ SAMPLE ID NUMBER: _____

SITE DESCRIPTION: _____

Circle the appropriate score for all 20 habitat parameters. Record the total score on the front page of the CBW.

Parameters to be evaluated within the sampling reach

HABITAT PARAMETER	CONDITION CATEGORY			
	OPTIMAL	SUBOPTIMAL	MARGINAL	POOR
1. Epifaunal Substrate/ Available Cover	Greater than 70% (50% for low gradient streams) of substrate favorable for epifaunal colonization and fish cover; most favorable is a mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% (30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% (10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% (10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/ Depth Regimes *(deep<0.5 m, slow<0.3 m/s)*	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow).	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

CALIFORNIA DEPARTMENT OF FISH AND GAME
AQUATIC BIOASSESSMENT LABORATORY

WATER POLLUTION CONTROL LABORATORY
REVISION DATE-- MAY 1999

Parameters to be evaluated in an area longer than the sampling reach

HABITAT PARAMETER	CONDITION CATEGORY			
	OPTIMAL	SUBOPTIMAL	MARGINAL	POOR
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left of right side by facing downstream	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities haveimpacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0

APPENDIX B – SAMPLE PHYSICAL HABITAT (PHAB) FIELD DATA SHEET AND SWAMP STREAM CHARACTERIZATION FORM, cont'd

REACH DOCUMENTATION
Standard Reach Length (wetted width ≤ 10 m) = 150 m Distance between transects = 15 m
Alternate Reach Length (wetted width >10 m) = 250 m Distance between transects = 25 m

Project Name:	Date:	Time:
Stream Name:	Site Name/ Description:	
Site Code:	Crew Members:	
Latitude: °N	datum: NAD27 NAD83	
Longitude: °W		

AMBIENT WATER QUALITY MEASUREMENTS					
Temperature (°C)		Dissolved O_2 (mg/L)		pH	
Specific Cond. (µs)		Dissolved O_2 Saturated		Alkalinity (mg/L)	

REACH LENGTH			
150 m		Other	
Actual Length (m)			
Explanation:			

DISCHARGE MEASUREMENTS (first measurement = left bank)
Check if measurement not possible. ☐

VELOCITY AREA METHOD (preferred)				Transect Width:			
	Distance from Bank (cm)	Depth (cm)	Velocity (m/sec)		Distance from Bank (cm)	Depth (cm)	Velocity (m/sec)
1				11			
2				12			
3				13			
4				14			
5				15			
6				16			
7				17			
8				18			
9				19			
10				20			

NOTABLE FIELD CONDITIONS (check one box per topic)						
Evidence of recent rainfall (enough to increase surface runoff)	NO		minimal		>10% flow increase	
Evidence of fires in reach or immediately upstream (<500 m)	NO		< 1 year		< 5 years	
Dominant landuse/ landcover in area surrounding reach	Agriculture		Forest		Rangeland	
	Urban/ Indus		Suburb/ Town		Other	

Site Code:	Site Name:	Date:

Wetted Width (m):	Bankfull Width (m):	Bankfull Height:	Transect: A

FLOW HABITATS (% between transects, T=100%)	
Channel Type	**%**
Cascade/ Fall	
Rapid	
Riffle	
Run	
Glide	
Pool	
Dry	

DENSIOMETER READINGS (0-17) *count covered dots*	
Center Left	
Center Upstream	
Center Down-stream	
Center Right	

BANK STABILITY 5m up and 5m downstream of transect and from bankfull to wetted width			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

PHOTOGRAPHS:	A (up):	A (down):

Wetted Width (m):	Bankfull Width (m):	Bankfull Height:	Transect: B

FLOW HABITATS (% between transects, T=100%)	
Channel Type	**%**
Cascade/ Fall	
Rapid	
Riffle	
Run	
Glide	
Pool	
Dry	

DENSIOMETER READINGS (0-17) *count covered dots*	
Center Left	
Center Upstream	
Center Down-stream	
Center Right	

BANK STABILITY 5m up and 5m downstream of transect and from bankfull to wetted width			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Wetted Width (m):	Bankfull Width (m):	Bankfull Height:	Transect: C

FLOW HABITATS (% between transects, T=100%)	
Channel Type	**%**
Cascade/ Fall	
Rapid	
Riffle	
Run	
Glide	
Pool	
Dry	

DENSIOMETER READINGS (0-17) *count covered dots*	
Center Left	
Center Upstream	
Center Down-stream	
Center Right	

BANK STABILITY 5m up and 5m downstream of transect and from bankfull to wetted width			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Site Code:	Site Name:	Date:

Wetted Width (m):	Bankfull Width (m):	Bankfull Height:	Transect: D

FLOW HABITATS (% between transects, T=100%)		DENSIOMETER READINGS (0-17) *count covered dots*		BANK STABILITY 5m up and 5m downstream of transect and from bankfull to wetted width			
Channel Type	%	Center Left		Left Bank	eroded	vulnerable	stable
Cascade/ Fall		Center Upstream		Right Bank	eroded	vulnerable	stable
Rapid		Center Down-stream					
Riffle		Center Right					
Run							
Glide							
Pool							
Dry							

Wetted Width (m):	Bankfull Width (m):	Bankfull Height:	Transect: E

FLOW HABITATS (% between transects, T=100%)		DENSIOMETER READINGS (0-17) *count covered dots*		BANK STABILITY 5m up and 5m downstream of transect and from bankfull to wetted width			
Channel Type	%	Center Left		Left Bank	eroded	vulnerable	stable
Cascade/ Fall		Center Upstream		Right Bank	eroded	vulnerable	stable
Rapid		Center Down-stream					
Riffle		Center Right					
Run							
Glide							
Pool							
Dry							

Wetted Width (m):	Bankfull Width (m):	Bankfull Height:	Transect: F

FLOW HABITATS (% between transects, T=100%)		DENSIOMETER READINGS (0-17) *count covered dots*		BANK STABILITY 5m up and 5m downstream of transect and from bankfull to wetted width			
Channel Type	%	Center Left		Left Bank	eroded	vulnerable	stable
Cascade/ Fall		Center Upstream		Right Bank	eroded	vulnerable	stable
Rapid		Center Down-stream					
Riffle		Center Right					
Run							
Glide							
Pool							
Dry							

PHOTOGRAPHS:	F (up):	F (down):

Site Code:	Site Name:	Date:

Wetted Width (m):	Bankfull Width (m):	Bankfull Height:	Transect: G

FLOW HABITATS (% between transects, T=100%)		DENSIOMETER READINGS (0-17) *count covered dots*		BANK STABILITY 5m up and 5m downstream of transect and from bankfull to wetted width			
Channel Type	%	Center Left		Left Bank	eroded	vulnerable	stable
Cascade/ Fall		Center Upstream		Right Bank	eroded	vulnerable	stable
Rapid		Center Down-stream					
Riffle		Center Right					
Run							
Glide							
Pool							
Dry							

Wetted Width (m):	Bankfull Width (m):	Bankfull Height:	Transect: H

FLOW HABITATS (% between transects, T=100%)		DENSIOMETER READINGS (0-17) *count covered dots*		BANK STABILITY 5m up and 5m downstream of transect and from bankfull to wetted width			
Channel Type	%	Center Left		Left Bank	eroded	vulnerable	stable
Cascade/ Fall		Center Upstream		Right Bank	eroded	vulnerable	stable
Rapid		Center Down-stream					
Riffle		Center Right					
Run							
Glide							
Pool							
Dry							

Wetted Width (m):	Bankfull Width (m):	Bankfull Height:	Transect: I

FLOW HABITATS (% between transects, T=100%)		DENSIOMETER READINGS (0-17) *count covered dots*		BANK STABILITY 5m up and 5m downstream of transect and from bankfull to wetted width			
Channel Type	%	Center Left		Left Bank	eroded	vulnerable	stable
Cascade/ Fall		Center Upstream		Right Bank	eroded	vulnerable	stable
Rapid		Center Down-stream					
Riffle		Center Right					
Run							
Glide							
Pool							
Dry							

Site Code:	Site Name:	Date:

Wetted Width (m):	Bankfull Width (m):	Bankfull Height:	Transect: J

FLOW HABITATS (% between transects, T=100%)	
Channel Type	**%**
Cascade/ Fall	
Rapid	
Riffle	
Run	
Glide	
Pool	
Dry	

DENSIOMETER READINGS (0-17) *count covered dots*	
Center Left	
Center Upstream	
Center Down-stream	
Center Right	

BANK STABILITY 5m up and 5m downstream of transect and from bankfull to wetted width			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

Wetted Width (m):	Bankfull Width (m):	Bankfull Height:	Transect: K

FLOW HABITATS (% between transects, T=100%)	
Channel Type	**%**
Cascade/ Fall	
Rapid	
Riffle	
Run	
Glide	
Pool	
Dry	

DENSIOMETER READINGS (0-17) *count covered dots*	
Center Left	
Center Upstream	
Center Down-stream	
Center Right	

BANK STABILITY 5m up and 5m downstream of transect and from bankfull to wetted width			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

PHOTOGRAPHS:	K (up):	K (down):

REACH SLOPE (BASIC PHAB, Reach Based use as many segments as needed)	METHOD	CL		HL		TR		HL	

SEGMENT 1		SEGMENT 2		SEGMENT 3		SEGMENT 4		SEGMENT 5		SEGMENT 6	
Slope (%) or Elevation Difference (cm)		Slope (%) or Elevation Difference (cm)		Slope (%) or Elevation Difference (cm)		Slope (%) or Elevation Difference (cm)		Slope (%) or Elevation Difference (cm)		Slope (%) or Elevation Difference (cm)	
	% cm		% cm		% cm		% cm		% cm		% cm
Segment Length		Segment Length		Segment Length		Segment Length		Segment Length		Segment Length	
Bearing		Bearing		Bearing		Bearing		Bearing		Bearing	
Propor-tion (%)		Propor-tion (%)		Propor-tion (%)		Propor-tion (%)		Proportion (%)		Proportion (%)	

APPENDIX C – COMPLETED PHYSICAL HABITAT (PHAB) FIELD DATA SHEETS AND SWAMP STREAM CHARACTERIZATION FORMS, 2011

Completed Physical Habitat field data sheets and SWAMP Stream Habitat Characterization Forms from all sites monitored in 2011 (on CD-ROM)

APPENDIX D – FIELD MEASUREMENTS AND PHYSICAL HABITAT ASSESSMENT, 2011

SUMMARY OF FIELD MEASUREMENTS AND PHYSICAL HABITAT ASSESSMENT SCORES FOR SITES SAMPLED IN 2011

Site Code	Stream Name	Site Name	Date	Time	Temp. (˚C)	Diss. Oxygen (mg/L)	Diss. Oxygen % Satur.	pH	Spec. Cond. (µS)	Alk. (mg/L)	Reach Length (m)	PHAB Score
ALH050	Alhambra Creek	Alhambra Creeck at Martinez Adult School	5/4/2011	10:30	14.1	10.12	99.30%	8.20	985	370	150	131
KIR115	Kirker Creek	At Kirker Creek Apts US of barbed wire fence	4/24/2011	10:00	15.2	5.98	60.50%	8.62	3895	440	150	110
MSH130	Upper Marsh Creek	County Detention Center	5/13/2011	10:00	14.9	11.02	108.90%	8.04	877	300	150	138
MSH140	Upper Marsh Creek	210 Tumbleweed Ct.	5/13/2011	13:00	16.3	10.43	106.58%	8.04	865		150	144
MTD100	Mitchell Creek	At Oak St.	5/6/2011	10:00	14.3	9.88	96.28%	8.16	586	240	150	141
PNL029	Pinole Creek	Pinole Library Demonstration Garden	5/5/2011	10:00	13.8	9.91	96.10%	8.24	1081	360	150	122
SPA070	San Pablo Creek	El Portal Rd at St. Joseph's Cemetery ; DS of metal ret	5/7/2011	10:00	13.4	9.49	91.10%	7.96	1277	400	150	108
SPA110	Wilkie	Santa Rita Rd. by De Anza School	5/16/2011	9:30	14.0	13.60	132.50%	7.72	1185	300	150	131
WAL050	Grayson Creek	Grayson Cr along Diablo Valley College	5/14/2011	14:00	16.42	17.67	180.80%	8.56	1626	340	150	114
WAL090	W. Fk. Grayson Creek	West Fk Grayson Cr at Grayson Lane and Buttner Rd	5/14/2011	9:30	12.27	10.64	99.73%	8.08	961	280	150	116
WAL130	Murderers Creek	North Fk Murderers Creek at Brookwood Park	4/20/2011	10:00	12.8	10.34	98.00%	7.76	906	315	150	110
WAL670	San Ramon Creek	Zephyr Circle	5/19/2011	10:00	12.74	15.06	142.30%	8.15	727	300	150	124

Notes for PHAB/field data table:
Site names and locations have been standardized. All other information in this table is derived directly from the field data sheets.
The ALH050 Spec. Cond. value had two different measurements on the original data sheet.
MSH140: alkalinity measurement left blank (according to data sheet, measurement was not possible).
SPA110 PHAB score had no value circled under the bank stability category for the right bank.

DATA QUALITY ASSESSMENT - OVERVIEW

During each year of data collection, the Contra Costa Clean Water Program and/or the Volunteer Creek Monitoring Program have conducted quality assurance procedures based on guidance from the California Department of Fish and Game and SWAMP.

To assess the accuracy of field data collection techniques, duplicate samples are collected annually in the field from at least 10% of the sites sampled during that year. Organisms identified in the original sample are compared with those identified in the duplicate sample using species similarity measurements. Past results of these comparisons consistently indicated that duplicate and original samples were at least 80% similar, suggesting that the accuracy of field measurements was high (Cressey and Sommers 2002, 2003, 2004, 2005, 2006).

In addition to field duplicate quality assurance measurements, each year at least 10% of the samples enumerated are analyzed a second time by an independent laboratory for discrepancies in taxonomic identification, and any such discrepancies are reviewed and resolved.

Procedures and results of these efforts are briefly summarized below for the 2011 data collection effort.

2011 QC SUMMARY-Completeness/Representativeness

As in previous years, several 2011 samples contained less than the expected 500 organisms, indicating relatively low abundance of BMI organisms at these sites. These samples were collected from the following sites:

ALH050
MSH130
SPA070*
SPA110
WAL090
WAL670

*The SPA070 site contained only 8 BMIs.

The low abundance illustrated by these low sample counts could be due to inherently low abundance at the sites, or due to sampling in recently-wetted areas where there was insufficient time for invertebrate colonization.

2011 QC SUMMARY - Field Duplicates

One field duplicate sample (for site WAL670) was submitted to the BSI lab and analyzed in 2011. For the various metrics associated with these four samples, relative percent difference (RPD) was calculated between the original and duplicate samples, as a means of assessing precision in the field collection and analytical processes. For the 2011 duplicate, the average RPD was 24% for the standard set of BMI metrics (i.e., the metrics were on average 89% similar). An acceptable level of difference between duplicates is normally considered to be 20-25%.

Taxonomic list of benthic macroinvertebrates identified in samples from Contra Costa County stream sites, spring 2011.

Phylum	Class	Order	Family	Final ID	CTV[1]	FFG[2]
Arthropoda						
	Insecta					
		Coleoptera				
			Dytiscidae			
				Agabus	8	p
				Sanfillipodytes	5	p
				Stictotarsus	5	p
			Haliplidae			
				Haliplus	5	ot
			Hydrophilidae			
				Hydrophilidae	5	p
		Diptera				
				Cyclorrhaphous/ Brachycera	6	
			Ceratopogonidae			
				Bezzia/ Palpomyia	6	p
				Ceratopogonidae	6	p
			Chironomidae			
				Chironomini	6	cg
				Orthocladiinae	5	cg
				Pseudochironomus	5	cg
				Tanypodinae	7	p
				Tanytarsini	6	cg
			Dixidae			
				Dixella	2	cg
			Empididae			
				Empididae	6	p
				Neoplasta	6	p
				Trichoclinocera/ Clinocera	6	p
			Ephydridae			
				Ephydridae	6	
			Pelecorhynchidae			
				Glutops	3	p
			Psychodidae			
				Psychoda	10	cg
			Sciomyzidae			
				Sciomyzidae	6	p
			Simuliidae			
				Simulium	6	cf
			Stratiomyidae			
				Caloparyphus/ Euparyphus	8	cg
				Euparyphus	8	cg
				Stratiomys	8	cg
			Tipulidae			
				Tipula	4	om

APPENDIX F - Benthic Macroinvertebrate Taxa Identified in Contra Costa County, 2011, cont'd

Ephemeroptera		
Ameletidae		
Ameletus	0	cg
Baetidae		
Baetis	5	cg
Callibaetis	9	cg
Fallceonquilleri	4	cg
Ephemerellidae		
Drunella	0	cg
Ephemerella	1	cg
Heptageniidae		
Heptageniidae	4	sc
Leptophlebiidae		
Paraleptophlebia	4	cg
Megaloptera		
Corydalidae		
Neohermes	0	p
Odonata		
Coenagrionidae		
Argia	7	p
Zoniagrionexclamationis	9	p
Lestidae		
Lestes	9	p
Plecoptera		
Chloroperlidae		
Sweltsa	1	p
Nemouridae		
Malenka	2	sh
Perlodidae		
Baumanella alameda	2	p
Isoperla	2	p
Kogotusnonus	2	p
Trichoptera		
Brachycentridae		
Micrasema	1	mh
Hydroptilidae		
Hydroptila	6	ph
Lepidostomatidae		
Lepidostoma	1	sh
Sericostomatidae		
Gumaga	3	sh
Arachnoidea		
Acari		
Acari	5	p
Hygrobatidae		
Atractides	8	p
Lebertiidae		
Lebertia	8	p
Sperchontidae		
Sperchon	8	p

APPENDIX F - Benthic Macroinvertebrate Taxa Identified in Contra Costa County, 2011, cont'd

Malacostraca		
Amphipoda		
Crangonyctidae		
Crangonyx	4	cg
Stygobromus	4	cg
Hyalellidae		
Hyalella	8	cg
Ostracoda		
Ostracoda	8	cg
Annelida		
Oligochaeta		
Oligochaeta	5	cg
Mollusca		
Bivalvia		
Veneroida		
Sphaeriidae		
Pisidium	8	cf
Gastropoda		
Basommatophora		
Lymnaeidae		
Lymnaeidae	6	sc
Physidae		
Physa	8	sc
Planorbidae		
Gyraulus	8	sc
Hypsogastropoda		
Hydrobiidae		
Hydrobiidae	8	sc
Potomopyrgus antipodarium	8	sc
Platyhelminthes		
Turbellaria		
Turbellaria	4	p

1) California Tolerance Value (CTV) based on a scale of 0 (highly intolerant) to 10 (highly tolerant)
2) Abbreviations used in denoting functional feeding group (FFG) are as follows:

cf = collector filterer
cg = collector-gatherer
mh = macrophyte herbivore
om = omnivore
p = predator
pa = parasite
ph = piercer herbivore
sc = scraper
sh = shredder

INDIVIDUAL METRICS AND CALCULATED B-IBI SCORES FOR SITES SAMPLED IN 2011

Watershed:	**Alhambra**	**Grayson (Walnut)**			**Marsh**		**Kirker**	**Mt. Diablo**	**Pinole**	**San Pablo**		**San Ramon (Walnut)**
Site Code:	ALH050	WAL050	WAL090	WAL130	MSH130	MSH140	KIR115	MTD100	PNL029	SPA070	SPA110	WAL670
Creek:	Alhambra	Grayson	W. Fork Grayson	Murderers	Upper Marsh	Upper Marsh	Kirker	Mitchell	Pinole	San Pablo	Wilkie	San Ramon
Metrics:												
Cumulative EPT	5	3	3	1	6	10	1	6	3	0	1	7
Percent Non-Insect Taxa	8	4	9	2	8	9	10	7	7	4	9	7
Diptera Taxa	10	8	10	4	10	8	10	8	10	4	10	10
Predator Taxa	7	2	3	1	10	10	8	6	4	1	5	7
Percent Collectors	4	10	4	1	10	4	9	5	1	10	10	5
IBI Score	**34**	**27**	**29**	**9**	**44**	**41**	**38**	**32**	**25**		**35**	**36**

Notes:
See Table 5 in report for method for conversion of raw metrics to scores.
Because the SPA070 site tallied only 8 identified benthic macroinvertebrates, an IBI score was not calculated for this site.
Grayson and San Ramon Creek watersheds are within the Walnut Creek watershed.

APPENDIX H–DESCRIPTIVE STATISTICS FOR SITES MONITORED IN 2001-2011

Stream	ID	First Year Sampled	Last Year Sampled	Total Years Sampled (n)	Minimum IBI	Maximum IBI	Mean IBI	Median IBI
Alhambra Creek	ALH020	2001	2007	5	12	25	18.4	16
Alhambra Creek	ALH030	2001	2001	1	41	41	41	41
Alhambra Creek	ALH040	2001	2001	1	31	31	31	31
Alhambra Creek	ALH050	2005	2011	5	13	34	23.0	23
Alhambra Creek	ALH060	2002	2003	2	15	17	16	16
Franklin Creek	ALH070	2001	2001	1	25	25	25	25
Franklin Creek	ALH080	2002	2007	5	21	32	25.8	23
Alhambra Creek	ALH087	2008	2008	1	26	26	26	26
Franklin Creek	ALH090	2001	2006	5	26	40	34.8	36
Franklin Creek	ALH100	2002	2002	1	26	26	26	26
Alhambra Creek	ALH110	2001	2010	4	14	44	26	23
Alhambra Creek	ALH130	2001	2009	3	23	33	26.3	23
Arroyo del Hambre	ALH140	2001	2008	7	15	34	25.9	24
Arroyo del Hambre	ALH150	2001	2009	2	19	39	29	29
Arroyo del Hambre	ALH160	2002	2007	5	30	46	34.2	31
Alhambra Creek	ALH170	2001	2008	6	20	39	28.2	25
Baxter Creek	BAX030	2006	2009	4	10	28	21.8	24.5
Baxter Creek	BAX045	2005	2008	4	8	22	17	19
Cerrito Creek	CER010	2006	2010	5	7	20	14	16
Cerrito Creek	CER020	2006	2008	2	20	21	20.5	20.5
Cerrito Creek	CER040	2002	2010	7	11	40	22.7	19
E Antioch Creek	EAN020	2006	2007	2	15	33	24	24
E Antioch Creek	EAN030	2006	2007	2	10	27	18.5	18.5
E Antioch Creek	EAN050	2006	2007	2	4	22	13	13
E Antioch Creek	EAN065	2006	2007	2	1	18	9.5	9.5
E Antioch Creek	EAN066	2006	2007	2	2	12	7	7
Grayson Creek	WAL030	2005	2008	3	4	10	6.7	6

Stream	ID	First Year Sampled	Last Year Sampled	Total Years Sampled (n)	Minimum IBI	Maximum IBI	Mean IBI	Median IBI
Grayson Creek	WAL050	2005	2011	3	6	27	15	12
Grayson Creek	WAL070	2005	2006	2	3	7	5	5
Grayson Creek	WAL080	2005	2006	2	9	11	10	10
Grayson Creek	WAL090	2005	2011	3	18	29	22.0	19
Grayson Creek	WAL100	2005	2006	2	14	15	14.5	14.5
Grayson Creek	WAL110	2005	2006	2	6	9	7.5	7.5
Grayson Creek	WAL120	2005	2006	2	6	11	8.5	8.5
Grayson Creek	WAL130	2005	2011	3	8	15	10.7	9
Kellogg Creek	KEL010	2002	2002	1	46	46	46	46
Mallory Creek	KEL020	2002	2003	2	36	46	41	41
Mallory Creek	KEL030	2002	2003	2	48	48	48	48
Kellogg Creek	KEL040	2002	2002	1	39	39	39	39
Kirker Creek	KIR040	2005	2007	3	7	19	14.7	18
Kirker Creek	KIR085	2006	2007	2	10	16	13	13
Kirker Creek	KIR095	2006	2006	1	14	14	14	14
Kirker Creek	KIR110	2005	2007	3	12	18	14.3	13
Kirker Creek	KIR115	2005	2011	5	9	38	24.0	26
Las Trampas Creek	WAL300	2003	2007	3	12	26	17	13
Reliez Creek	WAL310	2003	2004	2	18	23	20.5	20.5
Reliez Creek	WAL320	2003	2004	2	15	24	19.5	19.5
Reliez Creek	WAL330	2003	2007	3	30	38	35.3	38
Las Trampas Creek	WAL340	2003	2007	3	13	26	17.3	13
Happy Valley Creek	WAL350	2003	2007	3	21	25	22.7	22
Lafayette Creek	WAL360	2003	2007	3	16	29	21.3	19
Lafayette Creek	WAL365	2008	2010	3	25	37	30.3	29
Las Trampas Creek	WAL375	2008	2010	3	20	25	22.3	22
Las Trampas Creek	WAL380	2003	2007	3	15	26	20	19
Las Trampas Creek	WAL390	2003	2004	2	8	24	16	16
Grizzly Creek	WAL400	2003	2004	2	12	20	16	16
Las Trampas Creek	WAL410	2003	2010	3	16	32	25.3	28

Stream	ID	First Year Sampled	Last Year Sampled	Total Years Sampled (n)	Minimum IBI	Maximum IBI	Mean IBI	Median IBI
Las Trampas Creek	WAL420	2003	2007	3	45	50	47.7	48
Lower Marsh Creek	MSH010	2004	2007	4	5	28	14.8	13
Lower Marsh Creek	MSH020	2004	2005	2	12	14	13	13
Lower Marsh Creek	MSH030	2004	2005	2	11	18	14.5	14.5
Marsh Creek	MSH045	2008	2009	2	17	18	17.5	17.5
Lower Marsh Creek	MSH050	2004	2006	3	7	15	11.3	12
Marsh Creek	MSH052	2008	2010	3	18	31	25	26
Lower Marsh Creek	MSH060	2004	2005	2	15	18	16.5	16.5
Marsh Creek	MSH061	2008	2010	3	7	27	18.7	22
Lower Marsh Creek	MSH070	2004	2008	3	14	26	20.3	21
Upper Marsh Creek	MSH090	2004	2007	4	23	36	30.5	31.5
Upper Marsh Creek	MSH110	2004	2005	2	38	41	39.5	39.5
Upper Marsh Creek	MSH120	2004	2005	2	32	33	32.5	32.5
Upper Marsh Creek	MSH130	2004	2011	7	28	45	36.6	35
Upper Marsh Creek	MSH140	2004	2011	7	37	49	44.1	44
Curry Creek	MSH150	2002	2006	4	36	48	43.5	45
Upper Marsh Creek	MSH160	2002	2005	3	46	50	48.3	49
Upper Marsh Creek	MSH170	2002	2003	2	47	50	48.5	48.5
Upper Marsh Creek	MSH180	2002	2006	4	41	45	42.8	42.5
Mt. Diablo Creek	MTD010	2005	2006	2	11	14	12.5	12.5
Mt. Diablo Creek	MTD020	2005	2009	5	12	24	17.6	18
Mt. Diablo Creek	MTD050	2005	2007	3	14	31	19.7	14
Mt. Diablo Creek	MTD060	2005	2009	5	8	36	21.4	21
Mitchell Creek	MTD100	2005	2011	3	29	40	33.7	32
Mitchell Creek	MTD120	2005	2006	2	41	50	45.5	45.5
Pine Creek	WAL200	2008	2009	2	25	27	26	26
Pine Creek	WAL220	2008	2009	2	18	21	19.5	19.5
Pine Creek	WAL290	2008	2009	2	44	46	45	45
Pinole Creek	PNL010	2002	2009	6	12	35	20	19

Stream	ID	First Year Sampled	Last Year Sampled	Total Years Sampled (n)	Minimum IBI	Maximum IBI	Mean IBI	Median IBI
Pinole Creek	PNL020	2002	2003	2	10	11	10.5	10.5
Pinole Creek	PNL029	2008	2011	3	20	25	23	24
Pinole Creek	PNL030	2002	2003	2	10	15	12.5	12.5
Pinole Creek	PNL040	2002	2007	5	11	28	18.4	14
Pinole Creek	PNL050	2002	2003	2	19	22	20.5	20.5
Simas Creek	PNL060	2002	2006	4	21	33	25.3	23.5
Pinole Creek	PNL070	2002	2007	5	20	37	25.2	23
Pinole Creek	PNL090	2002	2003	2	22	28	25	25
Periera Creek	PNL100	2002	2009	7	22	41	30.6	32
Pinole Creek	PNL110	2002	2009	7	21	40	29.7	29
No Name Creek	PNL120	2002	2003	2	20	30	25	25
Rodeo Creek	RDO009	2009	2009	1	32	32	32	32
Rodeo Creek	RDO010	2004	2005	2	13	19	16	16
Unnamed Trib	RDO040	2004	2005	2	23	29	26	26
Rodeo Creek	RDO050	2004	2005	2	23	31	27	27
N. Fk. Rodeo Creek	RDO060	2004	2005	2	24	31	27.5	27.5
Rodeo Creek	RDO070	2004	2005	2	26	37	31.5	31.5
Refugio Creek	RFG010	2004	2005	2	9	11	10	10
Refugio Creek	RFG030	2004	2005	2	13	18	15.5	15.5
Refugio Creek	RFG040	2004	2010	3	14	22	16.7	14
Refugio Creek	RFG050	2004	2005	2	19	25	22	22
Refugio Creek	RFG060	2004	2005	2	16	21	18.5	18.5
Rheem Creek	RHM005	2006	2008	3	15	27	21	21
Rheem Creek	RHM010	2006	2007	2	8	16	12	12
Rheem Creek	RHM020	2006	2007	2	14	28	21	21
Rheem Creek	RHM030	2006	2009	4	16	40	23.3	18.5
Moraga Creek	SLE208	2009	2010	2	24	32	28	28
San Pablo Creek	SPA020	2005	2007	3	11	27	19.7	21

Stream	ID	First Year Sampled	Last Year Sampled	Total Years Sampled (n)	Minimum IBI	Maximum IBI	Mean IBI	Median IBI
San Pablo Creek	SPA070	2005	2011	5	15	39	22	19
Wilkie Creek	SPA110	2005	2011	6	13	35	27.3	28.5
San Pablo Creek	SPA124	2005	2008	4	13	27	19.5	19
Castro Creek	SPA130	2005	2009	5	15	37	25.8	26
Oak Creek	SPA132	2006	2006	1	5	5	5	5
San Pablo Creek	SPA133	2008	2009	2	25	26	25.5	25.5
San Pablo Creek	SPA134	2005	2008	4	15	32	26	28.5
San Pablo Creek	SPA175	2008	2010	3	20	33	28	31
San Pablo Creek	SPA190	2008	2010	3	28	30	28.7	28
San Pablo Creek	SPA240	2006	2009	4	10	32	25.8	30.5
San Ramon Creek	WAL500	2007	2009	3	23	28	26	27
San Ramon Creek	WAL520	2007	2008	2	22	24	23	23
San Ramon Creek	WAL670	2007	2011	3	20	36	27.0	25
San Ramon Creek	WAL700	2007	2008	2	24	26	25	25
San Ramon Creek	WAL730	2007	2009	3	31	49	42.3	47
San Ramon Creek	WAL750	2007	2008	2	50	50	50	50
Markley Creek	WAN050	2006	2006	1	18	18	18	18
W Antioch Creek	WAN060	2006	2007	2	13	18	15.5	15.5
W Antioch Creek	WAN080	2006	2008	3	11	15	13.3	14
Wildcat Creek	WIL030	2005	2008	4	16	19	17.8	18
Wildcat Creek	WIL050	2005	2007	3	21	27	23.3	22
Wildcat Creek	WIL058	2005	2006	2	13	29	21	21
Wildcat Creek	WIL060	2006	2009	3	18	40	28.3	27
Wildcat Creek	WIL070	2005	2009	5	36	43	40.2	40
Wildcat Creek	WIL130	2005	2009	4	25	33	30.3	31.5
Wildcat Creek	WIL180	2005	2009	4	20	50	40.3	45.5
	Total #:		Total # samples:	419				

Our Water - Our World

Our Water Our World

Contra Costa County Integrated Pest Management Store Partnership Program

Final Report 2011 - 2012

PROGRAM OVERVIEW

A total of 18 stores participated in this year's partnership. We added two new stores this year: Urban Farmer in Richmond and McDonnell Nursery in Orinda. This program was overseen by Debi Tidd, and sub-contractor, Annie Joseph, worked at some stores and events.

This year, the Our Water Our World Program partnered with the UC Statewide IPM Program to train 9 people on how to work with stores to provide less-toxic IPM information and support. Two of these interns assisted at some of the Contra Costa stores: Urban Farmer Store, Annie's Annuals, Navlet's in Concord and Ace in Martinez. Since these were not hours charged to the contract, we were able to offer more trainings and outreach events this year without going over budget. These interns were supervised by Annie Joseph.

Here is an overview of the basic components of the program:

- Program Administration: Tasks here include ordering training materials, making copies for training packets and collating 100 packets, prep hours for store trainings and set-ups, making labels, picking up materials from storage, researching pests & products, etc.

- Store set-ups: Once the bulk of the pesticide products are received by stores, all less-toxic products are labeled with OWOW shelf talkers and fact sheet racks are set up.

- Store trainings: Staff at partner stores are encouraged to attend store trainings with detailed information about pesticides and water pollution, identification of beneficials and pests, and understanding how to use less-toxic products.

- Store mentoring: On continued visits to stores we add or replace shelf talkers, refill fact sheet racks, set-up end caps and displays, talk with store staff about new products and pests, make recommendations about new products, and research and answer any staff questions.

- Outreach Events: Public events include both tablings and classes to answer questions and help with product selection.

NUMBERS AT A GLANCE

- 18 stores participating in the partnership
- 18 store set-ups with shelf talkers and fact sheet racks
- Store trainings provided to 13 key stores.
- 93 staff trained at formal staff trainings; 25+ additional staff trained in-aisle during informal, mentoring visits.
- 7 outreach events (approximately 280+ people)
- 5 additional outreach/publicity events (not charged to contract; 300+ people)

PARTICIPATING STORES

Here is the complete roster of participating stores:

- Ace Hardware, 1530 Contra Costa Blvd., Pleasant Hill
- Ace Hardware, 3610 Pacheco Blvd., Martinez
- Ace Hardware, 4451 Clayton Rd., Concord
- Ace Hardware, 3211 Danville Blvd., Alamo
- Ace Hardware, 2044 Mt. Diablo Blvd., Walnut Creek
- OSH, 1041 Market Place, San Ramon
- OSH, 2050 Monument Blvd., Concord
- OSH, 5400 Ygnacio Valley Rd., Concord
- Navlet's Garden Center, 1555 Kirker Pass Rd., Concord
- Navlet's Garden Center, 2895 Contra Costa Blvd., Pleasant Hill
- Navlet's Garden Center, 800 Camino Ramon, Danville
- Navlet's Garden Center, 6740 Alhambra Valley Rd., Martinez
- Orchard Nursery and Florist, 4010 Mt. Diablo Blvd., Lafayette
- Moraga Garden Center, 1400 Moraga Rd., Moraga
- McDonnel Nursery, 196 Moraga Way, Orinda
- Urban Farmer Store, 2121 San Joaquin, Richmond
- Annie's Annuals, 740 Market Ave., Richmond
- Sloat Gardens, 828 Diablo Rd., Danville

PROGRAM COMPONENTS

STORE SET-UPS:

Once each store received the bulk of their products for the Spring season, the less-toxic products were labeled with OWOW shelf talkers. Each talker has a printed label with the

name of the specific product. We include a printed product name so that the label does not end up under a more toxic product if products are moved around by staff. Products are labeled using the "Less-Toxic Product List" developed by OWOW. In addition to pesticides and fertilizers, other sustainable products to deter pests were labeled including weed block, pest traps, mulch and caulk.

Ace, Martinez

Orchard Nursery, Orinda

OSH, Concord

STORE TRAININGS:

We provided trainings to 13 key stores this year. Trainings included: information on the tie between pesticides, run-off and water quality, identification of beneficials in the landscape, common and new pests/diseases and invasive plants, techniques for managing pest problems, tips and techniques for using/selling the less-toxic products, and correct disposal of toxic materials.

Each training participant received a packet of information and resources including background on the OWOW program and IPM techniques, information on how products

work and how to read a pesticide label, laminated bug guides, a chart for identifying pest damage, pest fact sheets, *The 10 Most Wanted Bugs in Your Garden* brochure, and a list of resources and helpful websites.

In addition, this year each store was given a laminated guide to identifying good bugs to post in the store, laminated suggestions for rat/mouse management to post, and laminated sheets on the newest pests so that store staff can start to watch for new pests that may be entering our County.

Each participant is also asked to fill out an evaluation at the end of the training. Please see the summary of evaluations included at the end of this report.

store training at Orchard Nursery , Orinda

store training at Navlet's, Concord

STORE MENTORING AND RETURN VISITS

Continued visits to all stores are an essential part of keeping the partnership active. Shelf talkers need to be added or moved as new products come in and shelves are re-arranged, and fact sheets need to be kept stocked. In some cases, stores completely redesigned their shelves, and we needed to re-label all products.

During these visits we work with staff to answer questions and concerns, ask about customer questions, introduce new products and pests of concern, set up end caps with less-toxic products, provide in-aisle training for any new staff members, and provide additional information, materials and expertise as questions arise.

mentoring: working with Navlet's, Concord manager

less-toxic yellowjacket end cap

less-toxic weed control & organic fertilizers end cap

<u>OUTREACH EVENTS</u>

This year we held 7 outreach events. These events allow us to work with the public at the point of purchase, to help them identify and solve pest/disease problems, to advise them on less-toxic products and how to use them, and to give out samples of products. These events included both tablings and classes. In some stores, we were able to set up a 'kiosk' on less-toxic pest management provided by the statewide UC IPM program. These kiosks allowed customers to identify pests, beneficials and plant diseases in their garden and to learn the least toxic ways to manage these problems.

Class on pest management at Annie's Annuals, Richmond

IPM Kiosk at Urban Farmer, Richmond

tabling at Navlet's, Concord

tabling at Orchard Nursery, Orinda

ADDITIONAL PROGRAMS AND PUBLICITY

A number of events came up this year that allowed us to publicize the OWOW Store Partnership Program and to provide training on less-toxic management of pests. These events were not charged to the contract, but allowed us to reach an additional audience. These events included:

- A class for the Pleasant Hill Garden Club with 60 members in attendance.
- A mini-training for 25 managers of all the regional Orchard Supply Hardware Stores.
- A class on IPM and OWOW for 30 professional landscapers participating in the Contra Costa Bay-Friendly Landscape Maintenance Training.
- A table on OWOW and less-toxic products at a variety of trade shows in the Bay Area.
- A special vendor night for Sloat's Garden Center staff and buyers.

GOALS FOR NEXT YEAR'S PROGRAM

Here are some recommendations for next year's programs:

- Work with the OWOW program to see if we can develop some standardized visuals that will attract customers to the less-toxic products and give the self-talkers more visibility. We need to make sure they know to look for the blue shelf talkers.
- Develop more visuals for the trainings, especially around identification of bugs and diseases.
- Develop a seasonal schedule of end caps to promote to stores so that we can get them up at the appropriate times. Develop some standard signage to go along with end caps that all stores can use.
- Revise the evaluation forms. In particular, we need to think about how to ask if the program has changed opinions on pesticide use. We are getting a skewed reading when store staff marks 'no' – participants often write that their opinions haven't been changed because they already promote less-toxic products.

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Summary of 2012 IPM Store Employee Training Evaluation Forms

- The training was well organized and interesting.
  80% strongly agree, 19% agree, 1% neutral

- My training manual will be a useful resource in the future.
  85% strongly agree, 10% agree, 5% neutral

- The information will help me recommend and sell less-toxic products.
  75% strongly agree, 20% agree, 5% neutral

- The instructor was responsive to questions.
  88% strongly agree, 10% agree, 2% neutral

- The level of detail was appropriate.
  77% strongly agree, 22% agree, 1% neutral

- Visual aids were effective.
  87% strongly agree, 12% agree, 1% neutral

- Written materials were effective.
  83% strongly agree, 14% agree, 3% neutral

- I would recommend the training to my co-workers.
  86% strongly agree, 10% agree, 4% neutral

- I would like to learn more about IPM methods and IPM certification.
  65% strongly agree, 17% agree, 18% neutral

What part of the training was most useful?

- Insect identification beneficials and pests (23)
- All (20)
- Product info (17)
- Visual aids (15)
- IPM solutions for common pests (2)
- Methods and materials (2)
- Importance of compost (2)
- Great overview/explanations (2)
- Handouts/printed reference material (2)

- MAC's Field Guide to Good/Bad Bugs (2)
- Different kinds of plant problems
- What to do as a cashier
- New pest in area
- Examples of how to think creatively with IPM/Sustainability/preventing pests (3)
- Realizing effect of pesticides on environment

<u>What part of the training was least useful?</u>

- Lawn care

<u>Did the information change your views about pesticides? How?</u>

- Yes (34)
- No (13)

Please note that several of the training participants that said 'no' wrote that their view did not change because they were already supporting the use of less-toxic products. This is a question that may need to be re-worded in future evaluations.

<u>When this training is held again, what changes do you suggest?</u>

- More time/details (3)
- More product coverage (2)
- More on common garden problems/solutions (2)
- More handouts for customers (2)
- Include a list of plants that attract beneficials in the packet
- More intensive training on methods and materials.
- More pictures
- Not so much info for time allotted
- Say product names more slowly.
- Include all employees
- Real samples

<u>Additional comments written on evaluations:</u>

This is a good program. The general public should see this info on commercials on TV programs.

I learned about safer ways for pest control.

Added to our group's knowledge of safer/green options.

I'd like to see a part 2 where we get a repeat on methods and materials with more time and details.

I didn't know that it's all a big cycle and it affects everything. I made me like them (pesticides) less than I already did.

I appreciate your enthusiasm and humor.

Use less toxic first and try to encourage customers to do so.

I will help to point out good pesticides for our customers.

Makes us realize you can help the environment.

Will really try to stress starting with lowest level of toxicity first.

Excellent, informative speaker.

It was engaging from the start.

The mulching was very interesting and I will definitely be reading that.

Visual aids were great.

Reinforced my belief about the importance of IPM.

I realized how much they (pesticides) affect the groundwater.

Attachment 11.1
FY 2011/12 Mercury Collection

2010/11	C O U N T S					Unit	Total		
	Central San	West Cty	Delta Diablo	Delta Diablo retail partners		Measurement		Hg Mass (kg)	
Thermostats/3 grams per unit	139					ea.	139		
Thermometers/1 gram per unit	906					ea.	906		
Switches/lbs.						lbs.	0		
Mercury Batteries (0.2% mercury, based on 5 mg per 2 g battery)	57					lbs.	57	0.05	
High intensity discharge lamps (3.4 x 10^{-5} kg / lamp)	1,222					ea.	1,222	0.04	
Fluorescent Lamps (2.07 x 10^{-6} kg/ft)	186,032		82,880	8,620		ft.	277,532	0.58	
Compact Fluorescent Lamps (4.5 x 10^{-6} kg / lamp)	30,595		2,806	200		ea.	2,806	0.01	
U-Tube Fluorescent Bulbs (4.0 x 10^{-6} kg / lamp)			758	480		ea.	2,806	0.01	
Circular Bulbs (4.0 x 10^{-6} kg / lamp)			230			ea.	2,806	0.01	
Subtotal itemized mercury containing devices								**0.70**	
Elemental Hg	60				[1]	lbs.	60	27	
								Total Hg (Max)	**Total Hg (Miin)**
Miscellaneous mercury containing devices (lbs.)[3]		240	121		[1]	lbs.	361	16	0.3

[1] 1 kg = 2.2 lbs. 0.0022

[2] Conversion for 1 milligram to 1 pound = 0.0000022

[3] Weight includes drums; therefore amount of mercury is provided as a crude estimate assuming that the mercury content ranges from 0.2 to 10% of the total mass