CONTRA COSTA CLEAN WATER PROGRAM

FISCAL YEAR 2009/2010
ANNUAL REPORT

Volume I
Group Activities

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List of Acronyms

ACCWP	Alameda Countywide Clean Water Program
ABAG	Association of Bay Area Governments
BACWA	Bay Area Clean Water Agencies
BAMBI	Bay Area Macroinvertebrate Bioassessment Information Network
BASMAA	Bay Area Stormwater Management Agencies Association
BMI	Benthic Macroinvertebrate
BMP	Best Management Practice
BRMC	BASMAA Regional Monitoring Coalition
CASQA	California Stormwater Quality Association
CCC	California Coastal Commission
CCC	Contra Costa County
CCAG	Contra Costa 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
CEP	Clean Estuary Partnership
CEQA	California Environmental Quality Act
CPSC	California Product Stewardship Council
CSBP	California Stream Bioassessment Procedures
CWA	Clean Water Act
DCIA	Directly Connected Impervious Area

DCD	Department of Conservation & Development (formerly Community Development Department – CDD)
DDSD	Delta Diablo Sanitation District
DOIT	Department of Information Technology
DWR	Department of Water Resources
EBMUD	East Bay Municipal Utility District
FY	Fiscal Year
GIS	Geographical Information System
GBP	Green Business Program
GPS	Global Positioning System
HMP	Hydrograph Modification Management Plan
IDDE	Illicit Discharge Detection and Elimination
IMP	Integrated Management Practice
IMS	Information Management System
IPM	Integrated Pest Management
IRWMP	Integrated Regional Water Management Plan
LID	Low Impact Development
MEP	Maximum Extent Practicable
MOC	Municipal Operations Committee
MONC	Monitoring Committee
MRP	Municipal Regional Permit
MTC	Metropolitan Transportation Commission
MS4	Municipal Separate Storm Sewer System
NOI	Notice of Intent
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
PEIO	Public Education and Industrial Outreach
PIPC	Public Information/Participation Committee
PMA	Public Managers’ Association
POTW	Publicly Owned Treatment Works
PS	Performance Standard
QAQC	Quality Assurance Quality Control
RCD	Resource Conservation District
RMP	Regional Monitoring Program
RN	Referral Notice
RTA	Rapid Trash Assessment
RWQCB	Regional Water Quality Control Board
SAP	Sampling and Analysis Plan
SCA	Senate Constitutional Amendment
SFEI	San Francisco Estuary Institute
SFEP	San Francisco Estuary Partnership
SIC	Standard Industrial Classification
SMMP	Streamside Management Master Plan
SMPL	Streamside Management Program for Landowners
SOP	Standard Operating Procedure
SOW	Scope of Work
SWAMP	Surface Water Ambient Monitoring Program
SWMP	Stormwater Management Plan
SWRCB	State Water Resources Control Board
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TRC	Technical Review Committee
UCC	Urban Creeks Council

UPC	Urban Pesticide Committee
USEPA	United States Environmental Protection Agency
USGS	Unites States Geological Survey
WAM	Watershed Assessment and Monitoring
WAP	Watershed Action Program
WLA	Waste Load Allocation
WN	Warning Notice
WQAC	Water Quality Advisory Committee
WY	Water Year

SECTION 1 – EXECUTIVE SUMMARY

This Fiscal Year 2009/2010 Annual Report submitted to the San Francisco Bay and Central Valley Regional Water Quality Control Boards (Water Boards) marks the seventeenth time the Contra Costa Clean Water Program (Program) has documented its progress in managing and monitoring stormwater quality in compliance with our Joint Municipal National Pollutant Discharge Elimination System (NPDES) Permits. Looking back a decade from now, we will likely acknowledge that Fiscal Year 2009/2010 marked a significant leap forward in the evolution of stormwater management programs. With this significant leap, however, we will also acknowledge the tremendous challenges local agencies faced in complying with the most stringent water quality requirements ever adopted during a time of economic crisis second only to the Great Depression. Provided below is a summary of these accomplishments and challenges.

Adoption of the Municipal Regional Permit (MRP)

Perhaps the most notable event of Fiscal Year 2009/2010 was the issuance of a Municipal Regional Permit (MRP) on October 14, 2009 to 76 municipalities and special districts in the San Francisco Bay Region, including 18 of the 21 local agencies in Contra Costa County[1]. Development and adoption of the MRP took over five (5) years consuming enormous amounts of time and resources. The Water Board's 278-page MRP became effective on December 1, 2009 superseding the previous permit issued in 1999. Unlike the previous permit, the MRP was written entirely by Water Board staff and prescribes:

- Management practices, the level of implementation for each action, and reporting and evaluation requirements;

1 The cities of Antioch, Brentwood and Oakley, and the eastern portions of Contra Costa County and the Contra Costa County Flood Control and Water Conservation District are covered under a Municipal NPDES Permit issued by the Central Valley Water Board.

- Specific actions to control 303(d) listed pollutants and other pollutants of concern and to achieve Waste Load Allocations adopted under Total Maximum Daily Loads; and,
- Specific and comprehensive stormwater monitoring, including monitoring for 303(d) listed pollutants and other pollutants of concern.

Other notable MRP mandates include, but are not limited to:

- A 100% reduction of trash discharged from municipal storm drains within 12 years.
- Design and construction of 10 green street projects region-wide within 4 years.
- Development and implementation of Municipal Enforcement Response Plans within 5 months.
- Development and implementation of two countywide or region-wide, broad audience advertising campaigns on trash/litter in waterways and pesticides, including pre and post-campaign surveys to identify and quantify the audiences' knowledge, attitudes, and behaviors within 5 years.
- Except where shown to be infeasible, retain 100% of the water quality volume of runoff from new and redevelopment projects onsite through rainwater harvesting and use, infiltration, and evapotranspiration within 2 years.
- Development and adoption of municipal Integrated Pesticide Management (IPM) policies or ordinances within 6 months.
- Feasibility evaluation and pilot implementation of 5 projects to divert dry weather and first flush stormwater flows to sanitary district facilities to address these flows as a source of mercury and PCBs within 4 years.
- Implementation and evaluation of 10 region-wide stormwater treatment pilot projects to quantify the amount of mercury loads and PCB loads avoided within 4 years.
- Development and implementation of a mercury-related risk reduction program, and quantify the resulting risk reductions from these activities within 4 years.

Compliance with these research and resource intensive mandates given the limited financial resources available to local agencies will be a monumental challenge. Working collaboratively with local agencies within Contra Costa County and throughout the San Francisco Bay Region, municipalities are pooling their resources and expertise to comply with these mandates in the most effective and efficient way possible. Sections 2 through 15 in this Annual Report summarize these efforts.

In June 2010, Central Valley Regional Water Quality Control Board staff initiated discussions with Program staff and the East County permittees for reissuance of their Municipal NPDES Permit. The Program's primary goal and objective is to ensure the East County permit is consistent and coordinated with the MRP thereby preserving the highly successful and mutually beneficial association among Contra Costa agencies compromising the Contra Costa Clean Water Program, and not disturbing the long-standing partnerships and ongoing regional projects with BASMAA member agencies.

Funding the Unfunded Federal and State Clean Water Mandates

The Contra Costa County Flood Control & Water Conservation District sponsored legislation referred to as Assembly Bill 2768 (AB 2768), which authorized the District to establish Stormwater Utility Areas within permitted areas (i.e., cities, towns and unincorporated county areas) and to impose an annual assessment to pay for the costs associated with the implementation of the NPDES Program and general drainage maintenance activities. All municipalities participate in this financing mechanism with the exception of the cities of Richmond and Brentwood. Richmond and Brentwood rely on sewer charges to finance implementation costs. The Stormwater Utility Assessments were established in June 1993. These assessments generate approximately $14 million in revenue annually. The Program receives approximately 20% of this revenue to conduct activities on behalf of all municipalities with the remaining 80% returned to each co-permittee to implement individual Permit requirements. Each municipality was responsible for establishing an annual rate and a maximum rate for the Stormwater Utility Assessments, which were approved by the Contra Costa County Board of Supervisors acting on behalf of the Contra Costa County Flood Control & Water

Conservation District. Approximately 242,000 parcels were assessed. Stormwater Utility Assessments revenue cannot pay for any debt-financed capital improvements.

The Stormwater Utility Assessments are a dedicated source of revenue for the implementation of the Municipal NPDES Permit Program. While establishment of Stormwater Utility Assessments has been an extraordinary success for the Contra Costa Clean Water Program, particularly in light of the budgetary crisis facing all municipalities within the State of California, this funding source is no longer adequate to fund the plethora of significant new federal and state stormwater mandates. For the past several years, municipalities have been at their maximum Stormwater Utility Assessment rate, which is no longer sufficient to fully fund the Municipal NPDES Permit mandates, resulting in a funding gap. Additional local agency revenues, such as general fund revenues, are necessary to pay for the increased federal and state stormwater mandates.

Beginning in Fiscal Year 2005/2006, an aggressive effort was initiated to address this growing funding gap. In 1995, the Program contracted with SCI Consulting Group, Inc. (SCI) to conduct surveys to gauge public support for a possible Proposition 218 property-related fee election in the foreseeable future. SCI. also assisted in evaluating the various options available to the Program to enhance revenues. The funding mechanism that was considered was a property-related fee. Both a telephone and a “mail out/mail back” survey were used to determine the feasibility of a “Proposition 218” election which would require more than a 50% approval of property owners.

The surveys showed general support for an assessment but not at the required level to win approval. Recommended next steps included increased public education and outreach, which were implemented in fiscal years 2006/2007 through 2009/2010. Additionally, funds have been collected annually for eventually conducting a Prop 218 election, which is estimated to cost $1 to $1.5 million. This fiscal year, the Program again retained SCI to provide public opinion research, fee engineering, and balloting and professional consulting services for implementation of a Contra Costa stormwater quality funding initiative. This work will continue through next fiscal year and may lead to a possible Prop. 218 ballot initiative in November 2011. The decision to move forward will be contingent on the findings of the opinion research. Without additional revenues for implementation of the federal and state stormwater mandates, local agencies will continue to be faced with difficult choices on how to balance the need for important stormwater quality programs and other vital public services in their communities.

Restructuring the Program to Meet New Permit Challenges

The Program is composed of Contra Costa County, all nineteen (19) of its incorporated cities/towns, and the Contra Costa County Flood Control & Water Conservation District. The relationship between each municipality and the Program is contained in a “Contra Costa Clean Water Program Agreement" (Program Agreement) signed by all parties. This agreement outlines the duties and responsibilities of the Program, its staff, and the municipalities. Stipulated in the Program Agreement, each co-permittee must designate one (1) representative to participate on the Management Committee (MC), which is the primary decision-making body of the Program. The MC directs and monitors the implementation of group activities undertaken in compliance with our NPDES Permits. The Administrative Committee (AC) is responsible for administration, strategic planning, personnel, budgets, and conflict resolution. Additional committees and temporary workgroups (discussed further below) are staffed by the Program and municipal representatives.

Fiscal Year 2009/2010 marked a time of significant changes to the Program’s structure, including staffing. With respect to staffing, Donald P. Freitas, the Program Manager to the Program for the past 19 years, retired effective March 30, 2010. On March 17, 2010, the Management Committee appointed the Assistant Program Manger to Interim Program Manager effective March 31, 2010, and agreed to promote the Interim Program Manager to Program Manager as soon as possible.

In October 2009, the Management Committee voted to restructure its committees to better respond to the adopted MRP mandates and its increased emphasis on regional collaboration. A summary of these changes is as follows:

- Merged and renamed the Municipal Maintenance Ad Hoc Workgroup and the Commercial/Industrial Ad Hoc Advisory Workgroup to the Municipal Operations Committee (MOC).
- Merged and renamed the C.3 Implementation Workgroup and the New Development & Construction Controls Committee to the Development Committee (DC)
- Renamed the Watershed Assessment and Monitoring Committee to the Monitoring Committee (MONC).
- Renamed the Public Education and Industrial Outreach Committee to the Public Information/Participation Committee (PIPC).

This restructuring of Program committees was formalized and incorporated into an updated Program Agreement (2010-2025), which the Management Committee adopted on June 16, 2010. The Program Agreement will be executed in September 2010. The Program's restructuring was also coordinated with the restructuring of the Bay Area Stormwater Management Agencies Association's (BASMAA's) committees discussed below.

BASMAA is a consortium of San Francisco Bay Area municipal stormwater programs representing over 90 agencies, including all Contra Costa local agencies. 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. Last fiscal year, 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. In November 2009, BASMAA formally established a Trash / Municipal Operations Committee, and renamed its Monitoring Committee to Monitoring / POC Committee. The restructuring of BASMAA's organization and committees has already proved beneficial to its members. "Clean Watersheds for a Clean Bay" (CW4CB) is a new project funded by a grant to BASMAA from the USEPA. CW4CB is a partnership of Bay Area municipalities and countywide municipal stormwater management agencies. Implementation of the CW4CB grant project will result in Permittee compliance with the following MRP provisions:

- C.11/12.c - Pilot Projects To Investigate and Abate Mercury/PCB Sources
- C.11/12.d - Pilot Projects to Evaluate and Enhance Municipal Sediment Removal and Management Practices
- C.11/12.e. - Conduct Pilot Projects to Evaluate On-Site Stormwater Treatment via Retrofit
- C.11/12.i - Development of a Risk Reduction Program Implemented Throughout the Region

BASMAA has also entered into several contracts for technical services on behalf of its members for implementation of the MRP mandates region-wide. Further details regarding these region-wide efforts are outlined in Sections 2 through 15 of this report.

Attachment 1.1 shows the Program's new organizational structure and Program representation on BASMAA's five (5) working committees. Figure 1 "Group Activities" below outlines the various MRP provisions, the Program committee responsible for review and development of group activities for that provision, and the section in this Annual Report where further details are reported.

Figure 1: Group Activities

MRP Provisions	Responsible Committee(s)	Section
C.2 Municipal Operations	• Municipal Operations Committee	2
C.3 New Development and Redevelopment	• Development Committee	3
C.4 Industrial and Commercial Site Controls	• Municipal Operations Committee	4
C.5 Illicit Discharge Detection and Elimination	• Municipal Operations Committee	5
C.6 Construction Site Control	• Development Committee	6
C.7 Public Information and Outreach	• Public Information/Participation Committee	7
C.8 Water Quality Monitoring	• Monitoring Committee	8
C.9 Pesticide Toxicity Control	• Municipal Operations Committee • Public Information/Participation Committee • Monitoring Committee	9
C.10 Trash Load Reductions	• Municipal Operations Committee	10
C.11 Mercury Controls	• Monitoring Committee	11
C.12 Polychlorinated Biphenyls (PCBs) Controls	• Monitoring Committee	12
C.13 Copper Controls	• Municipal Operations Committee • Monitoring Committee	13
C.14 Polybrominated Diphenyl Ethers (PBDE), Legacy Pesticides and Selenium	• Monitoring Committee	14
C.15 Exempted and Conditionally Exempted Discharges	• Municipal Operations Committee	15

Program Management, Representation and Highlights

On behalf and under the direction of the Program's Management Committee, the Program is managed by a staff of five (5) full-time employees and one (1) part-time (28/40) employee. The Program also retains consultants to provide technical, administrative and public education services and support. Attachment 1.2 outlines Program staffing and consultants. As discussed above, Program staff is responsible for administering and coordinating implementation of mandated permit activities the Management Committee directs to be conducted as a "group." "Group" activities are those conducted by all 21 permittees countywide or regionally with other BASMAA member agencies. Municipalities also conduct activities individually. These individual activities are detailed in the Municipal Annual Reports provided with this Fiscal Year 2009/2010 Annual Report. Attachment 1.3 shows participation and attendance on the Program's committees (i.e., MC, AC, MOC, PIPC, MONC and DC) by co-permittees in Fiscal Year 2009/2010.

Listed below are a few of the Program's significant accomplishments that highlight Contra Costa permittees' ongoing commitment and dedication to protecting our local creeks and the San Francisco Bay/Delta Estuary, which are reported on in greater detail above or in the following sections of this Annual Report:

1. **Trash "Litter Travels, But it Can Stop with You" Campaign and Media Kick-off Event**. Section 7 provides a detailed review of this multi-media campaign designed to educate Contra Costa's citizens about the impacts of trash and litter in our waterways and how they can help address this problem. A Media Campaign Kick-Off event attended by the San Francisco Bay Water Board Executive Officer, Bruce Wolfe, was held on October 7, 2009 at the Walnut Creek BART station.
2. **Continuous Improvement of the Program's Innovative LID Compliance Approach.** Section 3 provides a detailed review of the Program's ongoing continuous improvement of its LID approach to meeting the site design, treatment control and hydrograph modification management requirements on new

development and redevelopment projects in Contra Costa County. In Fiscal Year 2009/10, the Program completed development of design criteria and sizing factors for two new Integrated Management Practices (IMPs); revised and provided a training on an improved IMP sizing calculator; initiated development and implementation of an HMP model calibration and validation monitoring effort in the City of Pittsburg; and, continued to provide outreach and statewide leadership on lessons learned in the planning, design and construction of bioretention facilities.

3. **Countywide Commitment to the Regional Monitoring Collaborative**. Sections 8, 9, 11, 12, 13 and 14 in this Annual Report, including the referenced BASMAA *MRP Regional Supplement for POC and Monitoring Annual Report for Fiscal Year 2009/2010*, detail the plethora of monitoring programs, projects and special studies mandated in the MRP. The MRP encourages Permittees to establish and commit to conducting many of these activities as part of a regional monitoring collaborative. All Contra Costa permittees committed to the participation and funding of regional monitoring activities in compliance with the Permits.
4. **Municipal Selection, Cleanup and Assessment of Trash Hot Spots.** Section 10 provides a detailed review of the Program's assistance to municipalities in selecting and submitting identified trash hot spots to the Water Board. Most all Contra Costa municipalities also performed the initial clean-up and assessment one year ahead of schedule. Additional details regarding these activities were submitted to the Water Board on July 1, 2010.
5. **Program Restructuring and Funding Initiative**. As discussed in further detail above, the Program's update to the Program Agreement, restructuring of Program committees, and commencement of a stormwater quality funding initiative represent significant steps taken to respond to the monumental challenges local agencies face in meeting their mandates in the MRP and the pending East County NPDES Permit.
6. **Development and Preparation of a New Annual Report Format**. Not discussed directly anywhere in this Annual Report, Provision C.16.b. required permittees under the MRP to develop and submit a common Annual Report format acceptable to the Water Board Executive Officer by April 1, 2010. To complete this task within the aggressive timeline established, BASMAA retained EOA, Inc. to develop the format,

which was formally approved by the Executive Officer on July 2, 2010. Given the short time period for municipalities to review and complete the new Annual Report format and the plethora of MRP mandates also required to be completed within the first year, preparation and submittal of this Annual Report, including the Municipal Annual Reports by the September 15, 2009 is a significant accomplishment.

Conclusion

In summary, the Contra Costa Clean Water Program is extremely proud of its accomplishments for Fiscal Year 2009/2010. These accomplishments are detailed in this Annual Report, which includes the Municipal Annual Reports for Contra Costa co-permittees, and BASMAA's Regional Supplements submitted separately by BASMAA on behalf of its member agencies. Despite these significant accomplishments, significant challenges lie ahead. The Program is committed to continuous improvement and further development and implementation of effective and efficient stormwater management programs.

SECTION 2 – PROVISION C.2 MUNICIPAL OPERATIONS

Introduction

With adoption of the Municipal Regional Permit (MRP), the Program's Municipal Maintenance Planning Workgroup was reestablished in October 2009 as a formal committee called the Municipal Operations Committee (MOC). The work of the MOC is performed by representatives of the Contra Costa municipalities with assistance from Program staff and consultants. As outlined in the Program Agreement (2010-2025), the MOC is a sub-committee responsible for, among other things, development and implementation of municipal operations pollution prevention programs, guidance and training conducted countywide and/or coordinated regionally with BASMAA's Municipal Operations Committee (MOC). This section highlights countywide and regional implementation of stormwater pollution prevention measures designed to control or reduce non-stormwater discharges to stormdrains and watercourses during operation, inspection and routine repair and maintenance activities of municipal facilities and infrastructure.

The MOC is also tasked with development and implementation of stormwater quality pollution prevention programs, guidance and training for: 1) conducting inspections of businesses and industrial facilities; 2) carrying out surveillance programs to detect and eliminate illicit non-stormwater discharges; 3) preventing impairment of urban streams by pesticide-related toxicity; and, 4) reducing, and eventually eliminating, trash discharged through municipal stormdrain systems. Accomplishments related to these topics are reported in later sections of this Annual Report.

The Program's MOC meets every fourth Thursday of the month. Program staff and two designated representatives of the Program's MOC attend and represent the Program at BASMAA's MOC, which meets every third Thursday of the month. For a listing of Contra Costa municipal representatives on the Program's MOC, and Program representatives to BASMAA's MOC, see Attachments 1.1 and 1.3.

Accomplishments

The following activities were conducted during FY 2009/2010 to assist permittees in compliance with mandates in Provision C.2 of the MRP:

1. Formation of the Program's MOC to facilitate countywide and regional implementation of municipal operations pollution prevention programs, guidance and training
2. Designation of Municipal representatives of the Program on BASMAA's Municipal Operations Committee
3. Expansion of BASMAA's Mobile Surface Cleaner Program
4. Coordination with BASMAA in development of pump station inspection guidelines and field form
5. Distribution of guidance materials for development and implementation of corporation yard stormwater pollution prevention plans (SWPPPs)

A summary review of each of these activities is provided below:

<u>Formation of the Program's MOC and Representation on BASMAA's Municipal Operations Committee</u>

The Program's MOC was formally created in October 2009 in response to adoption of the MRP. The Program's MOC is tasked with development of countywide and regional guidance and training to assist municipalities with implementation of their municipal operations pollution prevention programs in accordance with Provision C.2 of the MRP. Program staff and two municipal representatives of the MOC were designated in December 2009 to represent the Program on the BASMAA MOC for the duration of Fiscal Year 2009/10. Both the Program and BASMAA's MOCs have been meeting monthly since January 2010. Agendas and minutes for these meetings are prepared for each meeting and are widely distributed to Permittees, regulators, and interested stakeholders.

BASMAA's Mobile Surface Cleaner Program

BASMAA's Mobile Surface Cleaner Program is a training and certification program for individual mobile surface cleaners. The Program is designed to educate individual mobile surface cleaners on proper implementation of stormwater quality Best Management Practices (BMPs) for surface cleaning operations. The training and certification program entails a 30-minute online training video explaining the BMPs. Following the training is a test. If the trainee passes the test, then he/she is placed on a list of certified mobile surface cleaners, which is posted on BASMAA's website. The training and certification is provided free of charge and is now available via BASMAA's website. The Program promotes BASMAA's Mobile Surface Cleaner Program through its website. Municipalities hire only BASMAA certified mobile surface cleaners, or use trained in-house staff, for surface pavement washing of public facilities, and require implementation of the BMPs in BASMAA's Mobile Surface Cleaner Program by private businesses. This effort has been ongoing for many years and is consistent with Provision C.2.b. "Sidewalk/Plaza Maintenance and Pavement Washing".

Historically, the surface cleaning certification program addressed the cleaning of surface pavement (e.g., parking lots, plazas, and sidewalks). Efforts are now underway to expand 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". These efforts to expand BASMAA's Mobile Surface Cleaner Program will continue within the Program and BASMAA's MOCs in FY 2010/2011.

Pump Station Inspection Form

The Program's MOC, in coordination with the BASMAA MOC, developed an example pump station inspection form to assist Permittees in their inspections and collection of dissolved oxygen (DO) data from all applicable pump stations they own and operate twice per year during the dry season beginning after July 1, 2010.

Corporation Yard SWPPPs
Through the Program's MOC, Program staff provided guidance to municipalities for selecting and implementing corporation yard BMPs, developing SWPPPs, and conducting inspections during FY 2009/2010 consistent with the enhanced MRP requirements for SWPPPs and inspections. All co-permittees were informed of the requirement to complete specific SWPPPs for corporation yards by July 1, 2010.

Conclusion

The Program restructured in October 2009 to better assist municipalities with development and implementation of the MRP. This restructuring included formal establishment of a Municipal Operations Committee in October 2009. In December 2009, the Program's Management Committee formally designated two municipal representatives to participate and represent the Program on BASMAA's MOC. The Program believes the direct involvement of municipal practitioners in the review and development of tools, guidance and policies is critical to ensure the utility and effectiveness of our municipal operations pollution prevention programs. The restructuring of both the Program and BASMAA's subcommittee's is working and has thus far been an effective forum for permittees to collectively review the Provision C.2 mandates, and to develop tools, guidance and/or policies for coordinated and consistent implementation of municipal operations pollution prevention programs.

The initial focus of the Program's MOC was review of and training on the newly adopted mandates in MRP Provisions C.2, C.4, C.5, C.9, and C.10. With regard to Provision C.2, this MOC's review focused on the need to create a pump station inventory by March 1, 2010, and to inspect and monitor pump stations and discharges, respectively, beginning after July 1, 2010. Working collaboratively with BASMAA's MOC, an example pump station inspection form was developed. Continued assistance will be necessary in Fiscal Year 2010/11 to ensure proper monitoring for dissolved oxygen of pump station discharges, and identification and development of corrective actions. The

Program's MOC also reviewed and provided guidance to municipalities to ensure site specific Stormwater Pollution Prevention Plans were developed and/or updated by the July 1, 2010 deadline. The Program and BASMAA MOC also initiated a review of the BASMAA's existing Mobile Surface Cleaner Program and opportunities to improve and enhance this program for side/walk plaza maintenance and pavement washing, and to control other potential mobile business sources of pollutants to stormwater such as carpet cleaners and automobile washing. This work is ongoing.

In Fiscal Year 2010/11, the Program is tasked to provide training to municipalities for compliance with the "Rural Public Works Construction and Maintenance" provisions. This training may be coordinated and conducted regionally.

SECTION 3 – PROVISION C.3 NEW DEVELOPMENT AND REDEVELOPMENT

Introduction

The Program's #1 objective for C.3 implementation during 2009/2010 was: "Limit disruptions and potential confusion in Program implementation which could arise from changes to C.3 requirements in the Municipal Regional Permit (MRP)."

The San Francisco Bay Water Board approved the MRP covering 76 Bay Area municipal agencies – including 18 of the 21 members of the Contra Costa Clean Water Program – on October 14, 2010. The MRP took effect on December 1, 2009. Provision C.3, New Development and Redevelopment, turned out to be the most controversial new provision at the time of permit adoption.

Program staff and the staff of member agencies devoted much effort in the early part of the fiscal year to commenting and negotiating with Water Board staff regarding the MRP C.3 Provisions. In the latter part of the fiscal year, Program staff and local agency staff worked at the local, countywide, and regionwide level toward meeting MRP compliance deadlines (see Attachments 1.1 and 1.3 for a listing of specific municipal representatives actively participating in these efforts).

The Program has been moderately successful in attaining this objective. Many aspects of the MRP's C.3 Provision codify practices already adopted by Contra Costa municipalities. Further, Program staff and municipal staff were able to continuously improve their implementation of new development and redevelopment controls while also working on the MRP.

The Program has pursued an innovative LID-oriented approach to implementing source control, treatment, and hydrograph modification management since 2003. Following is a condensed timeline of activities and accomplishments:

2002/2003: In a February 2003 amendment, the Regional Water Board added new C.3 Provisions to the countywide stormwater permit.

2003/2004: To implement the requirements of new C.3 Provisions, the PROGRAM established a C.3 Oversight Committee, a Planning and Permitting Work Group, a Legal Work Group, a Technical Work Group, and a Capital Improvement projects Work Group. These work groups were assisted by Program staff and consultants. The work groups established key policies—including the requirement to submit a Stormwater Control Plan with applications for planning and zoning approvals—and drafted key documents, including the first edition of the *Contra Costa Clean Water Program Stormwater C.3 Guidebook,* which provides guidance for preparing a Stormwater Control Plan. The work groups also produced a Vector Control Plan and a work plan to prepare a Hydrograph Modification Management Plan (HMP) as required by the permit.

2004/2005: The Program conducted an “early outreach” survey of business and community leaders and held a half-day workshop on Provision C.3 in July 2004. Program staff prepared a “Checklist for Local C.3 Implementation,” created a C.3 web page to make Program-created resources available to the public, and prepared a second edition of the *Stormwater C.3 Guidebook.* The Program also completed an analysis of changes to development standards needed to implement Provision C.3. The Legal Work Group drafted a model ordinance which was adopted, with minimal changes, by Contra Costa County and each of its 19 cities and towns. The ordinances reference the “latest edition” of the *Stormwater C.3 Guidebook* and provide the basis for a remarkable countywide consistency in stormwater policies for new development. The Program submitted a draft HMP as required on November 15, 2004 and obtained Regional Water Board staff comments on the draft five months later on April 17, 2005. The Program submitted the final HMP as required on May 15, 2005.

2005/2006: The Program spent much effort during this year assisting Water Board staff to review the final HMP. The Program also produced policies on C.3 compliance for subdivisions and on the use of hydrodynamic separators to achieve compliance with Provision C.3. These policies were later incorporated into the *Stormwater C.3 Guidebook.*

2006/2007: The Regional Water Board adopted a permit amendment incorporating the HMP on July 12, 2006. By that October, the Program had begun implementation of the HMP. Preparation included production of calculation methods for sizing bioretention areas and other integrated management practices (IMPs) for HMP compliance as well as stormwater treatment. The calculation methods and factors were incorporated into the first version of the Program's IMP Sizing Calculator. In early 2007, Program staff and consultants led a design charrette with land development engineers, developers, and municipal staff involved in development review. The purpose of the charrette was to assist developers to incorporate LID by refining IMP designs and creating new IMP designs. The Program also sponsored a March 2007 roundtable of municipal engineers, attorneys and other staff to better address issues related to ensuring operation and maintenance of stormwater treatment facilities.

2007/2008: The Program's Legal Work Group followed up the roundtable by producing a set of model agreements and provisions for Codes, Covenants, and Restrictions to be used for subdivisions with stormwater management facilities. The C.3 Implementation Work Group (the product of the consolidation of the Planning and Permitting and Technical Work Groups) developed a draft of the *Stormwater C.3 Guidebook,* 4th Edition. The new draft substantially revamped the guidance, enhancing the focus on LID and including additional recommendations and requirements for the design and construction of bioretention facilities.

2008/2009: As in previous fiscal years, a considerable portion of the Program's resources were devoted to interactions with Water Board staff regarding the MRP, including the review of successive draft proposals by Water Board staff, preparation of responses and comments, and preparation and delivery of oral testimony, including that at the May 13, 2009 public hearing. The Program published the 4th Edition of the

Stormwater C.3 Guidebook, completed the design and development of sizing factors for two new IMPs, and sponsored a workshop on Planning, Design and Construction of LID IMPs. A second workshop, including training on the updated IMP Sizing Calculator, was delayed at the request of Water Board staff. The Program also completed a new Appendix B (Guidance on Soils, Plantings, and Irrigation for Bioretention Facilities) to the *Stormwater C.3 Guidebook.* Program staff subsequently worked with two soil suppliers to obtain samples and test results in accordance with the requirements in Appendix B. Using construction inspection cards developed in the cities of Walnut Creek and San Pablo, the Program C.3 Implementation Work Group developed a model form municipal staff adapt to guide construction inspections of bioretention facilities.

Accomplishments

2009/2010 Objectives

The Program's Program-level objectives for C.3 implementation during 2009/2010, as documented in the previous annual report, were:

1. Limit disruptions and potential confusion in Program implementation which could arise from changes to C.3 requirements in the Municipal Regional Permit.
2. Incorporate two new IMPs into the Guidebook.
3. Publish and make available the improved IMP Sizing Calculator, including the two new IMPs.
4. Sponsor a training session in the use of the Guidebook and the IMP Sizing Calculator.
5. Provide additional outreach by creating a self-guided tour of LID sites in Contra Costa County.
6. Compile lessons learned so far from planning, design, and construction of LID facilities.
7. Advance toward monitoring of installed LID facilities and evaluation of their hydrologic effectiveness in comparison to model predictions.

8. Continue to provide leadership in the use of Low Impact Development to meet California stormwater NPDES requirements for new developments and redevelopments.

Following is a description of activities and accomplishments that fulfilled these objectives:

Municipal Regional Permit Negotiation

Following the May 13, 2009 public hearing on the draft MRP Tentative Order, Water Board staff distributed a "revised tentative order" including some wholly new C.3 requirements. During July through September, Program staff, consultants, and local staff worked steadily preparing comments and negotiating with Water Board staff. For example, on September 15 the Program provided data showing the actual effect, in terms of LID implementation countywide, of exceptions to LID requirements. (The specific exceptions are included in the *Stormwater C.3 Guidebook;* the Program proposed similar exceptions be incorporated in MRP Provision C.3.e.)

Water Board staff requested on July 22, 2009 that the Program provide additional information on the Program's HMP implementation. This information was compiled and submitted in an August 20, 2009 letter.

The results of the MRP negotiation effort were partly successful but also inconclusive, as the Board deferred decisions on key issues, such as when and where partial or complete exceptions to LID requirements may be allowed, and on criteria for determining when harvesting and reuse is infeasible. Instead, the MRP includes requirements that the permittees submit information and proposals on these key issues. Water Board staff expressed their intent to propose amendments to the C.3 Provisions during the permit term. Work on this objective will likely continue throughout the term of the MRP.

Municipal Regional Permit Implementation

Shortly after MRP adoption, the Program developed and distributed a December 10 memorandum to municipal staff noting changes to C.3 requirements that were in effect immediately. A table of tasks and deliverables to be implemented under MRP Provision C.3 was also distributed. A fact sheet on MRP changes to new development requirements was posted to the Program's website in January.

Program staff and consultants revised the model form municipal staff use to document compliance of capital improvement projects with Provision C.3. The revisions were made to accommodate changes to C.3 applicability under the MRP. Following discussion within the Program's Development Committee, Program staff and consultants developed a memorandum on the applicability of MRP Provision C.3 to roads projects and began work on revisions to the model ordinance, which are needed to make explicit the new applicability requirements in MRP Provision C.3.b.

Hydrograph Modification Management Modeling Verification Project

The Program has worked consistently to identify potential sites for monitoring the hydrograph modification management performance of IMPs *in situ,* as required by MRP Attachment C. Program staff arranged to contract with the Contra Costa Flood Control and Water Conservation District to conduct monitoring, and with Brown and Caldwell to analyze the resulting data and to compare the performance predicted by the hydrological model used to determine sizing factors with the actual performance.

Program staff and consultants worked closely with City of Pittsburg staff to incorporate monitoring equipment into the design of the City's Fire Station #84 and also reviewed a local private development site as a potential location for monitoring. However, the effort to implement monitoring at these sites was abandoned because local conditions made monitoring difficult to implement and because the costs of coordination and potential delays to the projects were unacceptable to the project proponents. In November 2009, the Program used this experience to develop a summary of technical requirements related to the selection of sites for HMP monitoring.

City of Pittsburg staff identified an alternative project, the construction of a building housing the offices of the City's Fire Prevention Bureau. Program staff and consultants worked closely with City staff and the project engineer to optimize design of bioretention facilities on the site and to specify features that would facilitate flow monitoring at three bioretention facilities to be constructed as part of the project.

Development of Guidance and Tools for LID Implementation

Program consultants completed development of design criteria and sizing factors for two new IMPs to achieve hydrograph modification management as well as stormwater treatment. One of these IMPs consists of a cistern and flow-control orifice followed by a downstream bioretention facility; the other is a bioretention facility followed by a downstream vault and flow-control orifice. Design sheets and a complete table of factors and equations for sizing IMPs were incorporated in an October 2009 supplement to the 4^{th} Edition. A revised and much-improved version of the IMP sizing calculator was made available that same month. A half-day training session was held in Walnut Creek on October 29, 2009.

Program staff and consultants developed a May 10 draft of the *Stormwater C.3 Guidebook, 5^{th} Edition* and distributed it for municipal staff comment. The 5^{th} Edition incorporates MRP requirements as well as innovations and refinements to improve implementation of LID in Contra Costa County.

Regional Leadership

Beginning in November 2009, Program staff and consultants, and municipal staff from Contra Costa County and the City of Oakley, have participated in regionwide efforts, coordinated through the Bay Area Stormwater Management Agencies Association, to respond to various MRP C.3 requirements for submittals during the permit term. Program contributions included:

- A scope for regional reporting on “Green Streets” projects per MRP Provision C.3.b.v.(2).
- A memorandum on green roofs for stormwater control and a June 1, 2010 draft of the green roofs submittal required by MRP Provision C.3.c.iii.(4).
- Contributions to a PowerPoint presentation on “special projects” to be allowed LID treatment reduction credits under MRP Provision c.3.e.ii. The presentation was delivered to Water Board staff on April 1, 2010.
- Participation in an April 14, 2010 roundtable on soil specifications for bioretention per MRP Provision c.3.c.ii.(3). This roundtable led to a BASMAA decision to base the regional specifications on the Contra Costa specifications developed in 2008-2009.

Program staff and consultants also drafted an article on LID for the San Francisco Estuary Institute’s annual “Pulse of the Estuary” report.

Outreach and Statewide Leadership

Program’s Program manager Tom Dalziel, C.3 consultant Dan Cloak, and local staff Scott Wikstrom (City of Walnut Creek), David Swartz (Contra Costa County), Libbey Bell (City of Concord) and Phil Hoffmeister (City of Antioch) collaborated to prepare a series of presentations on Contra Costa’s Low Impact Development design approach to C.3 compliance. The presentations, which focused on lessons learned from the planning, design, and construction of bioretention facilities, were delivered at a special all-day November 1, 2009 pre-conference workshop on LID at the California Stormwater Quality Association’s 2009 conference in San Diego.

In another example of statewide leadership, Program staff and consultants prepared draft recommendations for effectiveness assessment guidance for new development and redevelopment controls and provided these to State Water Resources Control Board staff on August 12, 2009.

Program staff and City of Walnut Creek staff assisted City of El Cerrito staff to transport and set up a scale-model bioretention facility for display at a February 16, 2010 USEPA event marking the start of construction of the San Pablo Avenue Green Streets/Raingardens project in El Cerrito.

Program and local staff also commented on USEPA's proposed rulemaking for LID at a January 20, 2010 USEPA "listening session" in San Francisco. The Program also submitted a comment letter.

Throughout the year, Program staff and consultants assisted local staff and private developers by providing information about C.3 requirements and by sharing experiences with C.3 implementation.

Conclusion

The Program fulfilled its 2009/2010 objectives for C.3 implementation. In particular, Program staff and municipal staff worked together closely and effectively to limit and manage the disruptions and potential confusion created by the adoption and advent of MRP requirements, and spearheaded ongoing improvement of guidance and tools for implementing LID in new developments and redevelopments in Contra Costa. With the advent of LID requirements in municipal stormwater NPDES permits around the state, the Program's early emphasis on LID—and Contra Costa municipalities' five years of experience implementing LID through development review—have enhanced the Program's statewide stature. The Program is well poised to further enhance its effectiveness and expertise through its established process of continuous improvement.

The Program's Development Committee adopted a Work Plan for 2010/2011 that is 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 new MRP requirements 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.
- Continue Program's regional and statewide role as an exemplar and leader in C.3 implementation.

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 Program in 1993. How facility inspections and enforcement actions have been conducted has varied among Contra Costa permittees over the years. In Fiscal Year 2009/10, business inspections for the cities of Antioch, Clayton, Concord, El Cerrito, Hercules, Lafayette, Martinez, Oakley, Orinda, Pittsburg, Pleasant Hill, Richmond, and San Ramon, and the Towns of Danville and Moraga were conducted under a contract by 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 Program was issued its first Joint Municipal NPDES Permit in 1993. This innovative program was designed to "piggy-back" stormwater inspection services onto the ongoing pre-treatment inspections conducted by experienced and existing POTW inspectors for many years. This arrangement was 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 are referred to in this Annual Report collectively as the "Group Inspection Program". The Program 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, Pinole, San Pablo, and Walnut Creek, and Contra Costa County currently conduct their own business inspection programs.

As discussed in the previous sections of this Annual Report, the Program restructured in October 2009 in response to adoption of the MRP. This included the establishment of the Municipal Operations Committee (MOC). The Program's MOC replaced the Commercial and Industrial Ad Hoc Advisory Workgroup, which had provided a forum for business inspectors, both POTW and municipal, to meet quarterly and share experiences and solve common problems, and to review and develop training workshops for inspectors countywide.

Accomplishments

Following is a list of accomplishments conducted by the Program's MOC, and coordinated with BASMAA's MOC, to assist permittees with implementation of the mandates in provision C.4 of the MRP.

1. Establishing the Program's MOC to facilitate implementation of enhanced commercial and industrial business inspection and enforcement programs countywide and regionally;
2. Designating Municipal representatives of the Program to participate on BASMAA's MOC;
3. Renewing and administering the inspection contracts and agreements for the Group Inspection Program;
4. Developing a Model Enforcement Response Plan (ERP);
5. Supporting and participating in the Contra Costa Green Business Program; and,
6. Providing outreach to the business community.

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

Formation of the Program's MOC, and Designation of Program Representation on BASMAA's MOC

The details on the formation of the Program's MOC has been reviewed in previous sections of this Annual Report. The MOC has been meeting monthly since December 2009. For a listing of municipal participation and attendance at Program MOC meetings, see Attachment 1.3. For a list of Program representatives to BASMAA's MOC see Attachment 1.1. Due to competing priorities, there was little discussion and review of the provision C.4 mandates by the BASMAA MOC members. With the completion of priority tasks, opportunities will come in the future to share experiences, guidance and training among BASMAA member agencies. In Fiscal Year 2009/2010, Program staff was very active in renewing the inspection contracts and agreements for the Group Inspection Program, supporting and participating on the Contra Costa Green Business Program, and assisting in the Program's MOC in the review and development of guidance and tools for municipal implementation of the new Provision C.4 mandates. The Program's MOC was focused on ensuring municipalities' had sufficient authorities to implement the MRP, updated their business inspection plans, and develop and beginning implementing an enforcement response plan.

Administrative Support to Co-permittee Inspection Programs

Most municipal representatives on the MOC have multiple responsibilities. Stormwater compliance is just one of their responsibilities and hence their time is limited. They are in need of assistance to ensure their stormwater programs are effective and thorough. Program staff provides this assistance as needed. The Program structure is designed so that Program staff provides compliance interpretation of the MRP, training to municipal stormwater inspectors, and representation at all regional stormwater meetings and trainings on behalf of all co-permittees.

Program staff representation of co-permittees is an effective and efficient means of disseminating information from regional activities to individual permittees. Stormwater inspectors are trained to apply the most up-to-date and effective BMPs.

Management and Implementation of Group Inspection Program Contract

Program staff manages the inspection contracts between the fifteen (15) co-permittees involved in the "Group Inspection Program" and three local POTWs - Central Contra Costa Sanitary District (Central San), 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. Program staff meets with the municipalities annually to assess the services provided, set goals for the upcoming fiscal year, and reviews any special issues or enforcement problems that have occurred.

This fiscal year the inspection contract was expanded to include the City of Richmond. Richmond's inspection activities are partially implemented by local EBMUD inspectors and partially by City of Richmond staff. The EBMUD inspectors inspected the City of Richmond's auto facilities. City of Richmond staff conducted the remaining stormwater inspections for the year.

After a review of section C.4 of the MRP, Program staff has determined that inspection programs managed by the Program's contract are consistent with the MRP's requirements. 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 except a formal enforcement response plan (ERP), which is discussed below.

Renewal of the Inspection Contract

During FY 2009/2010, the Program inspection contract was updated and renewed to continue to provide inspection services to the fifteen (15) contracted municipalities. Improvements written in the contract include language to make the contract run in perpetuity.

The complete revision and renewal of this contract was a lengthy process, which delayed the contract's completion until January 2010. This caused a delay in inspection services in the commencement of inspections during the first part of the year. However, 95% of goals for the cities were met during the remaining months of FY 2009/2010. No outstanding enforcement issues were experienced during that time and no referrals were made to the Water Board, which means all enforcement issues were resolved between the municipality, inspector staff, and the non-compliant business.

With its continued success in substantially reaching inspection goals, the contract has proven its effectiveness in the field and met all MRP compliance mandates. No change has been made to the contract since all inspections and enforcement activities meet MRP compliance. The contracted inspection program will continue to expand their list of potential businesses and improve inspector education with new requirements in the MRP especially involving the pollutants of concern (POCs) (i.e., mercury, PCBs and copper).

Model Enforcement Response Plan (ERP)

The Program created a model ERP to assist municipalities with compliance MRP Provisions C.4.c, C.5.b, and C.6.b. The model includes an enforcement structure to address general non-compliance issues with the appropriate level of response, which begins with education and information with progressive enforcement steps reaching monetary fines and/or criminal prosecution. This model ERP was written by Program staff, reviewed by the MOC and the DC, and approved by the Management Committee. Each co-permittee took the final model ERP and tailored it to their suit their individual inspection program.

Green Business Program

The Program supports and participates in the Contra Costa Green Business Program. During FY 2009/2010, $9,000 was provided to support the Green Business program. The Program is the largest 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).

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 2009/2010, a total of 443 businesses were certified as a Green Business. The Green Business Program prepares an annual report every calendar year. Attachment C.4.b provides the 2009 Annual Report, which details their accomplishments. The stormwater inspectors have assisted the Green Business program by encouraging potential green business candidates.

The effectiveness of this program results from an increasing list of businesses certified as green year after year. There is now a wait list in Contra Costa to be certified as a green business. County staff has a difficult time certifying and recertifying the number of businesses interested in being part of the program. More and more demand from the business community and the consumer community is driving a larger green program in Contra Costa, perpetuating a growing need for green practices, green merchandise and good environmental stewardship. It is unknown as to the measurable effect the number of green businesses has on water quality in Contra Costa but the more green businesses the more awareness in the community about green practices and how each individual, through their consumer choices, can help improve our environment.

Providing Outreach and Resources to Businesses

Program staff produced a number of outreach materials such as BMP brochures, posters, a website, and a hotline for the business community. Each resource has been used by businesses and promoted by all stormwater inspectors in Contra Costa. During FY 2009/2010, no new resources were produced due to other MRP priorities but future plans are to develop more printed materials for the inspectors to hand out and educate businesses on BMPs as well as translating the pieces we have to other languages.

The effective results observed when using these materials are from direct communication with the businesses. Every year Program staff receives calls from businesses to acquire copies of the materials to train their staff and promote good environmental practices. Businesses use the website to find information on stormwater pollution prevention 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 clean 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.

Conclusion

For over fifteen years the Program 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 changes have been made to the inspection programs. To continue success and MRP compliance, the Program has set goals for FY 2010/2011. The Program’s goals include providing an annual training workshop for all stormwater inspectors, including updated training on POC identification and management, expanding the potential list of businesses to be inspected, developing more outreach material for the businesses, continuing to provide a hotline and website for businesses to educate themselves in stormwater pollution prevention, and continuing to support the Green Business Program. By completing these goals and continuing the current effort implementing all inspection programs, the Program will continue to be in compliance with C.4 of the MRP.

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

Introduction

The Program conducts illicit discharge detection and elimination (IDDE) group activities on behalf of all 21 co-permittees within Contra Costa. Program-wide illicit discharge activities conducted in FY 2009/2010 include illegal dumping reporting, management of the 1-800-NO DUMPING hotline, local and regional outreach to mobile businesses, attending BASMAA's Municipal Operations Committee (MOC) and creation of the Program's MOC to facilitate development of outreach materials and training for co-permittees. The MOC is the general venue where all illicit discharge activities, BMPs, trainings, and future projects are planned and directed. The MOC's purpose and structure is detailed in section C.2 of this report. The MOC is tasked with providing guidance, tools and training to assist municipalities with implementation of and compliance with the Provision C.5 mandates. The MOC meets monthly on the fourth Thursday of the month. Attachments 1.1 and 1.3 show participation and attendance by co-permittees at these meetings for Fiscal Year 2009/2010, and municipal representatives of the Program at BASMAA's MOC meetings.

Accomplishments

The following IDDE related activities were conducted as a group during FY 2009/2010:

1. Formation of the MOC, and monthly MOC meetings to discuss and coordinate program-wide IDDE activities;
2. Attending BASMAA's Municipal Operations sub-committee meetings to coordinate regional IDDE activities;
3. Development of a model Enforcement Response Plan (ERP);
4. Management of the 1-800-NO-DUMPING Hotline and Hazmat Incident Reports; and,

5. Review and support of BASMAA's Mobile Surface Cleaner Program.

The following is a detailed account of each activity listed above and its effectiveness since the adoption of the MRP:

MOC Meetings and Activities

The MOC was created in October 2009 as a formal committee to address MRP Provisions C.2, C.4, C.5, C.9, and C.10 of the MRP. The MOC has been meeting monthly since December 2009. An agenda and meeting minutes are prepared for each meeting and posted to the Program website. During FY 2009/2010 illicit discharge activities were limited due to other priorities in the MRP. However, the committee did develop a model Enforcement Response Plan (ERP); reviewed and distributed to co-permittees a model storm system screening form produced by the BASMAA MOC; and, discussed training needs for IDDE activities FY 2010/2011. These individual projects are discussed in the following paragraphs.

BASMAA's Municipal Operations Sub-committee

The BASMAA MOC was formally established in February 2010. The BASMAA MOC meets month to review and discuss regional implementation of MRP Provisions C.2, C.4, C.9, and C.10. Program staff and the two designated co-permittees who attend the BASMAA meetings as representatives of the Program act as a liaison to the Program's MOC. Due to other priorities in the MRP, there was limited review and discussion of the IDDE activities by the BASMAA MOC during FY 2009/2010.

The BASMAA MOC did, however, collaborative in the creation of a model storm system screening form. BASMAA MOC members shared how they manage their IDDE programs, and specifically how they conduct field screening investigations. Following these discussions, the BASMAA MOC agreed to create a model form to assist municipalities with a coordinated and consistent "Storm System Screening Form" This form was finalized through BASMAA after it received review by all the stormwater programs including Program's MOC. The final form was distributed to BASMAA members in June 2010, and is intended as a tool to be used by stormwater inspectors and municipal staff in the field.

Create a Model Enforcement Response Plan (ERP)

The Program created a model ERP to satisfy the MRP Provisions C.4.c, C.5.b, and C.6.b. The model ERP includes an enforcement structure to address general non-compliance issues identified during business inspections, during field IDDE field screening investigations, and construction-site inspection activities. The ERP provides for progressive enforcement beginning with information and education and ending with monetary fines and criminal prosecution. A draft model ERP was written by Program staff, reviewed by the MOC and the Program's Development Committee, and approved by the Management Committee in March. A final draft version, following a review by legal counsel, was adopted by the Management Committee in April. Each co-permittee took the finalized model ERP and tailored it to their individual stormwater programs.

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

The Program continues to manage the 1-800-NO-DUMPING hotline for citizens to report illicit dumping within their jurisdiction, and to obtain stormwater information. The Program received a total of 53 hotline calls in FY 2009/2010. The Program has been logging calls since FY 2004/2005. Attachment C.5.b lists calls received during FY 2009/2010. These calls, combined with calls that come directly to municipalities and County Hazmat, are tracked annually. All hotline calls are referred to the appropriate co-permittee for follow-up and, if necessary, enforcement**.**

Of the 53 calls received, the overwhelming majority of the calls were attributed to an identifiable illegal dumping incident. The materials dumped included mattresses, appliances, trash, paints, fuel leaking from vehicles, horse manure, and irrigation overflows. The information from the hotline can add to the trends found throughout the County and support the Program's effort to design abatement programs based on the most prevalent and problematic dumping occurrences.

The Program continues to collaborate with the Contra Costa County Hazmat Division on Spill Response. Hazmat's countywide 24-hour response is a vital component of co-permittees IDDE programs. Each month the Program disseminates the Hazmat spill response or "Incident Reports" to each municipality's Management Committee representative. These reports inform each co-permittee of Hazmat occurrences within their jurisdiction as well as provide the Program with illicit discharge incidents for tracking and analysis of trends. Co-permittees use this information to track the type and locations of spills and dumping incidents, and to conduct appropriate follow-up.

Program staff encourages all the co-permittees to analyze their 1-800-NO-DUMPING calls and Hazmat incident reports to help them identify trends, hot spots, and needed improvements to their IDDE programs. The Program will continue to track the hotline calls and provide copies of the Hazmat incident reports to the co-permittee for follow-up.

BASMAA's Mobile Surface Cleaner Program

BASMAA's Mobile Surface Cleaner Program is a training and certification program mobile surface cleaners. For more details on this program, please refer to Section 4 of this report. The Program promotes BASMAA's program through its website, encourages all co-permittees to hire only BASMAA-certified cleaners, and encourages the private business community to hire only BASMAA-certified cleaners. This program is ongoing and will continue to satisfy the requirement in the MRP to control pollution sources from surface cleaning activities in addition to inspection activities discussed in Section 4 of this report. Further detail regarding enhancement of the BASMAA Mobile Surface Cleaner Program are provided in the BASMAA's "*MRP Regional Supplement: Training and Outreach for Fiscal Year 2009/2010 Annual Report*", which was submitted separately by BASMAA on behalf of the Program.

Contra Costa has been effective in controlling illicit discharges from surface cleaners by a strong stormwater inspection program. Stormwater inspectors actively seek out and find illicit discharges by professional surface cleaners and residents, stop the discharge, administer enforcement on the discharger when needed, and educate the business about the certification program and the general public about the impacts of surface cleaning on local creeks and aquatic resources. Contra Costa has been actively stopping illicit discharges through a reactive inspection program as well as a proactive outreach campaign with outreach materials and training workshops provided to businesses through BASMAA and local programs. These efforts will continue into FY 2010/2011, as will plans to expand and improve the BASMAA Mobile Surface Cleaning Program.

Conclusion

The Program has consistently maintained a strong IDDE program, even prior to adoption of the MRP. All the co-permittees' institutionalized IDDE programs complement Provision C.5 of the MRP. With the development and implementation of the municipal ERPs, all of the requirements of Provision C.5 have been addressed. To continue success and MRP compliance, the Program has set goals for FY 2010/2011. The Program's goals will include: a) providing an annual training workshop for all stormwater inspectors and municipal staff on IDDE; b) expanding BASMAA Mobile Surface Cleaning Program to address discharges from a variety of mobile businesses; and, c) coordinating with BASMAA MOC members to improve and expand consistent and effective IDDE programs throughout the Bay Area.

SECTION 6 – PROVISION C.6 CONSTRUCTION SITE CONTROLS

Introduction

Beginning in July 2009, the Program's C.3 Implementation Workgroup merged with the New Development and Construction Controls Committee. Then, as part of the Program's restructuring in October 2009, the New Development and Construction Controls Committee changed its name to the Development Committee (DC). The DC is responsible for preparing Program guidance, tools, and training to assist municipalities with implementation of their construction and post-construction stormwater quality management programs; and, reviewing, researching and making recommendations to the Management Committee on stormwater quality matters related to land development activities. This section provides a summary report of the DC's activities to assist Contra Costa permittees with implementation of their construction-site stormwater quality protection programs, including the Provision C.6 mandates in the MRP, which became effective on December 1, 2009.

In Fiscal Year 2009/10, David Swartz, Contra Costa County, and Libbey Bell, City of Concord, served as Chair and Vice-Chair of the DC, respectively. Attachment 1-3 provides a listing of the municipal representatives participating on the Program's DC along with the meetings and attendance for Fiscal Year 2009/10. An agenda and meeting minutes were prepared for each meeting and posted on the Program website. In October 2009, David Swartz, Contra Costa County, and Frank Kennedy, City of Oakley, were designated by the Program's Management Committee to represent the Program on BASMAA's Development Committee.

Accomplishments

The DC's construction-site controls goals and objectives for Fiscal Year 2009/2010, as documented in the previous annual report, were:

1. Conduct follow-up training on planning, design and construction of LID stormwater facilities for municipal staff and development professionals.
2. Continue participation in development of the pending Municipal Regional Permit and, when adopted, develop work plans (tasks, schedule and budget) for implementation of new construction-inspection Performance Standards.
3. Develop or update construction-site stormwater quality outreach materials in coordination with BASMAA's New Development Committee, if possible.
4. Continue coordination of the Pre-Rainy Season Construction-Site Inspections.
5. Review and provide comments on the State's planned reissuance of the General Construction Activity Permit.
6. Review and provide comments on the development of the San Francisco Bay Regional Board's Stream & Wetland System Protection Policy and the State Water Board's Wetland & Riparian Area Protection Policy.
7. Review, update and enhance the Program's "Construction" web page.

Following is a description of activities and accomplishments that fulfilled these objectives:

Construction-Site Stormwater Quality Workshop

On March 18, 2010, the Contra Costa Clean Water Program co-sponsored an all-day Construction-Site Stormwater Quality Workshop held at the Shade lands Civic Arts and Education Center in Walnut Creek. The San Francisco Estuary Partnership, the San Francisco Bay Regional Water Quality Control Board, and Friends of the Estuary provided in-kind support.

Approximately 130 public and private sector construction-site stormwater quality practitioners attended the workshop. Copies of the workshop agenda, attendance roster, and presentations are posted on the Program's website at http://www.cccleanwater.org/workshops.html. The workshop covered the new requirements in the State Construction Site General Permit, which became effective on July 1, 2010; the Municipal Regional Permit, which became effective on December 1, 2009; and, lessons learned in the design and construction of post-construction Low Impact Development (LID) stormwater management facilities. This workshop complies with Provision C.6.f. in the Municipal Regional Permit, which requires training for municipal staff conducting construction-site inspections. This training is required at least every other year. Training topics are to include information on correct uses of specific BMPs, proper installation and maintenance of BMPs, permit requirements, local requirements, and the Enforcement Response Plans. All topics were covered in the workshop.

Pre-Rainy Season Construction Site Inspections

Performance Standard NDCC-15, under the old permit, required all agencies to conduct pre-rainy season inspections of every construction project by September 30 of each year. The objectives of the pre-rainy season inspections are: (1) to ensure the construction-site owner, or owner's representative, is aware of the municipality's stormwater requirements (e.g., to prepare and implement an erosion control plan prior to the wet-season); (2) to identify and correct potential problems before they occur; and, (3) to verify the construction-site owner, or owner's representative, is covered under the State's General Construction Permit, if applicable, and has prepared a Stormwater Pollution Prevention Plan (SWPPP). This year's inspections were documented using the same "Pre-Rainy Season Construction-Site Inspection Form" used in previous years, which was prepared by the DC and approved by the Management Committee (a copy of this form was provided as Appendix "C" in Volume I, Section 3 of the Fiscal Year 2005/2006 Annual Report). Program staff compiled this year's forms on behalf of the DC and all co-permittees and submitted them to the San Francisco Bay and Central Valley Regional Boards on October 15, 2009. Under the MRP, municipalities are required to notify, by September 1 of each year, all site developers and/or owners disturbing one acre of more of soil to prepare for the up-coming wet season. This new mandate will be incorporated into municipalities' internal procedures and implementation will commence next fiscal year.

Municipal Regional Permit Negotiation and Implementation

The Program DC's primary focus in the early part of the year was devoted to commenting and negotiating with San Francisco Bay Water Board staff regarding the pending MRP C.3 Provisions, which turned out to be the most controversial new provision at the time of permit adoption in October 2009. The C.6 "Construction Site Controls" provisions were, in comparison, uncontroversial. In late Fiscal Year 2009/10 (April 2010), the Central Valley Water Board staff initiated discussions with the Program and the East County co-permittees (i.e., cities of Antioch, Brentwood, and Oakley; Contra Costa County; and, the Contra Costa County Flood Control and Water Conservation District) for reissuance of their Municipal NPDES Stormwater Permit. The Program's primary goal and objective is to ensure the East County permit is consistent and coordinated with the MRP. This process will be a priority for the Program next fiscal year.

Following adoption of the MRP, the DC, in coordination with the Program's Municipal Operations Committee, developed a model Enforcement Response Plan (ERP) in accordance with Provisions C.4, C.5 and C.6. A working draft model ERP was adopted by the Management Committee on March 17, 2010 pending further review by the City/County Attorneys' Association Stormwater Subcommittee. This allowed municipalities to have an ERP plan in place by the April 1, 2010 deadline. The legal review was completed and a final draft model ERP was adopted by the Management Committee on April 21, 2010.

The DC also completed development and distributed to municipalities in May 2010 a model *Construction Site Inspection Report* that was adapted from a similar report prepared by the San Mateo Countywide Stormwater Pollution Prevention Program. Municipalities now use this report, or an equivalent, for documenting each construction-site stormwater quality inspection. Information gathered in the reports is then maintained by each municipality in either an electronic database or tabular format, and summarized in each Municipal Annual Report as required in Provision C.6.e.iii. The DC is working to develop and refine instructions for importing inspection data collected on an electronic copy of a completed *Construction Site Inspection Report* into an Excel spreadsheet, which can then be used to prepare the annual inspection summary reports due to the Water Boards on September 15 of each year. This work is ongoing and should be completed and available for municipal use next fiscal year.

With adoption of the Construction General Permit and the MRP, the DC agreed BASMAA's construction-site stormwater quality outreach materials needed to be reviewed and updated (e.g., Blueprint for a Clean Bay, Pollution Prevention – Its Part of the Plan (Plan Sheet), and the Construction Industry Tri-fold Brochures). At the request of the Program's DC, BASMAA's DC determined this task should be implemented regionally. To initiate this process, Contra Costa Clean Water Program representatives Dan Cloak (Program's consultant), and Frank Kennedy (City of Oakley) reviewed existing outreach materials to scope out which materials should be updated and how to reflect MRP and Construction General Permit requirements. Their recommendation was that the materials should be revamped rather than just updated. BASMAA DC members are currently reviewing the utility of the existing pieces and their primary audiences and how they prefer to receive their information. This work will continue as a regional task next fiscal year.

Construction Site Control Web Page

In FY 2008/09, the Program redeveloped its website to increase ease of use, enhance overall design, and to incorporate the Program's new tagline, "Support litter free local waterways." Overall restructuring was done with the intent to make the site more appealing to residential visitors, without decreasing access to materials presently used by the commercial sector. A goal of the DC in Fiscal Year 2009/10 was to review, update and enhance the "Construction" web page within the commercial sector; however, due to reduced staffing, competing demands involving ongoing C.3 implementation and the newly adopted Municipal Regional Permit, this activity has been delayed to next fiscal year.

Review of Pending Regulatory Initiatives

In Fiscal Year 2009/2010, the DC was tasked with tracking and reporting on the following pending regulatory initiatives:

- Municipal Regional Permit
- Draft Construction General Permit
- San Francisco Bay Regional Board's Stream & Wetland System Protection Policy
- State Water Resource Control Board's Wetland & Riparian Area Protection Policy

As discussed above, the DC's focus was devoted to negotiations, and then implementation, of the MRP. However, the DC did actively track through the California Stormwater Quality Association's Construction Subcommittee the State Water Resources Control Board's (State Water Board's) reissuance of its Construction General Permit (CGP), which was adopted on September 2, 2009 and became effective on July 1, 2010. To assist in providing much needed outreach and training on the new CGP, the Program retained Scott Taylor with RBF Consulting for the March 18, 2010 workshop (discussed above). Mr. Taylor is the current Chair of the California Stormwater Quality Association and has been involved with the State Water Board in development and implementation of a statewide training program on the new CGP. The DC will continue to provide information and updates on lessons learned in implementing the new CGP next fiscal year.

The DC was also tasked with tracking the San Francisco Bay Regional Board's *Stream & Wetland System Protection Policy* and the State Water Board's *Wetland & Riparian Area Protection Policy*. However, the DC is not aware of any new information or developments with either of these initiatives. The DC will continue to look for updates regarding development of these two policies next fiscal year.

Conclusion

The Program's DC substantially fulfilled its Fiscal Year 2009/2010 construction-site stormwater quality goals and objectives. With adoption of the San Francisco Bay Water Board's MRP and the State Water Board's Construction General Permit, and the pending reissuance of the Municipal NPDES Permit issued to East County permittees by the Central Valley Water Board, the Program's DC will be able to focus on assisting municipalities in revisiting and refining their construction-site stormwater quality management programs.

The DC's goals and objectives for Fiscal Year 2009/2010 are tentatively as follows:

- Timely reissuance of an East County NPDES Stormwater Permit, which is consistent and coordinated with the MRP.
- Continue to facilitate a forum for sharing issues and lessons learned in: a) the design and construction of LID stormwater management facilities; b) the implementation of the new Construction General Permit; and, c) implementation of the Provision C.6 construction-site control mandates.
- Review needs, and update or develop guidance and tools to assist municipalities with implementation of effective construction-site inspection and enforcement programs.
- Review and evaluate the Fiscal Year 2010/2011 municipal inspection findings on the effectiveness of the BMPs in the six categories listed in Provision C.6.c.i, and determine training needs for implementation in Fiscal Year 2011/2012.
- Continue active participation and coordination with BASMAA DC members in the review and development regional tasks to assisting MRP permittees with implementation of consistent and effective construction-site inspection and enforcement programs, including development of new or updated construction-site best management practice outreach materials.

- Continue to track and provide input on the development of the San Francisco Bay Regional Board's *Stream & Wetland System Protection Policy* and the State Water Board's *Wetland & Riparian Area Protection Policy*.
- Review, update and enhance the Program's "Construction" web page.

SECTION 7 – PROVISION C.7 PUBLIC INFORMATION AND OUTREACH

Introduction

The Program's Public Information/Participation Committee (PIPC), with assistance from Program staff and consultants, is responsible for development of materials and products, information dissemination, technical workshops, marketing, and public outreach as required in 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. For example, C.15.b.iv. requires permittees to discourage through outreach efforts individual car washing. The PIPC 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 (PIPC). Attachment 1.1 and 1.3 provides a list of Program and municipal representatives to BASMAA's PIPC, and participation and attendance at Program PIPC meetings, respectively. In Fiscal Year 2009/2010, Steven Spedowfski, City of San Ramon, and Laura Wright, City of Pittsburg, served as Chair and Vice-Chair, respectively, of the PIPC.

The Program spent approximately $530,000, more than any previous year, for PIP activities during this fiscal year. This was supplemented with a grant from the California Integrated Waste Management Board totaling $72,184, for a combined total expenditure of $602,184.

O'Rorke, Inc., has been employed as a professional consultant for outreach activities since October 2008. O'Rorke's experience with public education and outreach efforts in the Bay Area, their local media contacts and creative expertise provided a more technologically savvy outreach via the internet, in addition to traditional media.

The Program launched a Facebook page in fall 2009 (please see http://www.facebook.com/cccleanwater_program). The page promotes our six (6)

Litter ads, the Volunteer Creek Monitoring Program and provides a forum to post relevant articles to draw attention to stormwater issues. The Program's Facebook page and website are cross linked.

In FY 2008/2009 the Program redesigned its website to incorporate its new tagline, "Support litter free local waterways." The website was updated to include a "hot spot" on the home page where residents can pledge to stop using plastic bags in exchange for a recycled content reusable tote bag provided by the Program. One hundred-forty (140) bag requests were received in FY 2009/10, seventy-four (74) resulting from an outreach letter campaign to new homeowners that launched in the spring. Another hot spot was added on the homepage to link viewers to the Program's anti-litter advertisements.

Approximately 13,000 educational materials and promotional items were distributed in Fiscal Year 2009/10 to municipalities and the general public. This year's promotional items included t-shirts displaying the tagline "Litter stops with me", chico (tote) bags, shammies which educate residents about washing their car at home and native flower seed packets. The Program strives to promote non-toxic, recyclable, native promotional items.

As an active member of BASMAA, the Program participated in a region-wide media campaign which met requirements for Provisions C.7.c. Media Relations – Use of Free Media and C.7.d. - Stormwater Point of Contact. Details are provided in BASMAA's "*MRP Regional Supplement: Training and Outreach for Fiscal Year 2009/2010 Annual Reporting"*, submitted separately by BASMAA on behalf of the member agencies.

Accomplishments

C.7.b – Advertising Campaign

Creative Development - The Program developed additional print, online, and outdoor media pieces for the "Fancy…Litter?" campaign based on focus group feedback.

The campaign ran in fiscal year 2009/10. All media featured the new Program tag line "Litter travels but it can STOP with you."

In augmenting the four (4), fifteen (15) second TV vignettes produced in fiscal year 2008/09, the Program developed the following media pieces:

Radio

- Radio spots ran countywide on Metro radio and local Spanish radio stations KSOL and KBRG.

Outdoor / Transit

- Billboard placed alongside I-680 in Walnut Creek.
- Premier Panel Billboards ran in East County along Highway 4 in the city of Antioch.
- Transit ads including Queens, Tails and Interior Cards ran on the West Cat, Tri Delta and County Connection bus lines.
- BART posters placed in the Richmond, El Cerrito, Orinda, Lafayette, Walnut Creek, Pleasant Hill, and North Concord/Martinez BART stations.

Alternative Media / Out of Home

- TV spots on the Ripple TV in-store network featured the TV vignettes in Noah's Bagels locations in Walnut Creek and Pinole.
- TV spots on the Pumptop TV network featured the TV vignettes at gas station TV screens in Oakley, Danville, San Ramon and Pleasant Hill.
- Library flyers distributed to many libraries in Contra Costa County and displayed with other promotional materials.

In Store / Other Outdoor

- Star Kart ads ran on shopping carts in Richmond, Martinez, Brentwood, Lafayette, and San Ramon Safeway locations.

Online

- Placecast online ads ran throughout Placecast's network of affiliate websites and were geo-targeted to County residents.
- Google AdWords and Yahoo search ads ran on the Google and Yahoo search engines and were geo-targeted to County residents.
- Facebook online ads ran on Facebook and were geo-targeted to County residents ages eighteen (18) and older.
- Contracostatimes.com ads ran on the Contra Costa Times' website and were geo-targeted to County residents.

Direct Mail

- Letters introducing the Program and suggesting ways to reduce litter were sent to new homeowners in the County, resulting in seventy-four (74) tote bag requests.

Grassroots

- Bicycle outreach was conducted by a cyclist riding a recumbent bicycle with attached signage who rode at community events and popular destinations in Pinole, Pittsburg, El Cerrito, Danville, Alamo, Moraga, Concord, and Blackhawk.
- Grocery store posters translated into Chinese, Spanish and Tagalog, were posted by grocery stores in San Pablo, Richmond, Concord, and Walnut Creek.

Youth

- Zoom Media digital ads ran in bowling alleys in Antioch, Brentwood, Danville and Concord.
- Facebook online ads ran on Facebook and were geo-targeted to County residents under 18.
- Sparknotes.com online ads ran on the Sparknotes online study-aide website and were geo-targeted to County residents.

The Program has long been an advocate of significant media campaigns to try to reach the general public. In the last two (2) years, the Program has increased its media budget to provide a stronger outreach.

O'Rorke conducted a post-campaign survey. The results of the post-campaign survey, when compared to the pre-campaign focus groups conducted in February 2009, showed that while overall awareness of the slogan "Litter travels but it can stop with you" increased, generally most other awareness levels and levels of concern were shown to have decreased from 2009 to 2010. This was disappointing but also perplexing given the strong results of the Google Analytics data on the Program's CCCleanwater.org website. A detailed post-campaign survey report is available in Attachment C.7.b.iii.(2). Samples of print, online and outdoor media materials will be made available upon request.

In the last calendar year, the Program's website received a total of 18,504 unique visitors, 15,868 or 86% of which visited between October 5, 2009 and April 17, 2010 when the campaign was running. Website traffic increased from the typical 10 to 15 visitors a day to as much as 150 a day, with a few days spiking to near 300 in October during the Media Launch period.

So, while the survey results indicate that overall awareness decreased, the traffic to the CCCleanwater.org website suggests otherwise. For future campaigns, the Program has decided that additional methods of data collection and campaign analysis will be explored to augment a traditional phone survey.

Based on the results of the survey, the Program will develop a 2010/2011 advertising campaign that builds on the successes of the 2009/2010 campaign, while eliminating the media elements that did not perform as well. Because of the strong recall of the new Program tag lines, the creative (anti) Litter campaign developed last year will be reused. Slight revisions will be made, such as pulling ad designs that did not perform as well and streamlining some messages. The Program will begin developing the 2010/2011 advertising campaign during the summer of 2010, and will launch it in the fall of 2010.

C.7.c – Media Relations

October 7, 2009 "Litter" Campaign Media Launch - To promote the launch of the "Fancy…Litter?" fall campaign, the Program organized a kick-off press event at the Walnut Creek BART station on Wednesday, October 7th, 2009. After listening to various speakers including Bruce Wolfe, Executive Director of the San Francisco Bay Regional Water Quality Control Board, college students from throughout the County boarded a County Connection bus wrapped with the "Fancy…Litter?" campaign creative, and traveled throughout the County distributing free tote bags, and encouraging residents to "take the pledge" to reduce litter in their communities.

All major media outlets in the County were pitched prior to the event including TV, radio, print, and online. Representatives from KCBS-FM and the Contra Costa Times attended the event. Coverage appeared on KCBS-FM on October 8, 2009, in the Contra Costa Times on October 9, 2009, and on KCBS.com on October 8, 2009. A preview of the event ran on Danvilleweekly.com on 10/6/2009.

Media Pitches – BASMAA provided three (3) region-wide media pitches, for a total of thirty-eight (38) media placements on the subjects of pesticides, car washing and litter. Details are provided in Attachment C.7.c.

C.7.d – Stormwater Point of Contact

The Program's website provides a phone number and email contact information for each municipality's designated stormwater representative at http://www.cccleanwater.org/city-contact-list.html. The Program's Administrative Analyst updates the Contacts page when notified of a change of representative. As discussed in *BASMAA's MRP*

Regional Supplement for Training and Outreach Annual Reporting for FY 2009/2010, member programs' lists of points of contact and contact information are also posted on BayWise.org.

<u>*C.7.e – Public Outreach Events*</u>

Bringing Back the Natives Garden Tour – The Program supported the Sixth Annual Bringing Back the Natives Garden Tour, which took place on Sunday, May 2, 2010, showcasing fifty (50) gardens located in seventeen (17) cities and unincorporated areas in Alameda and Contra Costa counties (Alameda, Albany, Berkeley, Castro Valley, Clayton, Concord, El Cerrito, El Sobrante, Hayward, Livermore, Martinez, Moraga, Oakland, Orinda, Pinole, Richmond, and Walnut Creek).

The tour received overwhelming interest from the public. This year 5,920 people registered for the tour on-line, a 9% increase in registrants over last year's tour. On the day of the tour an additional 257 people visited the same day walk-in registration sites, which were set up in Alameda, Berkeley, Castro Valley, Concord, El Cerrito, Livermore, Martinez, Moraga, Oakland, and Richmond.

Survey results showed registrants' familiarity with gardening with native plants was:

- 38% - beginner
- 53% - some knowledge
- 9% - old hand

The 2010 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 (76%) wanted to learn how to select native plants. 56% wanted to learn how to conserve water. 51% wanted to learn how to garden for wildlife. 32% percent wanted to learn how to reduce pesticide use, 36% wanted to learn how to remove their lawns, and 22% wanted to learn about composting. 81% 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.

Evaluations of repeat registrants from the 2010 tour showed that after attending a prior Bringing Back the Natives Garden Tour: 21% of respondents had incorporated natives into their gardens (thereby reducing herbicide use and conserving water; up from 17% in 2009); 13% were encouraging wildlife with plant choices; 17% had grouped plants by water needs and incorporated drought resistant plants into their gardens (up from 12% in 2009); 12% had increased the density of plantings to out-compete weeds (reducing herbicide use and conserving water); 7% had begun mulching; 9% had reduced or eliminated pesticide use; 6% had reduced the size of their lawn; 9% were tolerating some insect damage; 7% had installed efficient irrigation; 5% had amended their soil; 3% were grasscycling; 5% were composting; and 3% 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: 39% planned to increase the density of plantings to out-compete weeds; 33% to group plants of similar water needs; 23% to install efficient irrigation; 22% to reduce the size of their lawn; 25% to encourage wildlife; 19% to incorporate native plants into their gardens; 16% to amend their soil with compost; 19% to mulch; 16% to minimize hardscapes; 15% to compost; 10% to tolerate some insect damage to plants; 10% to grasscycle; and 6% to reduce or eliminate pesticide use.

The tour was highly motivating to the 334 first time registrants who completed the evaluation. More than half (52%) of first-time registrants responded that they planned to increase the density of plants, thus helping to out-compete weeds and reduce water use. 52% of first time registrants planned to group plants by water needs, and 50% planned to incorporate native plants into their gardens. 34% planned to reduce the size of their lawns. 45% planned to incorporate drought resistant plants into their gardens (up from 39% in 2009); and 31% to install efficient irrigation. 44%planned to encourage wildlife, up from 35% in 2009. 27% planned to mulch, and 23% to amend their soils; 22% to compost kitchen scraps and yard waste; 23% planned to tolerate some insect damage; 18% planned to reduce or eliminate pesticide use; and 16% planned to reduce the amount of hardscape in their gardens.

Kids Creek Fest - The Program provided financial support for the May 8, 2010 event at Fernandez Park in Pinole. Kids Creek Fest, an event that combines play with an environmental message, is popular in the 10-and-under set. This environmental fair was the first of its kind to entertain, educate and inform young children and their families about the importance of caring for the earth, its resources, water, and animal life.

The event was designed to teach families that they can make a difference in their own homes and neighborhoods. Attendees learned about keeping water clean, the importance of organic food, and that kindness to each other and the environment goes a long way. One of the booths had a working watershed model so attendees could see how dumping oil or polluting the creek in one place effects aquatic life downstream. Attendees learned that they can help care for the environment in their own home by reducing or eliminating pesticides, herbicides and fertilizers, and the importance of planting native plants.

Over 1,000 people attended the event, 400 of them children. Pinole City Council member Pete Murray spoke about the importance of educating our children so that they learn from an early age to care for their environment. Eight (8) bags of trash and other garbage were removed from the section of Pinole Creek between the Park and the Senior Center.

The feedback on the survey flyers was very positive. The event generated a number of calls and emails thanking organizers. Media coverage included two mentions in the Times, posts on Berkeley Parents Network and announcements on the radio show "Childhood Matters." The West County Times sent a photographer on the day of the event.

C.7.f – Watershed Stewardship Collaborative Events

Bay-friendly Landscape (BFL) and Gardening Coalition – The Program continues to be a major supporter of BFL, a one-of-a-kind organization that provides local non-structural Integrated Pest Management (IPM) landscape training. The Program set aside significant funding for Fiscal Year 2009/10 to support BFL's workshop and annual dues. Since BFL was unable to obtain sufficient financing to hold their workshop, the funding was carried over to the FY 2010/11 budget, dedicated to the fall 2010 landscape workshop.

California Product Stewardship Council (CPSC) – The Program continues to support the California Product Stewardship Council (CPSC) through its annual membership fees. The CPSC is a coalition of local governments and their associations related to solid waste, recycling, resource conservation, environmental protection, water quality, and other cross-media issues. CPSC's mission is to shift 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.

Green Business Program - The Program has annually provided staff support and financial contributions to the Green Business Program to assist with their outreach activities to the business community. The Program, one of 25 local agencies, continues to be the highest contributor to this effort. Strategic meetings are held quarterly.

In 2009, sixty (60) businesses were certified "green" bringing the total to 443 certified green businesses in Contra Costa County, and almost 2,000 in the Bay Area. Among the new businesses were three (3) public agencies – the City Halls of El Cerrito and Richmond, and County Board of Supervisor's Member Federal Glover's Office.

The Green Business Program has also created a new, online database that will yield measurable program results and allow the program to go paperless, while creating consistency between programs statewide. Additionally, they have updated their "green requirements" to include Integrated Pest Management requirements.

Urban Creeks Council Streamside Management Program for Landowners (SMPL) Program - The Urban Creeks Council (UCC) is a non-profit organization working to preserve, protect, and restore urban streams and their riparian habitat. They act as advocates on behalf of creeks in urban areas, and offer support and technical advice to grassroots organizations. The SMPL Program was started with the Program in 2001.

The Program believes educating the public at the grass roots level will foster the sense of "ownership" to encourage residents to care for their neighborhood creeks. In FY 2009/10, UCC provided twenty-one (21) phone consultations for landowners who did not require a site visit. Assistance involves, for example, information related to a permit or regulation question, or the referral of a design/construction firm or creek group.

UCC also provided eighteen (18) follow-up and evaluation meetings to Contra Costa County residents to help bridge the gap between homeowners and various government agencies. Follow up visits are intended to monitor the success of projects that have been implemented during recent years. This year UCC also targeted landowners who had previously expressed interest in implementing an erosion control project in order to; 1) encourage them to participate in the EPA grant program; and 2) to provide additional technical information if they wished to implement a project without EPA assistance.

C.7.g – Citizen Involvement Events

Kids Creek Fest – Please refer to "C.7.e. – Public Outreach Events."

C.7.h – School Age Children

Kids for the Bay - The Program continued its collaborative work with the "Kids for the Bay" Program to deliver its "Watershed Action Program (WAP)." Sixteen (16) third, fourth and fifth grade classrooms, educating 426 students and sixteen (16) teachers, participated in “hands-on” science experiments and activities in their classrooms, which engaged them in their local watershed, while inspiring them to take action. The “Kids for the Bay” Program partnered with schools in each of the following cities/towns in Fiscal Year 2009/2010 – Antioch, Danville, El-Cerrito, Hercules, Moraga, Pittsburg, Pleasant Hill, and Richmond. Each of the WAP teachers and students participated in five interactive classroom workshops, an action project, and fifteen (15) of the sixteen (16) classes took a field trip to a local creek or bay habitat to practice and implement much of what they learned in the classroom. Thirteen (13) of the sixteen (16) teachers who participated in Fiscal Year 2009/2010 were returning teachers from Fiscal Year 2008/2009.

Action projects are an integral component of the WAP, and provide students an important opportunity to; 1) use the knowledge they have gained during the program; and, 2) take action and educate others on how to help their local watershed. Action Projects included three (3) classrooms that chose Natural Pesticides, making pesticides from natural ingredients available around the house. These students learned how pesticides are a poison that can get into the groundwater, surface water, and soil. Two (2) classrooms chose water quality testing in Ohlone Creek, Baxter Creek and Refugio Creek, testing for temperature, pH, dissolved oxygen, turbidity and salinity. These students wrote a letter to the City of Hercules providing their findings and made suggestions about ways to improve the health of their local watershed.

After students learned about their local watershed, they followed up their Action Project with a visit a creek, bay or delta habitat that is close to the school community. This helped students understand that the waterways in their local watershed are close-by and linked to their own school and homes. Using scientific equipment, students investigated and identified aquatic invertebrates and studied native plants, birds and other wildlife. Field trip highlights included water quality monitoring, investigating shoreline organisms, and a shoreline trash clean-up.

While the long-term benefits of the Program are unknown, one of the participating teachers summed up her experience when she wrote “One of the greatest challenges facing my students is their lack of authentic experience. Our school is a Title 1 elementary school with 100% of the students receiving free lunch daily. Their access to science enrichment, like so many students in districts across the state is extremely limited. Before this year, many of the students had never seen a microscope, looked through binoculars, or held a thermometer. They had no idea what a storm drain was, or how pollution of the watershed might affect them and their families.” Also, “Our action project at the local creek was one of the greatest days I have experienced in my teaching career. As educators, our greatest hope is that students will translate the classroom learning into authentic experiences. Listening to my students connect the field trip experiences to the lessons they had learned in the classroom demonstrated that they had a meaningful understanding of what we were trying to teach them. Their experiences in nature solidified their learning in the classroom lessons.”

Newspapers in Education - Newspapers in Education (NIE) has been a continuing program the Program supports in collaboration with many other public agencies. It provided student activity booklets and the use of newspapers to identify various environmental activities students and their families could implement. In Fiscal Year 2009/2010, twenty-one (21) high school, eight (8) middle school and thirty-two (32) elementary school classrooms were served. The Stormwater Management Program curriculum stresses the storm drain system and causes of stormwater pollution and how it can be prevented, followed by two activities designed to reinforce the information.

Used Oil Block Grant/Mr. Funnelhead - Several co-permittees within the Program provided their allocation of grant funds to the Program so we could institute a countywide comprehensive effort. Approximately $72,000 was expended on this activity. Matt Bolender is our Used Oil Block Grant consultant.

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

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

A total of eleven (11) oil collection centers were certified, four (4) were lost, for a net gain of seven (7). Two (2) of the centers lost were due to business closure.

"English as a Second Language" classes provided outreach to some of the "do-it-yourselfers" who may suffer from a language barrier. A total of fifteen (15) classes and 299 students participated in the classes. Survey results indicate the students were 34% do-it-yourselfers; more than twice the state average.

Mr. Funnelhead made appearances at twelve (12) community events in the cities of Antioch, Clayton, Concord, Danville, Orinda, San Ramon, Walnut Creek and the West County Earth Day providing a broad outreach to all demographics.

Mr. Funnelhead's educational and entertaining assemblies were held at twenty-two (22) elementary schools in the cities of Antioch, Concord, Danville, El Cerrito, Orinda, Pinole, Pittsburg, Richmond, San Pablo, and Walnut Creek and areas of unincorporated County, educating 6,420 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 and decades later to Mr. Bolender at community events.

Mr. Funnelhead and Mr. Bolender were forced to scale back activities in Fiscal Year 2009/10 due to dramatic funding cuts in the Used Oil Grant Fund money from the state. Previously, Mr. Bolender provided his services to municipalities county-wide. Cuts in funding forced him to focus his efforts on those municipalities that designated their UOBG funding to support the Program.

Kids Creek Fest – Please refer to "C.7.e. – Public Outreach Events."

Conclusion

Program staff is always receptive to new methods of outreach and 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.

In recent years the Program has fallen away from direct support of Our Water Our World (OWOW). The OWOW program now includes the design and development of 30 fact sheets (all translated in Spanish) that offer less-toxic pest management strategies for specific pests. These fact sheets are placed in retail outlets that sell pesticides to the public. Shelf-talkers are also placed on selected products on store shelves to make it easier for the public to identify safer alternatives to conventional pesticides. In addition, community outreach/educational events are held in the stores to promote the availability of less toxic methods and products, and training of store personnel is given and consists of principles of integrated pest management (IPM) and successful application strategies and sales techniques for less toxic products. The Program is exploring options to increase participation in OWOW next fiscal year.

SECTION 8 – PROVISION C.8 WATER QUALITY MONITORING

Introduction

This section provides an overview of the Program's monitoring work for Fiscal Year (FY) 2009/2010. A brief summary of the historical context of water quality monitoring is presented, followed by an overview of the current monitoring assessment activities and accomplishments for the FY 2009/2010. More detailed descriptions of activities to comply with specific requirements of C.8 appear in the MRP Regional Supplement for Pollutants of Concern and Monitoring Annual Report for FY2009 – 2010, produced by BASMAA.

As anticipated, the MRP dominated the monitoring agenda for the year. The first half of the year was spent planning for compliance with the MRP; implementation commenced during the second half of the fiscal year. The Program also continued to implement its own monitoring program, the Contra Costa Monitoring and Assessment Program (CCMAP), which is overseen by the Program's Monitoring Committee. The Program's Monitoring Committee is comprised of representatives from 7 Contra Costa co-permittees who met ten (10) times over the course of the year (see Attachment 1.3, Program Subcommittee Attendance, for the Program list of representatives). The committee provides the overall guidance for the monitoring program and recommends actions to be taken on behalf of all co-permittees.

Program staff and co-permittees also actively participate in BASMAA's Monitoring and POCs Committee and the Regional Monitoring Program (RMP). Through these efforts, the Program continues to characterize water quality conditions and identify pollutant sources and impacts associated with stormwater runoff in order to optimize the implementation of stormwater best management practices (BMPs).

Historical Context

The Program conducted wet-weather fixed station water quality sampling for three (3) years, from 1993 to 1996. Two streams, Rheem Creek and Walnut Creek, were monitored for runoff flows, physical properties, chemical water quality parameters, and toxicity. Additionally, rainfall was monitored at eleven (11) rain gauges within the two watersheds.

Effective FY 1996/1997, wet weather monitoring was suspended at the request of the San Francisco Bay and Central Valley Regional Water Quality Control Boards. The discontinuation of sampling occurred because the results were not providing information helpful to the Program for evaluating the effectiveness of its management program.

Subsequently, the San Francisco Bay Regional Board directed the Bay Area Stormwater Management Agencies Association (BASMAA) to develop a BASMAA Regional Monitoring Strategy (BRMS) for the Bay Area. The goal of the BRMS was to increase the efficiency and usefulness of monitoring activities by coordinating individual stormwater program efforts.

Contra Costa Monitoring and Assessment Program (CCMAP)

Consistent with the BRMS, the Program developed the Contra Costa Monitoring and Assessment Program (CCMAP) in 2001 to lead the Program's water quality monitoring and watershed assessment efforts. CCMAP is a long-term strategy designed to assess the condition of watersheds, water bodies, and water quality within Contra Costa County (County). It was originally created to satisfy the monitoring provisions in the Program's previous Joint Municipal NPDES Permits (Permit). The overall goal of CCMAP is to identify problem areas and reduce stormwater pollutants within the County's watersheds.

CCMAP is a "living" document, whose goals will evolve with other regional and State monitoring and assessment plans and strategies: the Municipal Regional Permit, Regional Monitoring Program (RMP), and Surface Water Ambient Monitoring Program (SWAMP). The goals of CCMAP are:

- To successfully characterize the "health" of individual watersheds within Contra Costa County;
- To prioritize sub-basins within individual watersheds, providing direction for future studies;
- To implement a water quality monitoring plan using alternative methodologies;
- To develop a Program-based Information Management System (IMS) and Geographical Information System (GIS) that will allow additional watershed analyses to occur.
- To integrate volunteer resources into CCMAP's water assessments; and,
- To comply with the Program's Joint Municipal NPDES Permits issued by the Central Valley and San Francisco Bay Regional Water Quality Control Boards.

CCMAP was 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 Fiscal Year 2000/2001. The Program began implementing Phase 3 in FY 2001/2002 using lessons learned from the pilot effort. The Program hired a Volunteer Monitoring Coordinator in FY 2003/04 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 into the present.

To properly assess the biological integrity of streams and the health of watersheds in the County, the Program uses benthic macroinvertebrate (BMI) community assemblages as the primary indicator of water quality and watershed health.

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 Program to report on the previous fiscal year's sample results. Our current FY 2009/10 Annual Report provides data and reporting on samples collected in spring 2009 (FY 2008/09). 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 (DCD, formerly the Contra Costa County Community Development Department), the Program submitted a Proposition 13 grant application to the State Water Resources Control Board (SWRCB) in Fiscal Year 2001/2002. In FY 2002/2003, the Program and DCD 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 County (CCC) 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 County watersheds.

When the grant ended, the Volunteer Program was in danger of expiring completely. Through the collaboration of the Program and DCD, a plan was developed to sponsor the Volunteer Program with funding from the Program. The Program has since provided financial support in the amount of $65,000 per year to the Volunteer Monitoring Program starting in FY 2006/07 through FY 2009/10. In exchange, the volunteers, under the leadership of Program Staff and the Volunteer Monitoring Coordinator, have conducted BMI sampling in creeks throughout the County. The Program will continue to explore the possibility of expanding the role of the volunteers to perform additional monitoring under the MRP.

Benthic Index of Biotic Integrity

In 2006, for the first time, the Program developed a preliminary Benthic Index of Biotic Integrity (B-IBI) for Contra Costa County using all data collected from 2001 to 2006 and compiled results from all sampling events into one document (PROGRAM, 2007). This is the first B-IBI of its kind to be developed in any county in the Bay Area and will serve as a proving ground for the development of a Bay Area-wide B-IBI in the future. The full report, "Preliminary Assessment of Aquatic Life Use Condition in Contra Costa Creeks, Summary of Benthic Macroinvertebrate Bioassessment Results (2001-2006)" can be found in the Program's FY 2006/2007 Annual Report.

Accomplishments

Implementation of CCMAP monitoring continued in spring 2009. As previously mentioned, 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 Program to report on the previous fiscal year's sample results. So this Annual Report (FY 2009/2010) provides data and reporting on samples collected in spring 2009 (FY 2008/2009).

The following paragraphs summarize the findings and conclusions of FY 2008/2009 monitoring conducted via CCMAP. A copy of the full report entitled "CCMAP, Summary of Benthic Macroinvertebrate Bioassessment Results (2009), June 17, 2010" can be found as Appendix C.8 – 1 of this Annual Report.

In 2009, the Contra Costa Volunteer Creek Monitoring Program conducted bioassessments at 35 creek sampling stations, within 14 of the 29 major watersheds in Contra Costa County. The spring 2009 field data collection effort involved 64 volunteers and approximately 708 volunteer hours, county-wide. BMI samples and associated habitat quality data were collected using the 2007 California Surface Water Ambient Monitoring Program (SWAMP) protocols. To provide a measurement of Aquatic Life Use condition at these stations, a preliminary Benthic Index of Biotic Integrity (B-IBI) score was calculated from the BMI identification results for each station, using a method developed previously for creeks in Contra Costa County. Ranges of B-IBI scores were then assigned to poor, marginal, fair, good, and very good categories.

Results from 2009 indicate that 71% of creek stations sampled in Contra Costa County scored in the very good, good, or fair categories. Stations in Pine and San Ramon Creeks (Walnut Creek Watershed), Wildcat Creek, and Marsh Creek scored the highest of all stations sampled (B-IBI scores equal to or above 40). The lowest IBI scores (18 or lower) were calculated for stations in the lower reaches of Marsh, Mt. Diablo, Cerrito, Pine, and Rheem Creeks. Generally, lower scores were obtained from samples in lower reaches of the respective watersheds, where higher-density urban land uses typically predominate.

For 2009 data, physical habitat quality (“PHAB”) scores (based on a semi-quantitative scoring system) were positively, though weakly, correlated with B-IBI scores. Physical habitat condition is typically related to the degree of development of the watershed.

Watershed-wide average B-IBI scores were calculated from the 2009 data to allow for broad inter-watershed comparisons. Among the 14 monitored watersheds there is a wide range in average scores, from San Ramon, Wildcat, and Alhambra Creeks, ranked first, second, and third, respectively, with average B-IBI scores in the “good” category, to Rheem and Cerrito Creek watersheds, ranked in the “marginal” category. Most watersheds had average scores in the “fair” category. Because all sites cannot be monitored every year, in any given year the mix of sites selected for monitoring strongly influences watershed-wide average scores.

Annual variability in average IBI scores is attributable to a number of factors, including site selection, antecedent (preceding) rainfall, and other climatological conditions. New Zealand mudsnails (*Potamopyrgus antipodarum*) were present in a sample collected from the Baxter Creek site (BAX030).

BASMAA Monitoring/POCs Committee & Establishment of the Regional Monitoring Coalition

The purpose of the BASMAA Monitoring/POCs Committee is to discuss and coordinate monitoring activities conducted by the Bay Area municipal stormwater management programs. In FY 2009/2010, Program staff actively participated in the BASMAA Monitoring Committee, now formally designated the BASMAA Monitoring and Pollutants of Concern Committee (BASMAA MPC). Two co-permittees were also designated by the Management Committee to represent the Program in decisions by the MPC. Lynne Scarpa of the City of Richmond and Phil Hoffmeister of the City of Antioch were the official designees to the committee. The main initial emphasis for BASMAA representatives, including Program staff, was to participate in development of the regional monitoring collaborative for implementation of the monitoring and pollutant of concern-related provisions of the MRP. As of July 1, 2010, all 21 of Contra Costa co-permittees committed themselves to participation in BASMAA's Regional Monitoring Coalition. Attachment C.8-2 provides documentation of the submittal.

All of the monitoring and POC-related activities of the MRP, for which there were deadlines in the FY 2009/2010, are summarized in the "BASMAA Regional Annual Report Supplement for POCs and Monitoring" which all Contra Costa permittees reviewed and approved, and authorized BASMAA to submit on its behalf.

The Program will continue to actively participate in the BASMAA MC during FY 2010/2011.

Conclusion

FY 2009/2010 marked a transitional period from the Program's focus on watershed monitoring and assessment program (CCMAP), which focused on BMIs as an indicator of watershed health, to a broader program of physical, chemical and biological monitoring as mandated by the MRP. In the coming fiscal year (FY 2010/2011), the Program expects to finalize the details of monitoring approaches through regional collaborations with BASMAA partners, in preparation for the first year of monitoring to be initiated in FY 2011/2012.

SECTION 9 – PROVISION C.9 PESTICIDES TOXICITY CONTROLS

Introduction

The Program conducts pesticide toxicity control group activities on behalf of all 21 co-permittees within Contra Costa. Program-wide pesticide toxicity controls conducted in FY 2009/2010 include: developing model IPM policy documents; tracking pesticide regulatory activities and participating in regional IPM task forces that promote stormwater protection through review of pesticide usage and regulation; supporting regional public outreach; working with the county Agricultural Commissioner; participating in BASMAA's Municipal Operations Committee; and, creating the Program's MOC to facilitate program-wide pesticide activities,. The MOC and MONC are the general venues where all pesticide activities, BMPs, trainings, and future projects are planned and directed. The MOC's purpose and structure is detailed in section C.2 of this report. The MOC provides support to co-permittees by providing guidance, tools and training.

Accomplishments

The following pesticide toxicity control related activities were conducted during FY 2009/2010:

1. Formation of the MOC, and monthly MOC meetings to discuss and coordinate program-wide pesticide toxicity control activities;
2. Participation in BASMAA's MOC to coordinate regional pesticide toxicity control activities;
3. Creation of a model IPM policy and program;
4. Supporting BASMAA's 'Our Water Our World' outreach campaign;
5. Performing public outreach to pest control operators;

6. Tracking and participating in relevant regulatory processes; and,
7. Interfacing with the Contra Costa County Agricultural Commissioners (CCAC).

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

MOC Meetings and Activities

The MOC was created during October 2009 as a formal monthly committee to address C.2, C.4, C.5, C.9, C.10 and C.13 of the MRP. Included in its monthly meetings is a set agenda to address all pesticide toxicity control activities. During FY 2009/2010 pesticide toxicity control activities included developing guidance materials such as a model IPM policy and a model IPM program. These documents are discussed in the following paragraphs of this section. An agenda and minutes are created for each meeting and posted to the Program website. See attachment 1.3 for a listing of participants and attendance on the MOC for Fiscal Year 2009/2010.

BASMAA's Municipal Operations Committee

As mentioned in section C.2 of this report, the BASMAA Municipal Operations Committee (MOC) was created in February 2010 as a formal committee to address C.9 of the MRP as well as C.2, C.4 and C.5. Section C.10 of the MRP is addressed by the same committee but in a separate session devoted exclusively to issues regarding trash. Program staff and the two designated co-permittees who attend the BASMAA meetings share what is discussed during the BASMAA meetings at the MOC (see attachment 1.1 for a listing of Program representatives on BASMAA's MOC). Due to other priorities in the MRP, pesticide toxicity control activities were discussed on a limited basis during FY 2009/2010.

Model IPM Policy and IPM Program

Section C.9 of the MRP required co-permittees to establish and implement an IPM policy or ordinance by July 1, 2010. To assist co-permittees in this effort, Program staff, with the assistance of the MOC, developed a model IPM program, including model IPM policy materials for the co-permittees. The IPM Program was reviewed by the MOC and the Management Committee. The Program produced three different working IPM program templates: a full version, a highlighted or condensed version, and a simplified version to satisfy the varying needs of co-permittees. The templates were then tailored to match the needs and resources of each co-permittee.

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

Our Water Our World - The Program supports BASMAA in its efforts to develop and provide educational outreach directly to the consumer/user at the point of purchase through the "Our Water Our World" (OWOW) program. Details are provided in the BASMAA "*MRP Regional Supplement for Training and Outreach*."

Locally, the Program distributes the OWOW literature to schools and at community events in addition to the general public when requested. Program staff promotes the program through our website and verbal communication to citizens, schools, co-permittees, and businesses.

The Program is exploring options to provide direct financial support for OWOW in the Program's Fiscal Year 2010/11 budget. Staff has been working with the OWOW Bay Area representative, Annie Joseph, to determine the financial commitment necessary to increase the number of retail outlets participating in Contra Costa County in the OWOW program.

As an active member of BASMAA, the Program participated in a region-wide media campaign which met requirements for Provisions C.9.h.ii. - Point of Purchase Outreach. Details of that campaign are provided in Section C.7.

C.9.h.vi – Public Outreach: Pest Control Operators

Bay-friendly Landscape (BFL) and Gardening Coalition – The Program continues to be a major supporter of BFL, a one-of-a-kind organization that provides Integrated Pest Management (IPM) training and certification to public and private sector landscape professionals. The Program set aside significant funding for Fiscal Year 2009/10 to support BFL's planned workshop. Since BFL was unable to obtain sufficient financing to hold their workshop, Program funding was carried over to the FY 2010/11 budget for a workshop to be held in fall 2010.

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

This portion of the MRP is one that the Program is proud to say it has already been implementing for several years. The BASMAA Monitoring / POC voted to fund the *reporting* element of this task and the BASMAA Board of Directors approved this as a Regional Project in May 2010. However, the actual work of tracking and participating in regulatory efforts fell largely on the shoulders of Program staff on behalf of all BASMAA members.

Program staff has participated in the California Stormwater Quality Association (CASQA) Pesticides Subcommittee since mid-2007 and served as co-chair of the committee since February 2009. Program staff has also actively participated in the Urban Pesticides Pollution Prevention Project (UP3 Project) since 2006. A summary of activities and accomplishments for FY 2009/10 can be found in "BASMAA's *MRP Regional Supplement for POCs and Monitoring Annual Report for FY 2009/10*."

C.9.f – Interface with County Agricultural Commissioners

Following the adoption of the MRP, Program staff began working with co-permittees to begin implementation of this provision. During January 2010 the MOC addressed the MRP requirement for Permittees to interface with local agricultural commissioners. It was discussed that each co-permittee in Contra Costa would establish open communications with the County's Agricultural Department if not already done so. Open communications would include reporting misuse of pesticides, though at that time it was unclear as to the role each agency would have in that effort.

Over time, it became clear that co-permittees were confused about this provision and having difficulty effectively implementing it so the Program took the opportunity to outreach to the Agricultural Commissioner on behalf of all co-permittees. Program staff and one co-permittee representative met with the Vince Guise, Contra Costa County Agricultural Commissioner (CCAC) and his deputy, Cathy Fisher. The purpose of the meeting was to explain the requirements of the permit and find out what information can be shared between the two agencies.

The first revelation was that Mr. Guise and his staff were not aware of the MRP and unhappy that they had not been involved in the adoption process. Program staff explained the history of the permit and brought them up to speed on where the permit stands at present.

Program staff explained pyrethroid pesticides are one of the largest challenges cities currently face. Mr. Guise explained that they only get 1 or 2 reports of potential violations of pesticide regulations per year from people outside their agency. And of these, they have only been able to prove a violation has occurred in a handful of cases. Program staff explained that only in very coincidental cases would city staff be in a position to recognize that a pesticide violation was occurring. If cities are to report pesticide violations to the CCAC, they will need to be educated on what to look for, and an efficient reporting mechanism established between the two agencies must be established. Mr. Guise expressed concern that their agency does not have the resources to deal with a potentially significant number of new reports of violations. It was agreed that improving communication between the co-permittees and the CCAC was the place to start. To that end, Mr. Guise was invited to an upcoming meeting of the Program's MOC committee where he can talk directly with a number of the co-permittees. The Program will continue to track progress on this provision and provide an update in the FY 2010/2011 Annual Report.

Conclusion

The Program has approached pesticides toxicity control primarily through promotion of IPM and direct involvement in regulatory processes, which have the potential to curtail toxicity from urban use pesticides. IPM was promoted through education and training, workshops, and literature from regional trainings to the co-permittees. As an example, the Program has been a host to the Bay Friendly Landscaping Program, which educates landscapers about IPM and other green practices to reduce waste thus preventing pollution from entering stormwater systems. With the adoption of the MRP, the Program has taken a more active role by providing guidance materials to those co-permittees that had not developed their own IPM policies and programs. Each co-permittee has implemented IPM to the level dictated by their needs and resources.

Program goals for FY 2010/2011 include providing a Bay Friendly Landscaping Certification and Training Workshop for landscape businesses and municipal staff; continuing to support BASMAA's OWOW program; continuing to participate in regulatory processes; providing outreach to communities on an as-needed basis; and, working closely with Contra Costa co-permittees to implement stronger IPM programs.

SECTION 10 – PROVISION C.10 TRASH LOAD REDUCTION

Introduction

The Program conducts some trash reduction activities on behalf of all 21 co-permittees within Contra Costa. During FY 2009/2010, the main program-wide task for trash was the coordination and submittal of the municipal trash hot spot selection, cleanup and assessment data on July 1, 2010. Other program-wide tasks conducted during FY 2009/2010 were the establishment of the Program MOC, which dedicates a portion of its monthly agenda to trash reduction activities, and participation in the BASMAA Trash / MOC, which has dedicated it's time to development of a baseline trash loading and tracking methodology. Program staff and two (2) co-permittees attend the BASMAA Trash / MOC meetings every month. See attachment 1.1 for a list of Program representatives to BASMAA's Trash / MOC. Below is a detailed discussion of trash reduction activities by the Program.

Accomplishments

The following trash reduction related activities were conducted as a group during FY 2009/2010:

1. Formation of the MOC, and attendance at monthly MOC meetings to discuss and coordinate program-wide trash reduction activities;
2. Participation in BASMAA's Trash / MOC meetings to coordinate regional trash reduction activities; and,
3. Coordination and submittal of municipal trash hot spot assessment and cleanup information to the Water Board on July 1, 2010.

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

<u>MOC Meetings and Activities</u>

The MOC was created in October 2010 as a formal monthly committee to address C.2, C.4, C.5, C.9, C.10 and C.13 of the MRP. An agenda and minutes are created for each meeting and posted to the Program website. During FY 2009/2010, trash reduction activities were focused on trash hot spot selection and cleanups. The MOC was instrumental in developing guidance materials detailing a consistent protocol for trash hot spot selection, identification, cleanup and assessment, as well as photo documentation. The trash hot spot protocol was distributed to the co-permittees with a detailed schedule of when their hot spot work was to be completed. Each MOC meeting guided and assisted the co-permittees with this trash hot spot work. The MOC also provided updates regarding the BASMAA Trash / MOC, and provided comments on the work done by BASMAA to develop a baseline trash loading and tracking methodology. More work will occur during FY 2010/2011.

BASMAA's Trash / MOC

BASMAA created the Trash / MOC to coordinate regional efforts for trash reduction. To date the Trash / MOC has assisted members with development of a trash hot spot selection and assessment protocol, which the Program used as an example to create its own trash hot spot submittal format. Other work planned for BASMAA's Trash / MOC includes developing a baseline trash loading and tracking methodology. BASMAA hopes to create a trash baseline loading calculation that will provide a consistent formula for all permittees. BASMAA has just begun this effort, which continues during FY 2010/2011.

Trash Hot Spot Submittal

With guidance materials from the BASMAA Trash / MOC, the Contra Costa co-permittees selected, assessed, and cleaned their chosen trash hot spots during FY 2009/2010 ahead of the requirements in Provision C.10 of the MRP. Program staff gathered all trash hot spot information, including trash hot spot locations, trash assessment data, and photo documentation from all co-permittees. The information was then compiled into one submittal to the Water Board on July 1, 2010. See attachment C.10 for documentation of the submittal.

In carrying out their hot spot assessments and clean-ups, many co-permittees learned that the first half of the calendar year is not an ideal time to assess and clean hot spots because of the wet weather, muddy terrain, and overgrown weeds causing problematic and unsafe conditions for field work. The co-permittees would prefer to conduct their hot spot work during the second half of the year, ideally during the summer and fall months to avoid bad weather and overgrown weeds near and around the creeks. In the future, the co-permittees, with the flexibility of future due dates in the MRP, will be conducting their trash hot spot work during the summer or fall.

Conclusion

The trash requirements in the MRP outline an aggressive mandate. A 100% reduction of trash discharged from municipal stormdrains in 12 years will be a huge challenge. Permittees, however, are dedicated to reducing the trash problem in Contra Costa in the most effective and efficient way possible. Goals for trash reduction during FY 2010/2011 are to participate in the BASMAA Trash / MOC in the development of the baseline trash loading and tracking methodology.

SECTION 11 – PROVISION C.11 MERCURY CONTROLS

Introduction

The majority of MRP requirements related to mercury are being addressed regionally through BASMAA. Reporting on these elements of the MRP, for which there were deadlines in FY 2009/2010, can be found in the BASMAA "*Regional Annual Report Supplement for POCs and Monitoring.*"

Accomplishments

Two provisions related to mercury which the Program performed separately from BASMAA in cooperation with our co-permittees are C.11.a.i and C.11.a.ii.

<u>C.11.a.i – Mercury Recycling Efforts</u>

The Program's co-permittees collect household hazardous waste at 3 regional facilities throughout the county: Central Contra Costa Sanitary District (Central San), Delta Diablo Sanitation District (DDSD), and West County Wastewater District (WCWB). Central San 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. WCWC serves Richmond, Pinole, El Sobrante and San Pablo.

In addition, the Program has collaborated with Delta Diablo 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.

<u>C.11.a.ii – Mercury Collection</u>

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. In the future, BASMAA will be developing methods to more carefully track all types of mercury containing devices and working with the hazardous waste facilities to change the way they track and report this data so that a more thorough accounting can be made.

In FY 2009/2010, Central San collected approximately 95 pounds of mercury. DDSD collected approximately one (1) pound of mercury plus 49 pounds of mercury-containing devices. WCWD collected approximately 2 pounds of mercury plus 135 pounds of mercury containing devices. The amount of actual mercury recovered from these devices was not able to be determined for DDSD and WCWD because the data were not reported in such a way for which there are known conversion factors.

For a detailed breakdown by facility, see attachment C.11.a.ii of this Annual Report.

Conclusion

All co-permittees participate in mercury collection and recycling through their promotion and outreach to residents and consumers for the household hazardous waste facilities in their communities. These facilities do not track the data on a city-by-city basis but nevertheless the data are a valuable tool to track the total quantities of mercury removed from the waste stream that may have otherwise become water quality impairment. The amounts of mercury prevented from entering the wastestream are very significant. In the future, the Program and other BASMAA entities expect to improve not only the total quantities of mercury collected, but improve the quantification methods used to document it.

SECTION 12 – PROVISION C.12 PCB CONTROLS

Introduction

The majority of MRP requirements related to PCBs are being addressed regionally through BASMAA. Reporting on these elements of the MRP, for which there were deadlines in FY 2009/2010, can be found in the BASMAA "*Regional Annual Report Supplement for POCs and Monitoring.*"

Accomplishments

One provision related to PCBs which the Program performed in conjunction with BASMAA that is not fully documented from the perspective of the Program in the regional report is C.12.a Municipal Inspectors Training.

Provision C.12.a requires Permittees to develop training materials and train municipal industrial facility inspectors to identify, in the course of their existing inspections PCBs or PCB-containing equipment. Additionally, Permittees are required to incorporate such PCB identification into existing industrial inspection programs. To assist Permittees in complying with this Provision, the BASMAA Board of Directors (BOD) agreed to fund a regional project in FY 2009/2010 to develop training material for stormwater inspectors. The scope of the project was to develop regional training and reporting materials to assist commercial/industrial facility stormwater inspectors in identifying PCBs, copper and mercury during their inspections, and provide inspectors with useful Best Management Practices (BMPs) and information materials for distribution to facility owners/operators. The draft training materials were completed in late June 2010 and included a guidance manual for stormwater inspectors, inspection form templates, a PowerPoint training presentation, and example BMP materials.

Program staff held a training seminar for industrial inspectors in the identification of PCBs, copper and mercury on July 22, 2010 to coincide with the Program's regular MOC committee meeting. Inspectors from Delta Diablo Sanitation District and Central

Contra Costa Sanitary District attended the training as did representatives from Contra Costa permittees who perform their own inspection services. The majority of the two hour meeting was dedicated to the training. The PowerPoint developed by BASMAA was presented and discussed, and copies of the inspectors' manual and BMPs were provided to all participants for their reference in carrying out inspections in the future. Inspectors from East Bay Municipal Utility District were also invited to the training but declined to participate as they had just attended the same training sponsored by Alameda County Clean Water Program.

Conclusion

The Program will continue to provide training to inspectors in FY 2010/2011.

SECTION 13 – PROVISION C.13 COPPER CONTROLS

The majority of MRP requirements related to copper are being addressed directly by co-permittees or regionally through BASMAA. Reporting on these elements of the MRP, for which there were deadlines in FY 2009/2010, can be found in the BASMAA *"Regional Annual Report Supplement for POCs and Monitoring.*"

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

MRP requirements related to 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 2009/2010, can be found in the BASMAA "*Regional Annual Report Supplement for POCs and Monitoring*."

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

Introduction

In October 21, 2009, the Management Committee restructured Program committees. The Program's Municipal Maintenance Workgroup and Commercial/Industrial Ad Hoc Advisory Workgroup were merged and renamed the Municipal Operations Committee (MOC). The MOC was tasked with, among other things, review, development and coordination of countywide and/or regional tasks for implementation of Provision C.15. As discussed below, these activities were limited in Fiscal Year 2009/2010.

The MOC met for the first time on December 15, 2009. Garth Shultz, City of El Cerrito, and Rich Payne, City of Walnut Creek, were selected to serve as Chair and Vice Chair, respectively, for Fiscal Year 2009/2010. Meeting agendas, minutes and attendance were prepared for each meeting and posted to the Program website.

Accomplishments

The MOC, working closing with BASMAA's Trash / Municipal Operations Committee (MOC), was focused on the following priorities in Fiscal Year 2009/2010:

- Assisting municipalities with development of their pump station inventories by March 1, 2010;
- Assisting municipalities with development and implementation of Enforcement Response Plans for business inspections and illicit discharge detection and elimination programs by April 1, 2010;
- Developing a common Annual Report format for MRP permittees, acceptable to the Water Board's Executive Officer, by April 1, 2010;
- Assisting municipalities with the selection, assessment and submittal of trash hot spots information by July 1, 2010;

- Assisting municipalities in the development of a baseline trash load and tracking methodology for which a progress report is due on February 1, 2011; and,
- Assisting municipalities with development and implementation of an Integrated Pesticide Management (IPM) policy or ordinance by July 1, 2010.

In October 2009, the Program's Management Committee initially identified the following tasks, to be implemented countywide or regionally, for assisting municipalities with implementation of C.15:

- Coordinating the development of BMPs and procedures for emergency fire fighting discharges.
- Developing outreach materials discouraging residential car washing, and encouraging commercial car washing facilities;
- Requiring new or rebuilt swimming pools, hot tubs, and fountains to have a connection to the sanitary sewer to facilitate draining events, including the coordination of such requirements with the sanitary sewer agencies; and,
- Promoting measures to minimize runoff and pollutant loading from excess irrigation.

However, due to the priority MOC tasks, on the above C.15 specific tasks were delayed to next fiscal year. However, existing programs initiated prior to adoption of the MRP substantially fulfilled three (3) of the four (4) tasks above. A brief description of each is provided below.

Car Washing Brochure and Charity Car Washing Kits

Charity Car Wash Pilot Campaign

During FY 2007/2008, the Program created a charity car wash pilot campaign to meet the need for controlling illegal discharges from charity car wash events. The Program was encouraged to create a charity car wash campaign by co-permittees and charitable organizations who were concerned that car washing activities were polluting the environment. The Program created a campaign that included community outreach and a list of BMPs for a charity car wash event to prevent polluting the environment. The level of participation differed with each co-permittee. Many co-permittees had already decided to proactively prevent wash water, soap and dirt from entering the storm drain system by prohibiting charity car wash events. A few co-permittees decided to use the campaign materials but not actively seek out organizations who are hosting the events, due to the sensitivity of the community.

The charity car washing campaign included the creation of a brochure and a car washing kit that contained: 1 submersible pump; 1 - 50' extension cord; 1 - 3' rubber mat; 2 - 50' garden hoses; 1 metal spray nozzle; 3 collapsible safety cones, and sumo tape. The brochure instructed charity organizations how to conduct a car washing event without discharging wash water into the storm drain system. The brochure was mailed to childrens' organizations such as Boy Scouts of America, schools and religious organizations. The brochure explains why allowing wash water from car washing is illegal and harms our stormwater system. The brochure instructs organizations to: 1) contact the Program; 2) make sure that charity car washes are legal within their municipality; and, 3) how to use the car washing kit by following instructions provided.

The campaign was launched in June of 2008. Many of the co-permittees have loaned out the car washing kits, and have been successful in involving the community when its resident wish to host a car-washing event. Program staff looks forward to assessing the success and popularity of the charity car wash campaign in future fiscal years.

Stormwater Pollutant Control for Pools, Spas, Ponds and Decorative Fountains

In December 2004/January 2005, each municipality adopted an updated Stormwater Ordinance that requires every project applicant for a development project that is subject to the development runoff requirements in the City's NPDES permit to prepare and submit a stormwater control plan that meets the criteria in the most recent version of the Contra Costa Clean Water Program's *Stormwater C. 3. Guidebook (Guidebook)*. The Program's current *Guidebook, 4th Edition,* requires a sanitary sewer cleanout be in an accessible area within 10 feet of any pool, spa, pond, decorative fountain, or other water feature. This requirement is consistent with the connection requirements in the MRP.

Source Controls for New Landscaping

The MRP requires municipalities to promote measures that minimize runoff and pollutant loading from excess landscape irrigation. Appendix "D" of the Program's *Guidebook* (discussed above) titled "Stormwater Pollutant Sources/Source Control Checklist," requires applicants to design landscaping that minimizes irrigation and runoff, and the use of fertilizers and pesticides that contribute to stormwater pollution. Furthermore, the Program's *Guidebook*, Appendix B, includes guidance for designing irrigation systems to minimize water use and avoid overwatering. Smart irrigation controllers and drip emitters are strongly encouraged.

Conclusion

In Fiscal Year 2009/2010, the Program's and BASMAA's MOCs were focused on a number of priority mandates contained in Provisions C.2, C.4., C.5., C.9., and C.10, including the development of a common Annual Report form. Working with the Program's and BASMAA's MOCs, significant progress was made. These accomplishments are highlighted in the previous sections of this Annual Report.

Tentative goals and objectives for assisting municipalities with implementation of Provision C.15 next fiscal year are as follows:

- Coordinating the development of BMPs and procedures for emergency fire fighting discharges;
- Evaluating the effectiveness of existing 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

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
- Budgetary
- Conflict Resolution

MANAGEMENT COMMITTEE

DUTIES

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

STAFF

Tom Dalziel, (TD), Interim Program Manager
Elisa Wilfong, (EW), Watershed Management Planning Specialist
Jamison Crosby, (JC), Watershed Management Planning Specialist
Michelle McCauley, (MM), Administrative Analyst
Kristen Hardeman, (KH), Clerk - Senior 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
Lynne Scarpa, City of Richmond
Phil Hoffmeister, City of Antioch

BASMAA DEVELOPMENT COMMITTEE

PROGRAM REPRESENTATIVES

Tom Dalziel, Program Staff
David Swartz, Contra Costa County
Frank Kennedy, Town of Moraga and City of Oakley

BASMAA PUBLIC INFORMATION / PARTICIPATION COMMITTEE

PROGRAM REPRESENTATIVES

Michelle McCauley, Program Staff
Stephen Spedowfski, City of San Ramon
Dan Jordan, Contra Costa County

BASMAA MUNICIPAL OPERATIONS COMMITTEE

PROGRAM REPRESENTATIVES

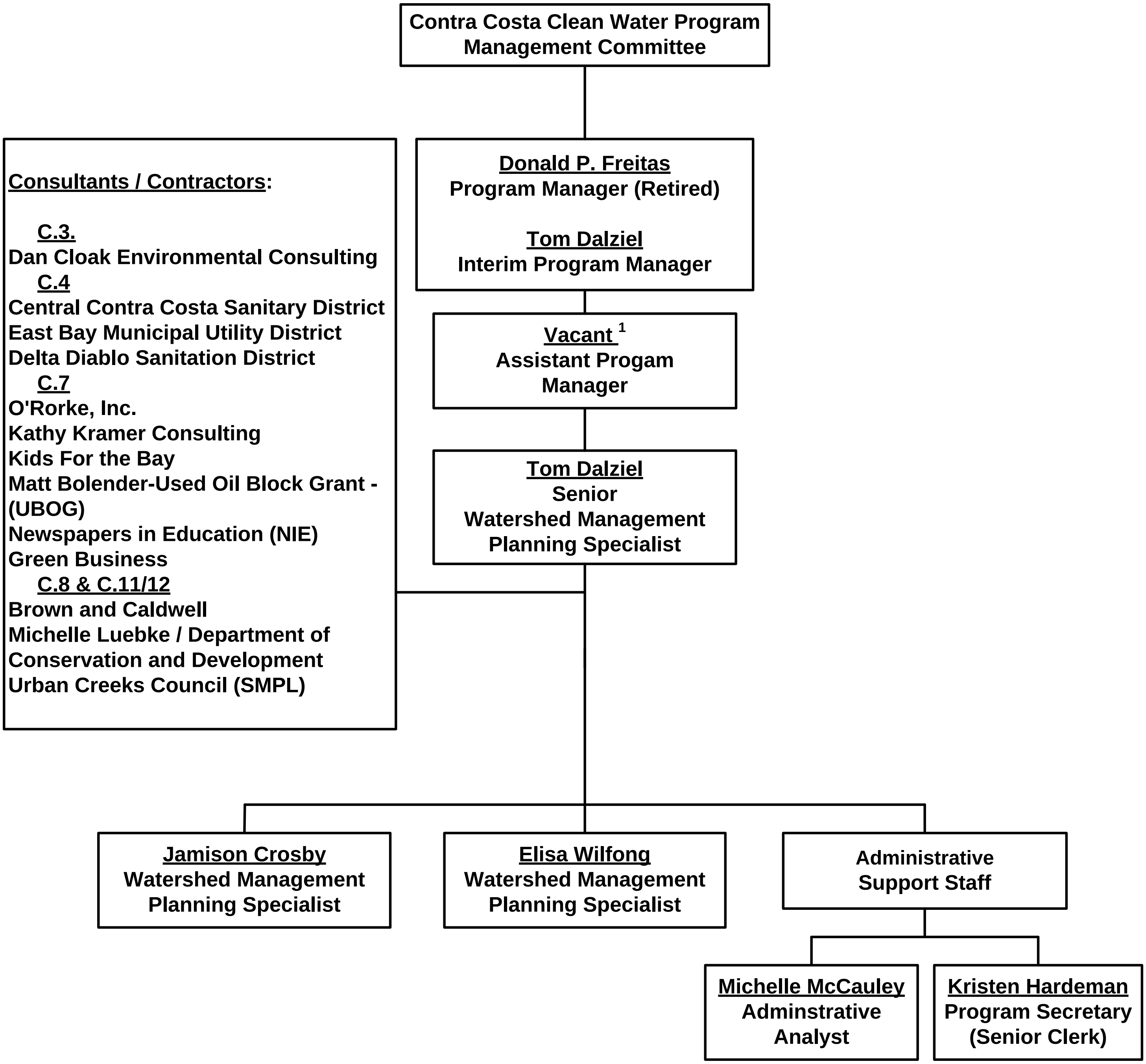
Elisa Wilfong, Program Staff
Rinta Perkins, City of Walnut Creek,
Steven Spedowfsk, City of San Ramon

BASMAA TRASH COMMITTEE

PROGRAM REPRESENTATIVES

Elisa Wilfong, Program Staff
Rinta Perkins, City of Walnut Creek,
Steven Spedowfsk, City of San Ramon

Contra Costa Clean Water
Program Management



[1] Reclassification of person and position (Tom Dalziel) was approved by the Public Works Department, but denied by the County Admiinistrator.

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Last Updated: September 13, 2010

ADMINISTRATIVE COMMITTEE
FY 2009/10 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL (3)	AUG (3)	SEP	OCT	NOV (3)	DEC (3)	JAN	FEB	MAR	APR	MAY	JUN	INDIV % ATT	MUNI % ATT
City of Antioch	**Phil Hoffmeister (1)**			1	1				1	1	1	1	1	88%	**88%**
	Julie Haas-Wajdowicz													0%	
City of Brentwood	**Jack Dhaliwal**				1			1	1	1	1			63%	**88%**
	Jeff Cowling			1								1		25%	
City of Concord	**Jeff Roubal**				1			1	1	1	1	1	1	88%	**100%**
	Libby Bell			1	1									25%	
County Unincorp.	**David Swartz**				1				1	1	1		1	63%	**100%**
	Rich Lierly							1				1		25%	
	Charmaine Bernard													0%	
	Dan Jordan			1										13%	
City of Pittsburg	**Jolan Longway**			1	1			1	1	1	1	1	1	100%	**100%**
	Laura Wright													0%	
City of Pleasant Hill	**Rod Wui**			1	1			1	1	1	1		1	88%	**88%**
	Steve Wallace													0%	
City of Richmond	Jenny Oorbeck													0%	**100%**
	Lynne Scarpa			1	1			1	1	1	1	1	1	100%	
PROGRAM STAFF															
	Donald Freitas			1	1			1	1						
	Tom Dalziel			1	1			1	1	1	1	1	1		
	Jamison Crosby									1	1				
	Elisa Wilfong			1	1										
	Michelle McCauley			1	1			1	1	1	1	1	1		
NON-VOTING															
Flood Control	Mitch Avalon			1	1			1		1	1		1		
	Greg Connaughton			1	1				1						
Town of Danville	Chris McCann				1			1	1				1		
City of San Ramon	Steven Spedowfski							1	1				1		

(1) Chairperson

(2) Vice-Chairperson

(3) Meeting Cancelled

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MANAGEMENT COMMITTEE
FY 2009/10 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL	AUG	SEP(3)	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	1	1		1	91%	**91%**
	Julie Haas-Wajdowicz													0%	
City of Brentwood	**Jeff Cowling**	1					1							18%	**100%**
	Jack Dhaliwal		1		1	1		1	1	1	1	1	1	82%	
City of Clayton	Kristen Burger													0%	
	Laura Hoffmeister	1	1		1	1	1	1	1	1	1	1	1	100%	**100%**
City of Concord	**Jeff Roubal**	1	1		1	1	1		1	1	1	1	1	91%	**100%**
	Libbey Bell							1						9%	
Town of Danville	**Christine McCann**	1	1		1	1	1	1	1	1		1	1	91%	**91%**
	Michael Stella													0%	
City of El Cerrito	Alexis Petru													0%	
	Melanie Mintz													0%	
	Garth Schultz	1	1		1	1	1	1	1	1		1	1	91%	**91%**
City of Hercules	Erwin Blancaflor								1					9%	**91%**
	Jeff Brown									1		1		18%	
	Jose Pacheco	1	1		1	1		1			1		1	64%	
City of Lafayette	**Donna Feehan**	1	1		1	1	1	1	1	1	1	1	1	100%	**100%**
	Ron Lefler													0%	
City of Martinez	**Alex Stroup**	1	1		1	1	1	1	1	1	1	1		91%	**100%**
	Tim Tucker							1		1			1	27%	
Town of Moraga	Frank Kennedy		1					1	1					27%	**82%**
	John Sherbert											1	1	18%	
	Jill Mercurio	1			1	1					1			36%	
City of Oakley	**Frank Kennedy**	1	1		1	1		1	1	1	1	1	1	91%	**91%**
	Jason Vogan													0%	
City of Orinda	**Cathy Terentieff**		1		1	1	1			1	1	1	1	73%	**100%**
	Paul Lang	1						1	1					27%	
City of Pinole	Nancy Voisey	1	1		1	1	1	1	1			1	1	82%	**82%**
	Dean Ellison								1					9%	
	Frank Kennedy													0%	
City of Pittsburg	Jason Burke	1												9%	**100%**
	Jolan Longway		1		1	1	1	1	1	1	1	1	1	91%	

MANAGEMENT COMMITTEE

FY 2009/10 ATTENDANCE ROSTER

City of Pleasant Hill	**Rod Wui [2]**	1	1		1	1	1	1	1	1	1	1	1	100%	**100%**
	Steve Wallace													0%	
City of Richmond	**Lynne Scarpa**	1	1		1	1	1	1	1	1	1	1	1	100%	**100%**
	Jenny Oorbeck													0%	
City of San Pablo	**Karineh Samkian**	1	1		1	1	1					1	1	64%	**100%**
	Adele Ho							1	1	1	1			36%	
City of San Ramon	**Steven Spedowfski**	1	1		1	1	1	1	1		1	1	1	91%	**91%**
	Maria Robinson													0%	
City of Walnut Creek	**Rinta Perkins**	1			1	1	1	1	1	1	1	1	1	91%	**100%**
	Scott Wikstrom													0%	
	Steve Waymire		1											9%	
Contra Costa County	**Rich Lierly**	1	1			1	1		1		1	1	1	73%	**100%**
	David Swartz		1		1			1		1				36%	
Flood Control	**Greg Connaughton**	1			1			1	1	1				45%	**88%**
	Paul Detjens											1	1	18%	
	Mitch Avalon						1	1			1			25%	
PROGRAM STAFF															
	Donald Freitas	1	1		1	1	1	1	1	1					
	Tom Dalziel	1	1		1	1	1	1	1	1	1	1	1		
	Jamison Crosby	1	1		1	1	1	1	1	1	1	1	1		
	Elisa Wilfong	1	1		1	1	1	1	1	1	1	1			
	Michelle McCauley	1	1		1	1	1	1	1	1	1	1	1		
	Kristen Hardeman				1								1		

[1] Chairperson

[2] Vice- Chairperson

[3] Meeting cancelled

MUNICIPAL OPERATIONS COMMITTEE
2009/10 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	INDIV % ATT	MUNI % ATT
City of Antioch	**Roger Clarke**							1	1			1		50%	**67%**
	Phil Hoffmeister									1				17%	
City of Brentwood	**Jeff Cowling**							1				1		33%	**83%**
	Roger Stromgren										1			17%	
	Laurie Monte								1		1	1	1	67%	
City of Concord	**Jeff Roubal**							1		1	1		1	67%	**83%**
	Libbey Bell								1					17%	
Contra Costa County	**Charmaine Bernard**							1	1	1		1	1	83%	**83%**
	Nancy Stein											1		17%	
	Tony Medina								1				1	33%	
	Alex Anaya								1					17%	
City of El Cerrito	**Garth Schultz** (1)							1	1	1		1	1	83%	**83%**
	Bill Driscoll							1	1	1			1	67%	
City of Hercules	**Glenn Moniz**							1	1	1	1	1	1	100%	**100%**
	Misael Gomez												1	17%	
City of Lafayette	Ron Lefler													0%	
	Donna Feehan										1			17%	
	David Terhune							1	1	1			1	67%	**83%**
City of Pinole	**Patrick Bowie**							1	1		1	1	1	83%	**100%**
	Tim Harless							1		1		1		50%	
City of Pittsburg	**Hilario Mata**							1	1				1	50%	**83%**
	Bobby Joaquin												1	17%	
	Walter Pease								1	1	1			50%	
City of San Pablo	**John Medlock**							1	1		1			50%	**66%**
	Adele Ho									1				17%	

MUNICIPAL OPERATIONS COMMITTEE
2009/10 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	INDIV % ATT	MUNI % ATT
City of San Ramon	**Steven Spedowfski**								1	1	1	1	1	83%	**83%**
	Patrick Gutierrez								1					17%	
City of Walnut Creek	**Rich Payne** (2)							1	1			1	1	67%	**100%**
	Rinta Perkins							1	1	1	1			67%	
PROGRAM STAFF															
	Elisa Wilfong							1	1	1	1	1			
	Jamison Crosby										1	1	1		
	Michelle McCauley							1	1	1	1	1	1		
NON-VOTING															
City of Clayton	Laura Hoffmeister														
Town of Danville	Chris McCann							1		1	1	1	1		
City of Martinez	Alex Stroup														
Town of Moraga	John Sherbert								1		1	1	1		
Town of Moraga	AJ Kennedy							1							
City of Oakley	AJ Kennedy								1	1	1	1			
City of Oakley	Frank Kennedy														
City of Orinda	Cathy Terrentieff									1	1	1			
City of Orinda	Paul Lang								1				1		
City of Pleasant Hill	Rod Wui								1				1		
City of Richmond	Lynne Scarpa								1		1	1	1		

(1) Chairperson

(2) Vice-Chairperson

(3) Meeting Cancelled

NEW DEVELOPMENT COMMITTEE
2009/2010 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL	AUG	SEP [3]	OCT [3]	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
City of Antioch	**Phil Hoffmeister**		1				1	1		1	1	1	
	Julie Haas-wajdowicz												
City of Clayton	**Laura Hoffmeister**						1	1		1		1	1
City of Concord	Jeff Rogers												
	Libbey Bell [2]	1	1			1	1	1	1	1	1	1	
	Mario Camorangan												
Town of Danville	**Chris McCann**		1			1	1	1	1	1		1	1
City of El Cerritto	Yvette Ortiz					1							
	Saied Aminian	1	1				1	1		1	1	1	1
City of Hercules	**Jeff Brown**						1		1	1		1	1
	Glenn Moniz	1	1					1					
City of Lafayette	**Christine Sinnette**	1					1	1	1	1	1	1	1
City of Martinez	**Khalil Yowakim**	1				1	1	1	1	1		1	1
	Tim Tucker												
Town of Moraga	Frank Kennedy						1					1	1
	John Sherbert	1	1			1		1	1	1	1		
City of Oakley	**Frank Kennedy**	1	1			1	1	1	1	1	1	1	1
City of Orinda	**Cathleen Terentieff**	1	1			1	1	1	1	1	1	1	1
City of Pinole	**Frank Kennedy**												
	Nancy Voisey	1	1				1	1	1	1			1
Contra Costa County	**David Swartz [1]**		1				1		1		1	1	1
	Monish Sen									1			
	Rich Lierly							1					
	Dan Jordan	1				1							
PROGRAM STAFF													
	Tom Dalziel	1	1			1	1	1	1	1	1	1	1
	Elisa Wilfong								1	1	1		
	Michelle McCauley	1	1			1		1					

NEW DEVELOPMENT COMMITTEE
2009/2010 ATTENDANCE ROSTER

NON-VOTING													
City of Pittsburg	**Jolan Longway**					1	1		1	1	1	1	1
City of Pleasant Hill	**Rod Wui**												
City of Richmond	Jay Ghandi												
	Lynne Scarpa		1				1		1	1	1		1
City of San Pablo	Karineh Samkian												
City of San Ramon	**Chris Low**	1	1			1	1		1	1	1	1	1
	Steven Spedowfski												
City of Walnut Creek	Carlton Thompson						1		1	1			1
	Scott Wikstrom												
	Diana Walker												

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

MONITORING COMMITTEE
2009/10 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL	AUG[3]	SEP[3]	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	80%	**80%**
	Julie Haas-Wajdowicz													0%	
City of Concord	Libbey Bell								1					10%	
	Jeff Roubal	1			1	1	1	1		1	1		1	80%	**90%**
Contra Costa County	Charmaine Bernard													0%	
	Nancy Stein [2]	1			1	1	1	1	1	1	1	1	1	100%	**100%**
City of Richmond	**Lynne Scarpa** [1]	1			1	1	1		1	1	1	1		80%	**80%**
	Jenny Oorbeck													0%	
City of Walnut Creek	Michael Hawthorne										1			10%	
	Rinta Perkins	1			1	1	1	1	1	1		1	1	90%	**100%**
PROGRAM STAFF															
	Elisa Wilfong														
	Jamison Crosby	1			1	1	1	1	1	1	1	1	1		
	Michelle Luebke							1			1				
	Michelle McCauley	1			1	1	1		1	1	1	1			
NON-VOTING															
City of Pittsburg	Alfedo Hurtado				1				1	1	1		1		
	Jolan Longway	1						1							
City of San Pablo	Karineh Samkian	1				1	1								

[1] Chairperson

[2] Vice-Chairperson

[3] Meeting Cancelled

PUBLIC INFORMATION / PARTICIPATION COMMITTEE
2009/10 ATTEDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL (3)	AUG (3)	SEP (3)	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	INDIV % ATT	MUNI % ATT
City of Antioch	**Julie Haas-Wajdowicz**				1	1	1	1	1	1	1	1	1	100%	**100%**
	Phil Hoffmeister													0%	
City of Brentwood	**Laurie Monte**				1	1	1		1	1				56%	**67%**
	Jeff Cowling										1			11%	
Flood Control District	**CeCe Sellgren**									1	1	1		33%	**100%**
	Greg Connaughton				1	1	1	1	1	1				67%	
City of Pittsburg	**Laura Wright** (2)				1	1	1	1	1	1		1	1	89%	**89%**
	Jason Burke													0%	
City of San Pablo	**Karineh Samkian**				1	1	1							33%	**33%**
	Adele Ho													0%	
City of San Ramon	**Steven Spedowfski** (1)				1	1	1	1	1		1	1		78%	**78%**
	Robin Bartlett													0%	
Contra Costa County	**Dan Jordan**				1	1	1	1	1			1	1	78%	**89%**
	David Swartz										1			11%	
PROGRAM STAFF															
	Donald P. Freitas				1	1	1	1	1	1					
	Tom Dalziel						1	1	1			1	1		
	Michelle McCauley				1		1	1	1	1	1	1			
NON-VOTING															
City of Richmond	Jenny Orbach														
	Lynne Scarpa							1			1	1			
City of El Cerrito	**Garth Schultz**								1						
City of Pinole	**Nancy Voisey**								1						

(1) Chairperson

(2) Vice-Chairperson

(3) Meeting Cancelled

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TOPLINE REPORT

For
O'Rorke, Inc.
By
Nichols Research, Inc.

May 2010

Nichols Research, Inc., 39141 Civic Center Drive, Suite 425, Fremont, CA 94538
www.nicholsresearch.com

Table of Contents

Purpose

The purpose of this study was to provide The Contra Costa Clean Water Program with information about attitudes, perceptions and behaviors of Contra Costa County Residents that would aid with continuing development and implementation of its outreach efforts and current campaign awareness. A benchmark study was conducted in 2009 with the same purpose and year-to-year comparisons, where appropriate, are included.

Content

More specifically, the survey provides information about the following topics:

1. Overall awareness and understanding of specific campaigns, including advertisements, slogans and messaging.
2. Perceptions and level of concern of the impact/pollution level of litter on local Contra Costa County water bodies.
3. Level of awareness and understanding of litter and protection of the County water bodies.
4. Understanding and knowledge of the CCCWP and its website.
5. Level of awareness and understanding of advertisements and specific slogans/messages related to litter.
6. Willingness to participate in litter prevention practices.

Methodology

O'Rorke retained the services of Nichols Research, the largest woman-owned marketing research and data-collection company in Northern California. All interviews were completed by trained and experienced interviewers within the Nichols Research phone center and monitored by an on-site supervisor during the entire course of the study.

Four hundred 6-8 minute interviews were conducted between mid April and mid May of 2010 to residents of Contra Costa County who are 18 years or older.

Random sampling was used so the completed interviews represent a population sample of the entire county with cross tabulations prepared for the four distinct areas of Contra Costa County: East, West, North/Central, Lamorinda/South, and the unincorporated area.

A reliability criterion of .01 and .05, or 99 and 95 percent was utilized for this project. The level of reliability indicates significant findings that are both one percent and five percent chance, or less that the statistical differences reported in the study are due to measurement error.

Quotas were established to ensure the most representative sample of the county as possible. The sample was stratified by area of the county and demographic variables, such as gender and age. The sample demographics were reflective of the population of Contra Costa County. A complete listing of demographics can be found in the appendix.

Social and Economic Changes Occurring Between 2009 and 2010

Top of mind awareness, perceptions and opinions can be affected by external factors such as political, social and economic issues. Environmental concerns can sometimes be overshadowed by other events that are viewed as more pressing. Some of the top changes that occurred between the Spring of 2009 and Spring of 2010 include:

- The economy declined all through 2009 and news of slow recovery only began to emerge in early 2010. People who are worried about their jobs and mortgage payments tend not to be as concerned about the environment.

- Increased usage of social sites like Facebook and LinkedIn. Adults aged 35-50 increased their usage of Facebook and Twitter emerged as a strong new digital tool.

- TIVO, DVRs and Netflix became more and more popular among TV viewers, partially because commercials can be skipped. Avid TV watchers are often likely to use a method to watch multiple TV shows in a shorter amount of time.

- Smart Phones have become even more of a source for advertising and information, particularly when the iPhone 3G was introduced in the summer of 2009 with thousands of new applications.

- YouTube increased its audience and continues to attract more creators and viewers.

- Newspaper readership continued to decline at an alarming rate because of an exodus to the web, including blogs and homepage news offerings such as 'Yahoo News'. Almost every major metropolitan newspaper was fighting for their life in 2009, and a few lost the battle and closed their doors.

- The effects of the BP oil spill in The Gulf had not yet been determined when this survey was conducted.

Principal Findings

Litter and Pollution

- Fewer respondents say they think litter impacts/pollutes local water bodies than in 2009, but when those who say maybe and don't know are included, there is only a slight change from one year to the next.

- Almost the same number of people are very or somewhat concerned about litter polluting water as were in 2009, with a small number more who are not at all concerned than in 2009.

- Renters, females and African Americans are the most concerned about litter polluting water.

- The population with the lowest incomes remains consistent with 2009 by all indicating they are very concerned about litter polluting water. This makes sense because the areas of the county with high concentrations of low-income residents also have the most problems with litter.

<u>Awareness of Reports/Advertising/Information About Litter</u>

- Fewer residents than in 2009 have heard or seen anything relating to how litter travels and builds up; the difference is extremely small though and may be attributed to changes in the type of media being viewed and listened to.

- Older citizens, over the age of 65, are more aware of reports/advertising/information about Litter, which may be a result of that age group continuing to utilize more traditional means of media like newspapers, radio and TV.

- There was a significant increase from 2009 in awareness from residents who saw stenciled storm drains and billboards with a message, but a decrease in those who saw advertising on the TV or heard it on the radio. Oddly, awareness via the Internet also decreased.

- Of those who had seen information, the majority said the message stated the threat of litter getting into the water system and the importance of not littering.

<u>Program Awareness</u>

- Awareness of the Contra Costa Clean Water Program remained flat from 2009 to 2010, but the regions of the County where there is awareness changed from year to year. In 2009 there was less awareness among residents of the unincorporated and North/Central areas of the county than in 2010.

- Of the respondents aware of CCCWP, a negligible number have ever visited the website, which is consistent with 2009.

<u>Advertisements, Slogans and Messages</u>

- There is an increase in the number of people that remember the slogan “Litter Travels But it Can Stop With You”, from 2009 to 2010, but about the same number remember “Fancy…Litter”.

- Again, residents in the unincorporated area and North/Central are more likely to remember the slogan. People in the 18-29 year age group are also the most likely to remember the slogan “Litter Travels” which is different than 2009 when people 60 and above, remembered it.

- Those who remembered either of the two messages indicate the main theme is that litter gets into the water system.

Pollution Prevention

- Actions that more than half of residents say they are willing to do are: ***Not Place Trash on the Sidewalk or Streets, Not Throw Cigarettes on the Ground, Participate in Community Events to Help Cleanup trash/Cigarettes Properly, Remind Family, Friends and Colleagues That Litter Travels and Should Stop With Us and Clean Up Litter in Park or Picnics Areas***
- Residents are least willing to ***Call an 800#*** or ***Visit a Website for More Information.***
- Many more people say that ***Not Place Trash on Sidewalk or Streets*** and ***Not Throw Cigarettes on the Ground*** are actions that do not apply to them than in 2009, which caused the total number of residents who say they would be ***very*** or ***somewhat*** likely to take these two actions to decrease from 2009.
- More residents say they are not willing to ***Stop Using Plastic Bags*** than said it in 2009, which is a moot point since most cities, and the whole State of California are planning to eliminate the use of plastic bags.
- Contra Costa County residents are more willing to ***Visit a Website For More Information*** than in 2009 and more are ***very*** willing to ***Participate in Community Events to Help Clean Up Trash/Cigarettes Properly***, but those ***not*** willing to take this action remains the same as 2009.

Significant Findings of the Survey

The findings are analyzed by the differences in response to each survey question based upon the following variables:

- Region of Contra Costa County respondent resides in
- Gender
- Age
- Income
- Education
- Ethnicity
- Length of time in current home
- Home ownership

1. Litter and Pollution

When asked whether they thought litter impacts/pollutes local water bodies, **76.5% of** respondents said ***yes***, **7%** said ***no***, **8%** said ***maybe*** and **8.5%** said ***don't know***. The percentage of respondents who said ***yes*** was much higher in 2009, ***87%***, than in 2010

- Although a similar number of males and females said ***yes,*** a slightly higher percentage of men, **9%**, than women, **5%**, said ***no***.

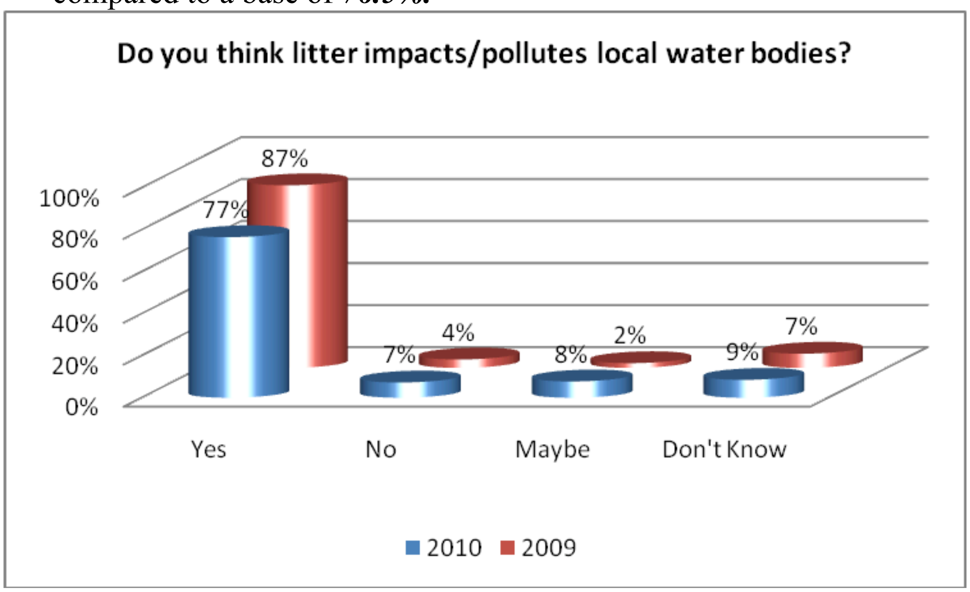
- 30-39 and 50-59 year olds said ***yes*** more often, **90/81%**, than those over 60 years old, ***62%*** and, consistent with the 2009 results, respondents older than 60 were much more likely to say ***don't know*** than younger respondents.

- No respondents with less than a high school education said ***no***; all 14 said yes, maybe or don't know. They also had the lowest percentage, ***57%***, of respondents to say ***yes***, and the highest ***maybe*** and ***don't know***.

- Residents living in the West, ***16%***, were more likely to say ***don't know*** than residents of the other areas.

- Asians and Hispanics were more likely to say ***don't know*** than Caucasians and African Americans.

- Respondents with the highest incomes, $100-$199K and those in the $15-$29K income group, said ***yes*** more frequently than those in other income groups, yet oddly, those with incomes over $200K responded more like the mid-income residents. Only ***50%*** of the lowest income respondents said ***yes***, compared to a base of ***76.5%.***



41% of residents said they would rate their concern about litter polluting water ***very*** high, **39%** said ***somewhat*** high, **15%** said a ***little*** and **5%** said ***not at all***. It is not surprising, and has been found in past studies and the 2009 results, that residents of the lower socioeconomic areas of Contra Costa County indicated greater concern about litter polluting water than residents of the more affluent areas.

- Caucasians at **37%**, and Asians at ***38%***, were less likely to say ***very*** concerned, whereas African Americans at **61%**, were more likely to say ***very,*** all of which is consistent with the 2009 findings. Asians and Caucasians were more likely to say ***somewhat,*** **40%** and **45%**, than African Americans, **32% and Hispanics, 27%**. Hispanics, at ***13%*** and Asians at ***11%*** were much more likely than others to say ***not at all***, with Caucasians and African Americans at ***2%,*** or less.

- Respondents' ages did not make as big a difference in how they answered this question as it did in 2009. The only major difference was that respondents over the age of 60 were more likely to say they are a ***little*** or ***not at all*** concerned more frequently than younger age groups, but not significantly.

- Renters and females, were most likely to say ***very*** concerned. **48%** of females but only **35%** of males said ***very***, whereas **18%** of males said a ***little*** compared to only ***11%*** of females. Also, **9%** of males said **not at all** while only **2%** of females said it. These findings are consistent with the differences found between genders and home ownership in 2009.

- **54%** of renters said ***very*** compared to ***39%*** of home owners and ***40%*** of lessees.

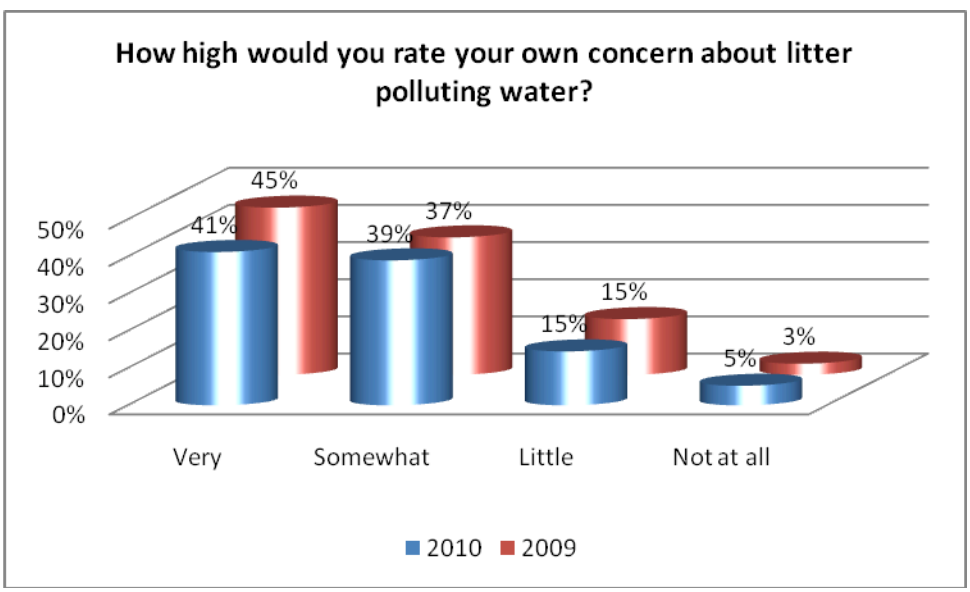
- Residents in the East area said a ***little*** much less often, **5%**, and those in the South area said ***very*** a little less often, **36%**.

- Unlike the findings in 2009, respondents with a high school degree, or less, were much more likely to have said ***not at all***, than the other education levels. In 2009, respondents with less than a high school education were much more likely than other education levels to say they were ***very*** concerned, whereas, in 2010 those same respondents are more consistent with the other education levels.

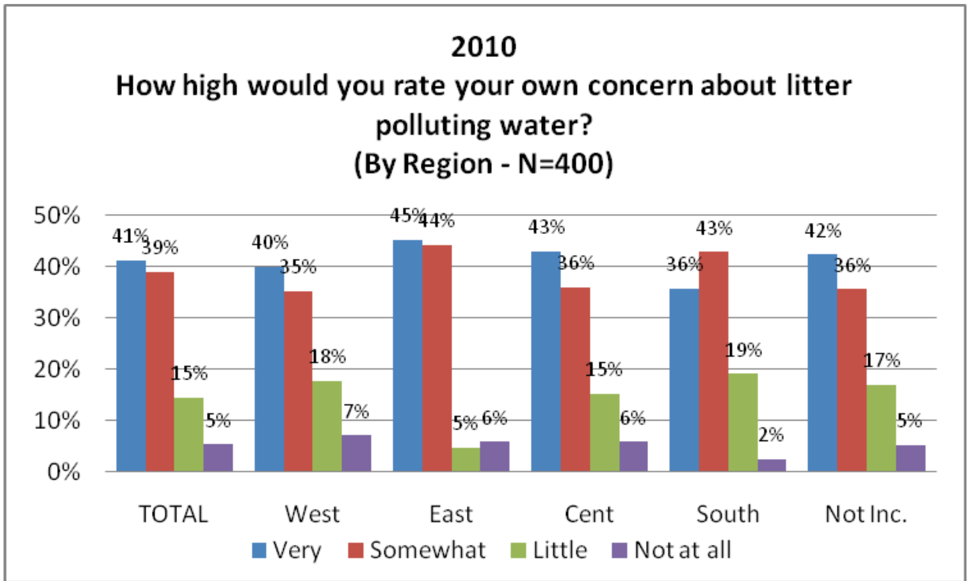
- Residents who have lived in their homes for less than one year were more likely than others to say ***very***, **53%**, and less likely to say ***a little, 7%.***

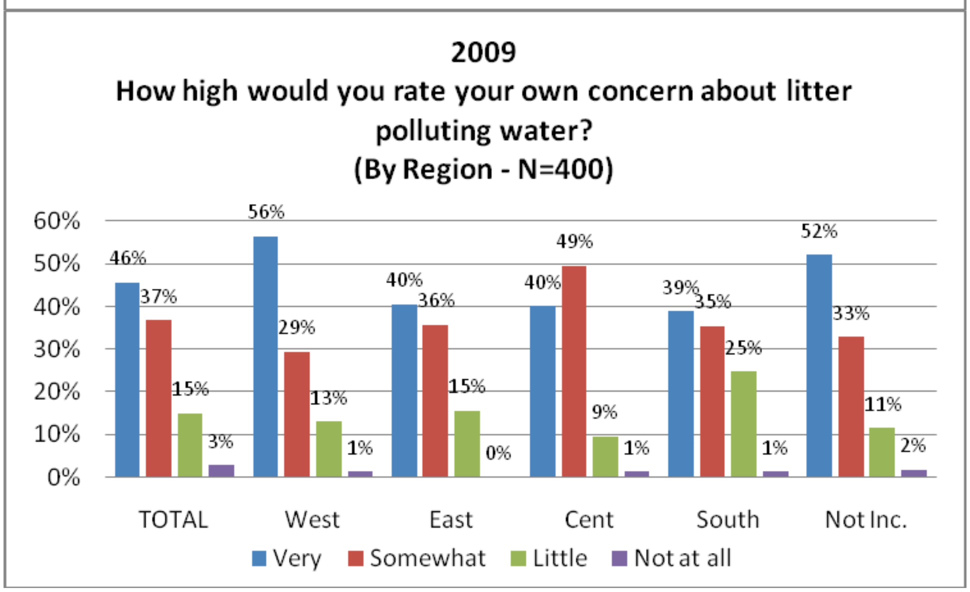
- As in 2009, **100%** of respondents with incomes under $15K rated their concern ***very*** or ***somewhat***.

<u>OVERALL</u>

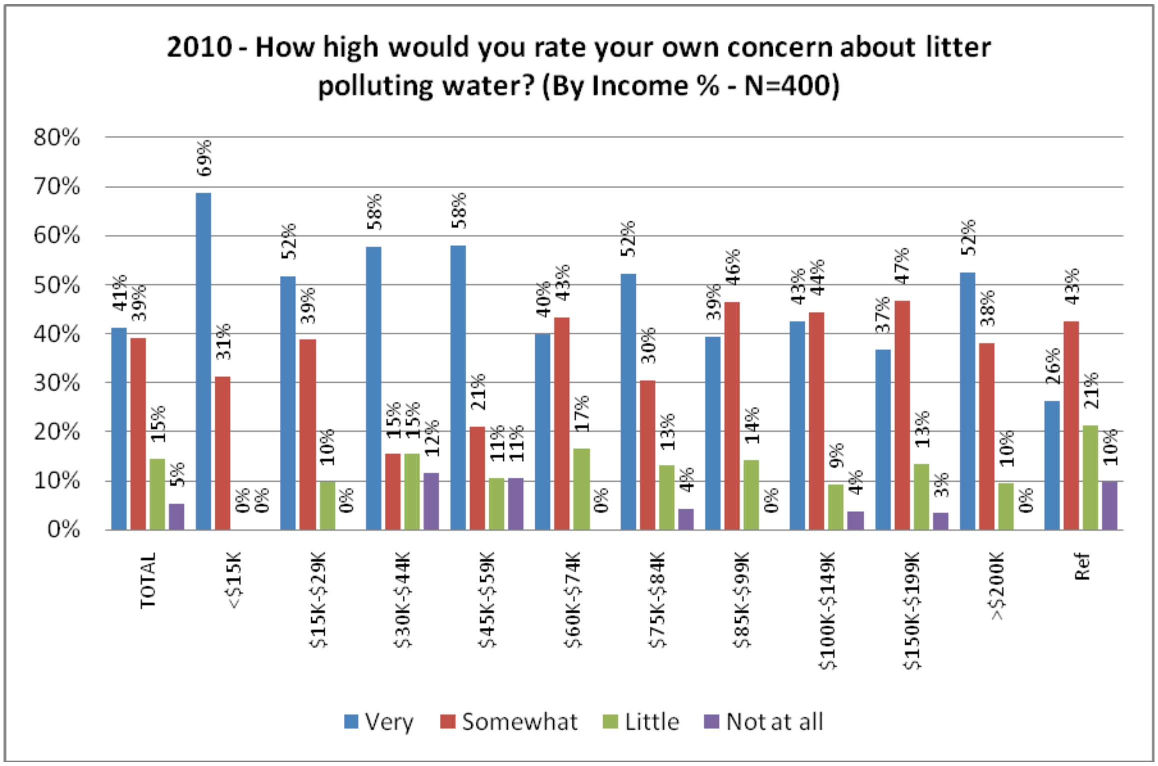


BY ***REGION***

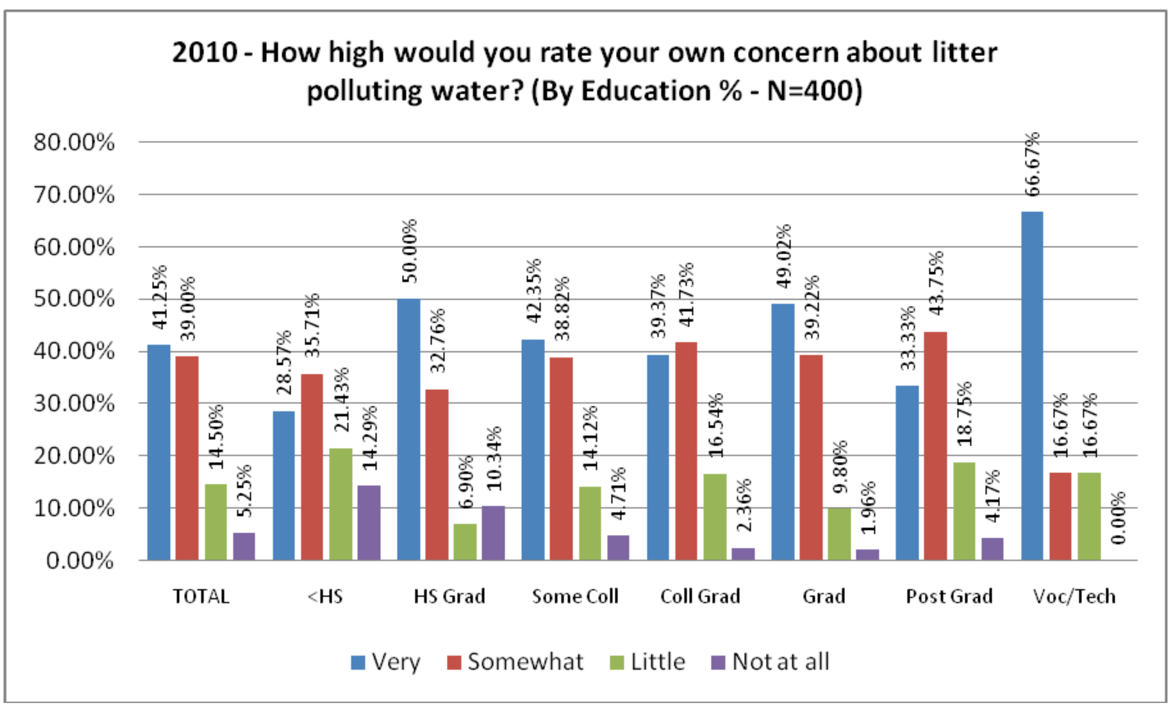

2010
How high would you rate your own concern about litter polluting water?
(By Region - N=400)
50%
40%
30%
20%
10%
0%
41%
39%
15%
5%
40%
35%
18%
7%
45%
44%
5%
6%
43%
36%
15%
6%
36%
43%
19%
2%
42%
36%
17%
5%
TOTAL
West
East
Cent
South
Not Inc.
Very
Somewhat
Little
Not at all


2009
How high would you rate your own concern about litter polluting water?
(By Region - N=400)
60%
50%
40%
30%
20%
10%
0%
46%
37%
15%
3%
56%
29%
13%
1%
40%
36%
15%
0%
40%
49%
9%
1%
39%
35%
25%
1%
52%
33%
11%
2%
TOTAL
West
East
Cent
South
Not Inc.
Very
Somewhat
Little
Not at all

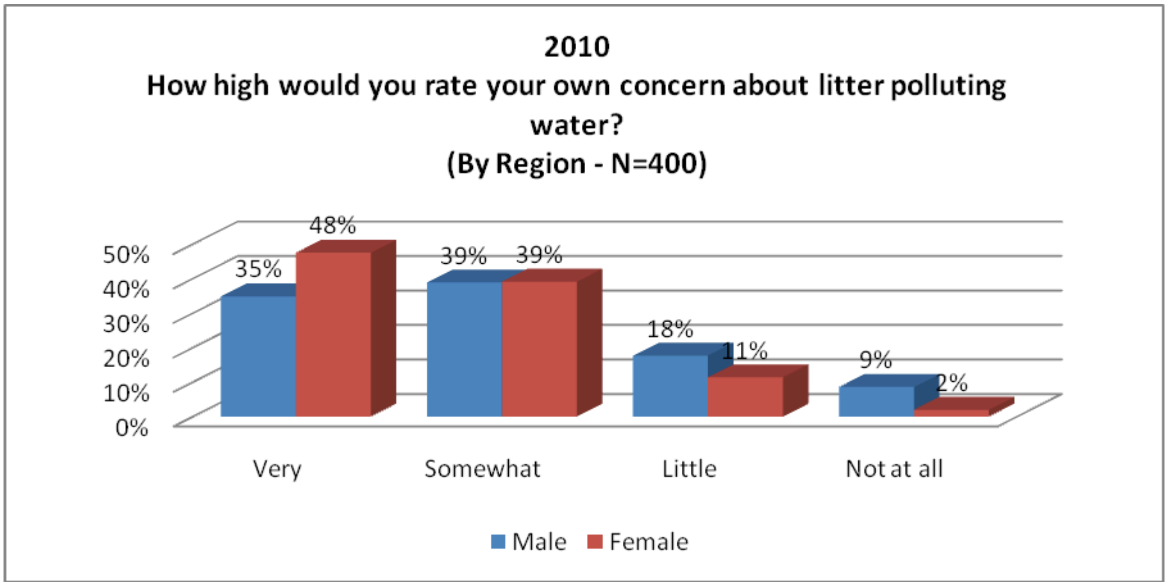
BY ***INCOME***



BY ***EDUCATION***



BY ***GENDER***

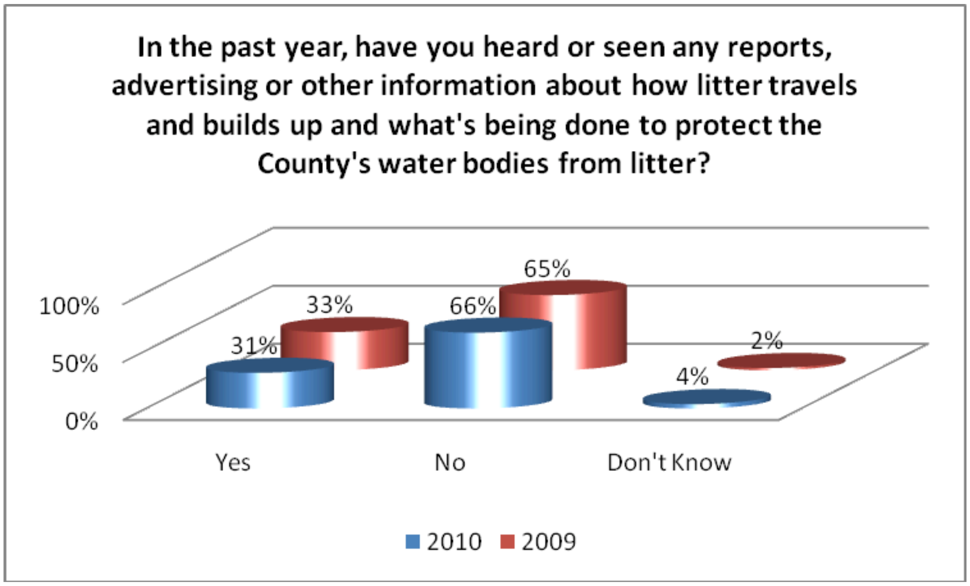


2. Awareness of Reports/Advertising/Information About Litter

31% of the respondents said they ***have*** heard or seen any reports, advertising or other information about how litter travels and builds up and what is being done to protect the County's water bodies from litter, **66% have not** and **4% don't know**. Compared to 2009, those who have not heard any reports remained the same, ***2%*** fewer said ***yes***, and ***2%*** more said ***don't know***.

- Respondents over the age of 65 were more likely to say ***yes*** and respondents under the age of 50 were less likely to say ***don't know***.

- Not significant, but noticeable, and the opposite of 2009, is that residents in the ***West*** region were more likely to say ***no.*** In 2009 residents of the West region were more likely to say ***yes*** than residents of the other regions. Females were still a little more likely, ***33%*** to say ***yes*** than males, ***29%***, which was similar in 2009.



Of the **123** people out of the **400** interviewed who indicated they had heard or seen information, **41%,** said they saw it on the ***television***, **31%** in a ***newspaper***, **18%** some ***other*** place, ***10%*** on ***stenciled storm drains***, ***9%*** on ***billboards***, **4%** on the ***radio***, **4%** through ***government agencies*** and **2%** on the ***internet***. The percentage of awareness decreased from 2009 for ***television***, ***newspaper, some other place***, ***radio*** and ***internet***, but increased for ***stenciled storm drains*** and ***billboards***.

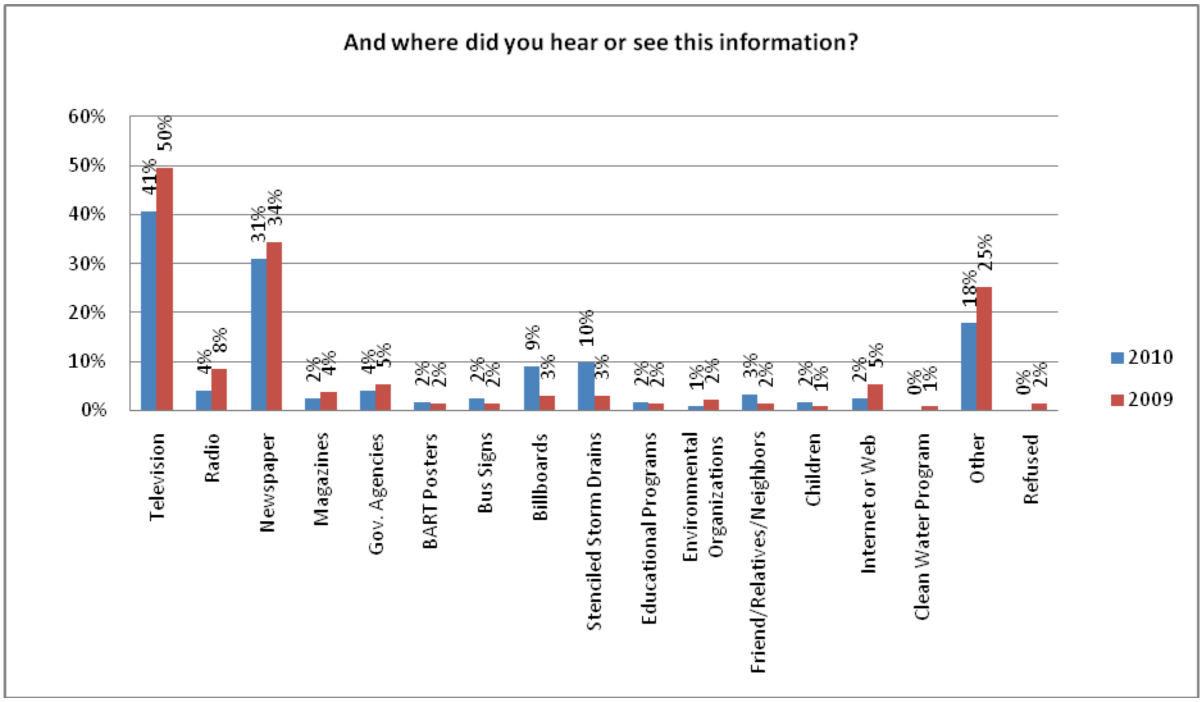
- Residents who have lived in their home for more than 10 years and respondents who are over the age of 65 were most likely to have seen information in a ***newspaper***.

- African Americans, Hispanics, renters, females, those with some college, college grads, and residents from the West and Central areas of the County were most likely to have seen information on ***TV***.

- Homeowners with incomes in the $60K-$199K range and Hispanics were most likely to say ***Billboards***.

- Homeowners, residents of the non-incorporated areas, Caucasians, Asians and residents with at least a college degree, were most likely to say ***stenciled storm drains***.

- Of the respondents who said they had heard or seen information someplace else, most indicated they received an insert in their water bill and some said they got a flyer. The listing of 'other' places is in the Appendix.



Those who indicated they had heard or seen information were asked what the information meant to them and their responses were recorded verbatim. The answers are very similar to those given in 2009. The entire list of responses is in the Appendix and ten of those that are representative of the answers are listed below:

1. That littering destroys the beaches and when you dump anything into the gutters it goes directly into the ocean and affects our eco-system.
2. Litter makes its way through the water ways ands up in the bay and oceans.
3. Do not litter.
4. No dumping in empty lots or pouring down storm drains.
5. All the chemicals we use go into local waterways.
6. Think twice about throwing litter out of the car on the street.
7. It is social responsibility to prevent littering.
8. Made me more aware of how bad the situation is and that everyone needs to do right.
9. The build up of litter and pollutants endangers the water supply in the county.
10. It meant that litter in water bodies is a problem that needs to be addressed before it gets worse.

3. Awareness of the Contra Costa Clean Water Program and Website

31% of the residents surveyed said ***yes***, they had heard of CCCWP, **62%** said ***no*** and **7%** ***don't know***, which is almost identical to 2009. Only ***yes*** and ***don't know*** changed by ***1%*** each. The 123 respondents, **31%**, who said ***yes***, were asked follow-up questions about CCCWP'S website.

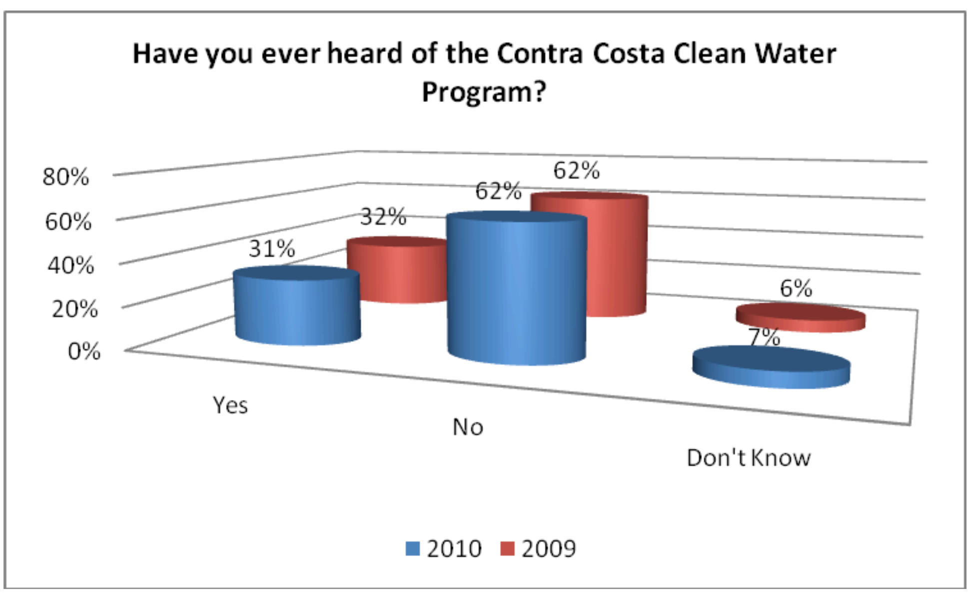
- Residents of the South and West area of the County were much more likely to say ***no***, they have not heard of the program, **70%,** and those residing in the North/Central and non-incorporated areas said ***yes*** more often, which was a change from 2009, when it was the residents of the non-incorporated area that had not heard of CCCWP.

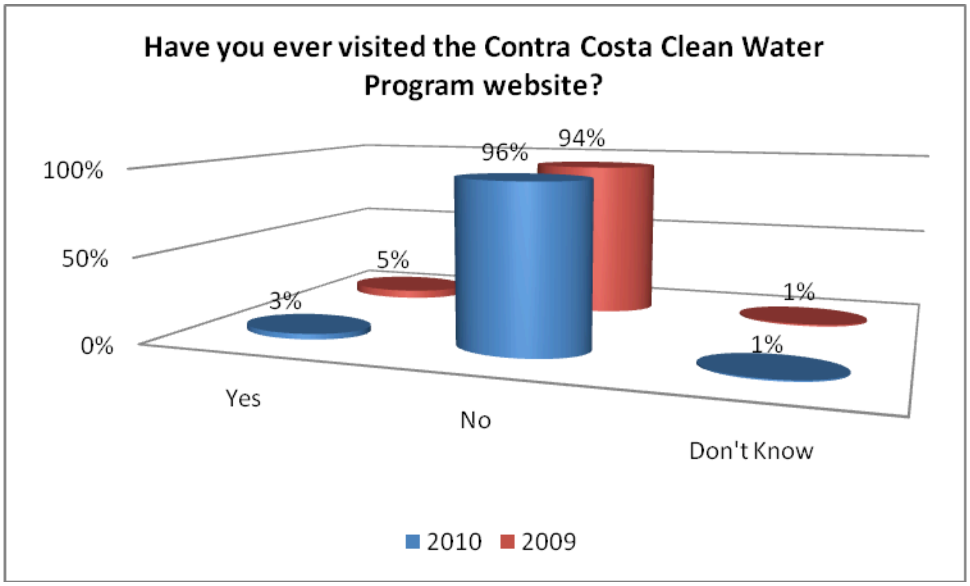
- Respondents 30-39 years old, said ***yes*** more often than respondents in all other age groups and 40-49 year olds said ***no*** more often. 60-64 year olds said ***don't know*** more often than other respondents.

- As in 2009, Hispanics at **27%** were a little less likely to say ***yes*** than respondents of other ethnicities and African Americans at ***39%*** were the most likely to say yes. ***31%*** of Caucasians and **30%** of Asians said yes.

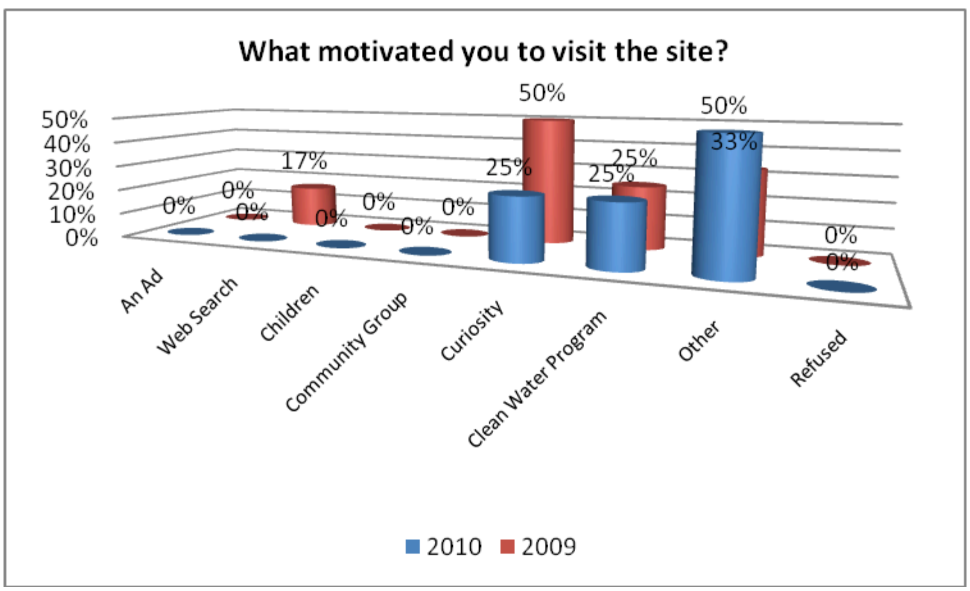
- Respondents who have lived in Contra Costa County for more than 10 years said ***don't know***, **11%,** and respondents living in their homes for 3-5 years said ***no***, *77%*, more than people who have lived in the County for other lengths of time.

- Residents with incomes $60-$74K were more likely to say ***yes***, **53%**, than those in the other income groups and respondents with incomes over $200K were the least likely to say ***yes***, **10%**.

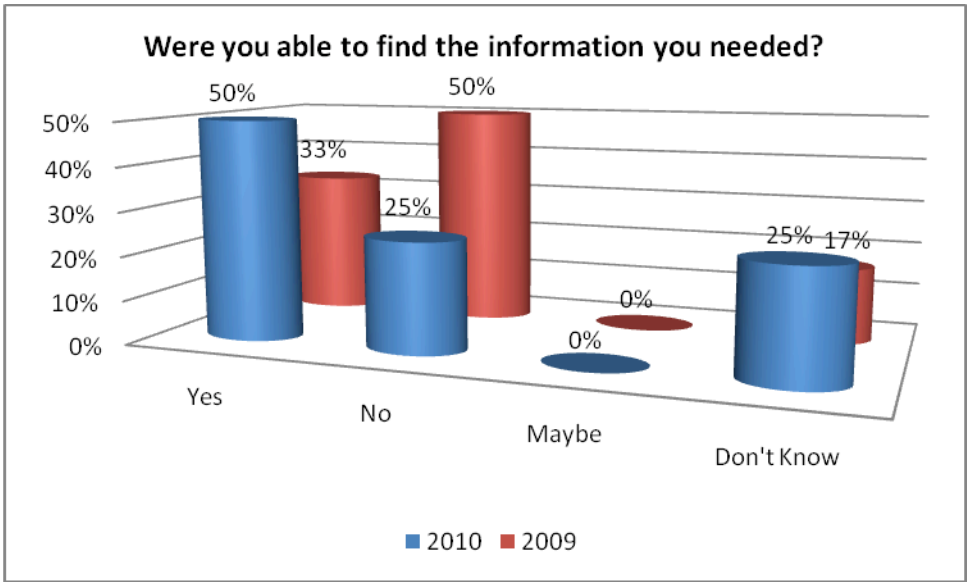




Only **4** people total, **3%** of the **123** people asked, said they have ever visited the website and **96%** said ***no***, they had not**. 2** of the **4** live in the East region of the County and **all 4** are homeowners. One person said ***don't know***.



Two respondents were able to find the information they were looking for, one was not and one said don't know.



4. CCCWP Litter Advertisements, Slogans and Messages

When asked if they had ever heard or seen advertisements about the CCCWP that mentioned the slogan "Litter Travels but it Can Stop With You", **14%** of respondents said ***yes,*** **78%** said ***no***, **6%** said ***maybe*** and **2%** said ***don't know***. More respondents said yes, maybe and don't know, ***22%*** than they did in 2009, ***16%***.

- Residents in the North/Central, **17%,** and unincorporated areas, **17%**, were more likely to have said they were aware of the advertising than those from the West, **8%.** This is a change from 2009, when the West had the highest, ***18%*** of residents, who had ever seen or heard the ad, and Non-Incorporated had the lowest, ***5%.***

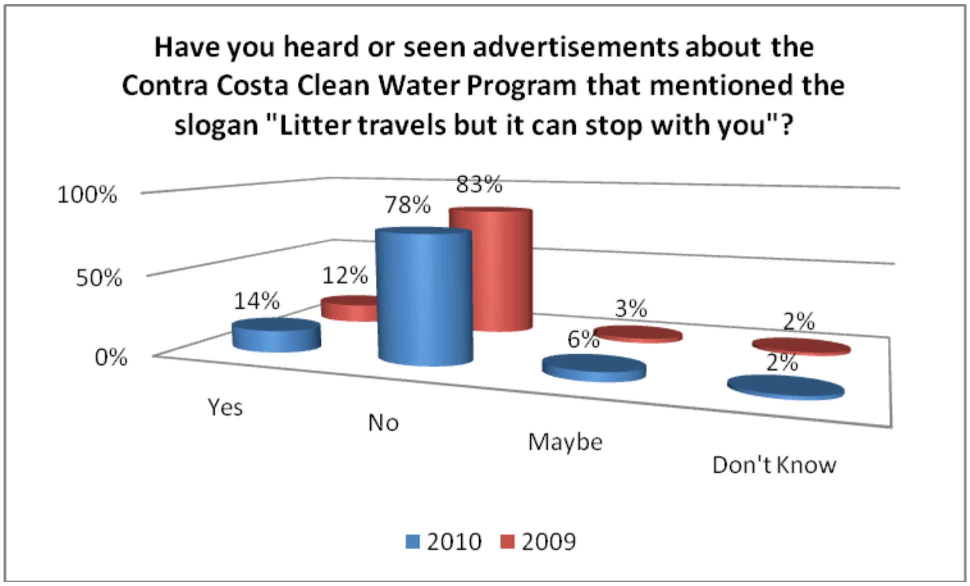
- People 18-29 years of age said ***yes, 21%,*** much more than respondents in the other age groups and respondents over age 50 were more likely to say ***don't know.***

- Caucasians and Hispanics were much more likely, **17%** than African Americans, ***5%*** or Asians, **8%**, to have heard or seen advertising. This is a definite change from 2009 when African Americans were much more likely to have seen this message than the other ethnicities.

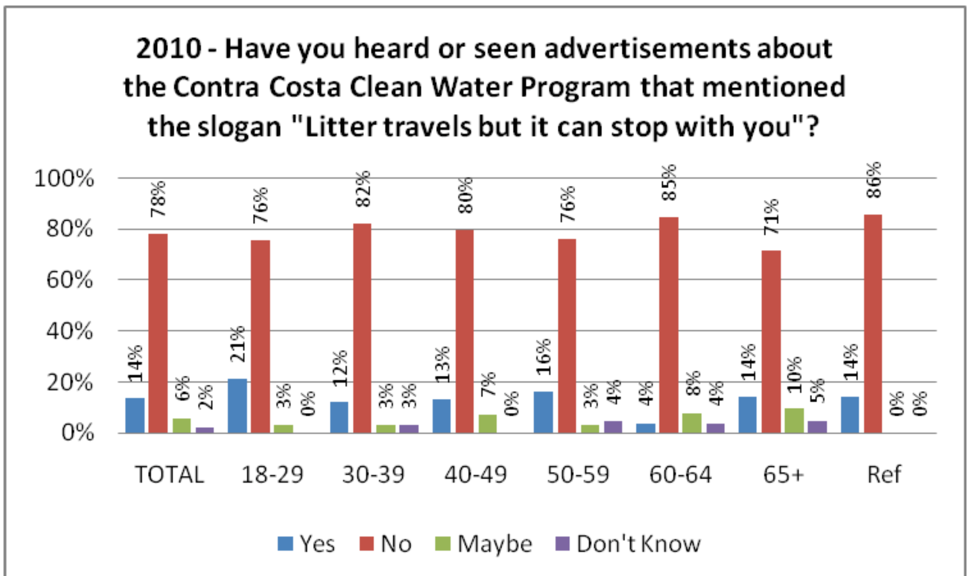
- More respondents, **30%**, with incomes between $75-$84K said yes, they had seen or heard advertising.

- Renters were much more likely to say ***maybe***, ***16%***, than homeowners, ***4%*** and males were slightly more likely, ***16%*** than females, ***12%***.

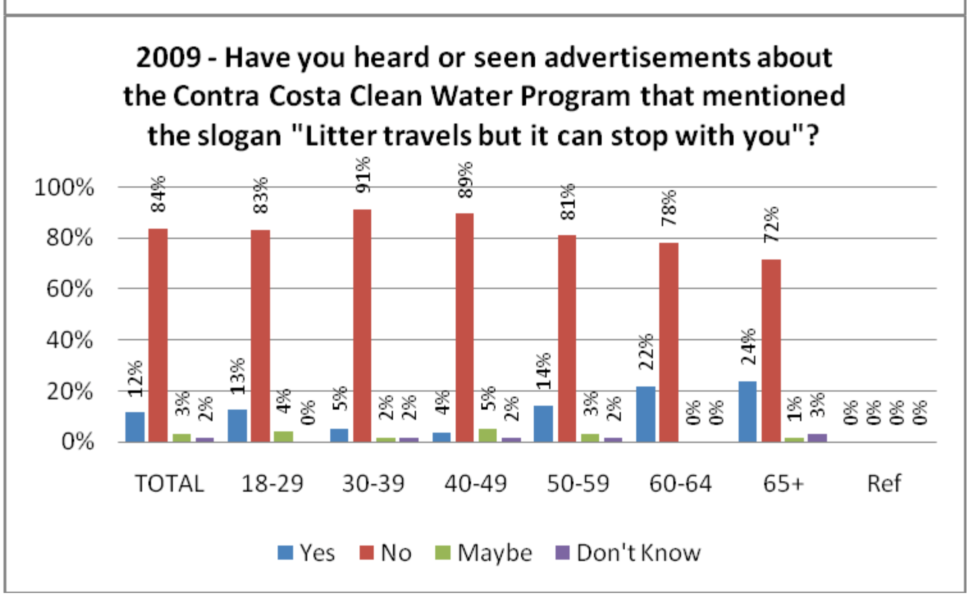
- Residents who lived in the County for more than 10 years said ***no*** less frequently**.**



Have you heard or seen advertisements about the Contra Costa Clean Water Program that mentioned the slogan "Litter travels but it can stop with you"?
100%
50%
0%
14%
12%
78%
83%
6%
3%
2%
2%
Yes
No
Maybe
Don't Know
2010
2009



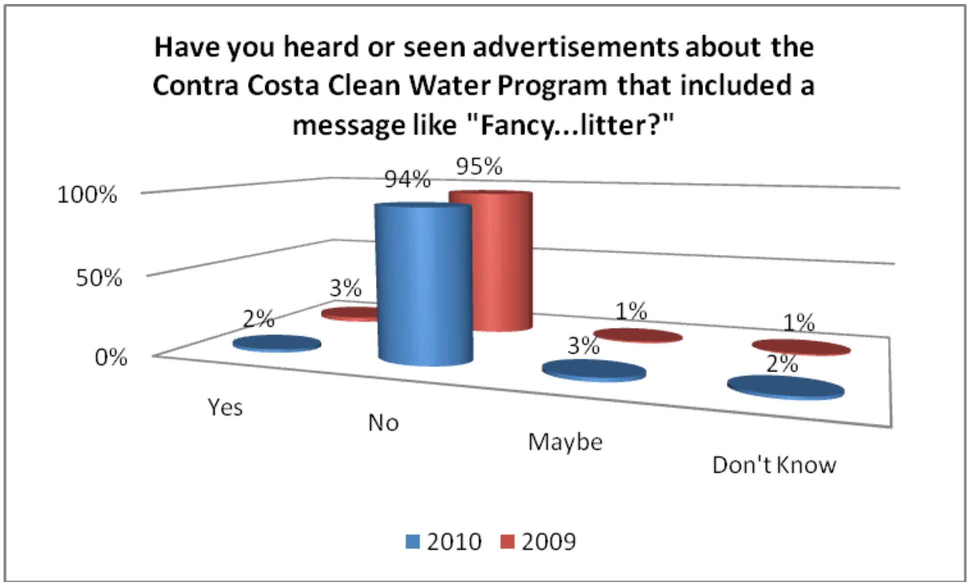
2010 - Have you heard or seen advertisements about the Contra Costa Clean Water Program that mentioned the slogan "Litter travels but it can stop with you"?
TOTAL 14% 78% 6% 2%
18-29 21% 76% 3% 0%
30-39 12% 82% 3% 3%
40-49 13% 80% 7% 0%
50-59 16% 76% 3% 4%
60-64 4% 85% 8% 4%
65+ 14% 71% 10% 5%
Ref 14% 86% 0% 0%
Yes
No
Maybe
Don't Know



2009 - Have you heard or seen advertisements about the Contra Costa Clean Water Program that mentioned the slogan "Litter travels but it can stop with you"?
TOTAL 12% 84% 3% 2%
18-29 13% 83% 4% 0%
30-39 5% 91% 2% 2%
40-49 4% 89% 5% 2%
50-59 14% 81% 3% 2%
60-64 22% 78% 0% 0%
65+ 24% 72% 1% 3%
Ref 0% 0% 0% 0%
Yes
No
Maybe
Don't Know

Only **2%** of respondents (8 people), said they had heard or seen advertisements about the CCCWP that included a message like "Fancy…Litter", **94%** said ***no,*** and 2% each said ***maybe*** or ***don't know***.

- Six of the eight respondents that said yes are 40-59 years old.
- Respondents with some college said ***yes*** more often and all eight of the respondents who said ***yes*** own their home.
- Most of the respondents, **5 of 8**, who said ***yes*** have lived in their home for 10 or more years and **none** who have lived in their home for less than 1 year said ***yes***.



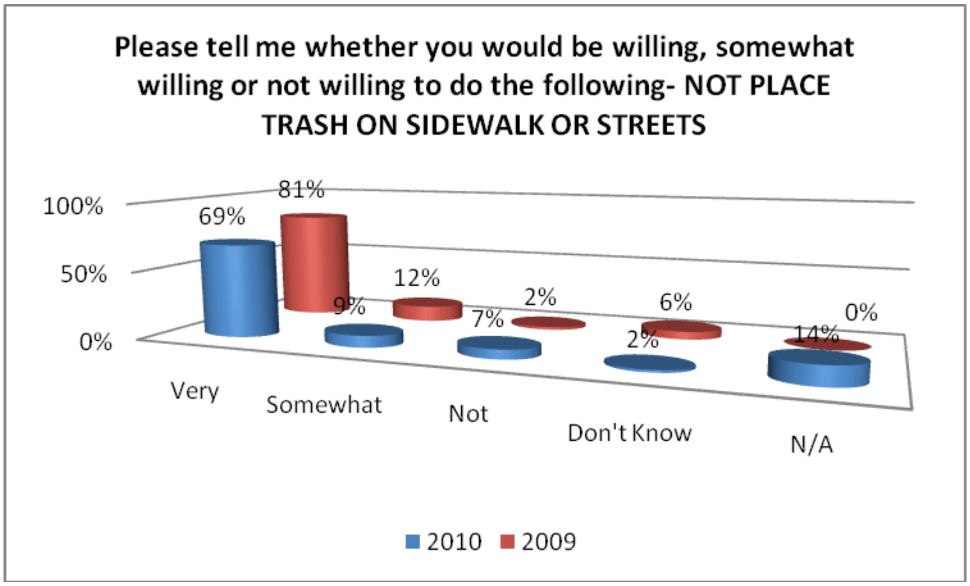
As in 2009, the respondents who indicated that they had heard or seen either of the two advertisements were asked what the ads said to them, ***what was the message the commercial was trying to get across,*** and the main answers were:

- A reminder not to litter
- Do not put litter down the drain
- Too many people litter and it gets into our water
- We are not doing enough to prevent pollution
- Be careful what goes into our water system and sewage system

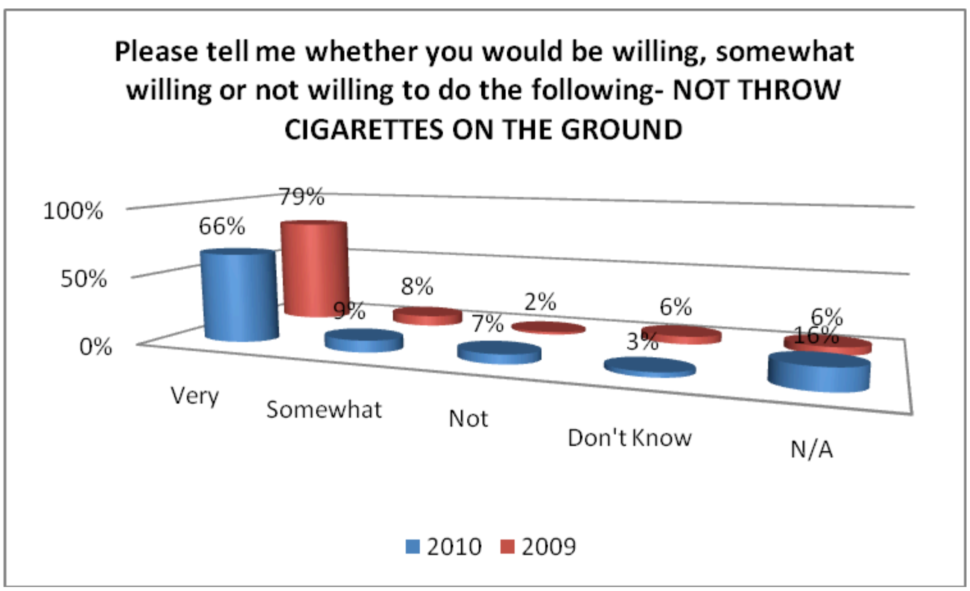
A list of all answers is included in the Appendix.

Again, only the respondents who indicated they had heard or seen any advertising, were asked to rate a series of 8 litter habits by indicating whether the ads or messages would make them rethink those habits and be very, somewhat or not willing to do certain behaviors.

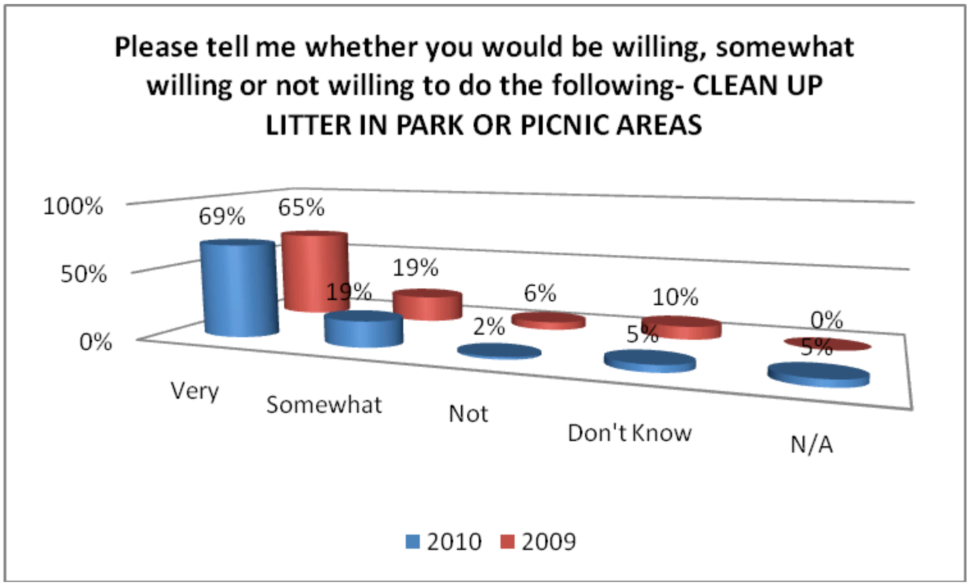
1) NOT PLACE TRASH ON SIDEWALKS OR STREETS



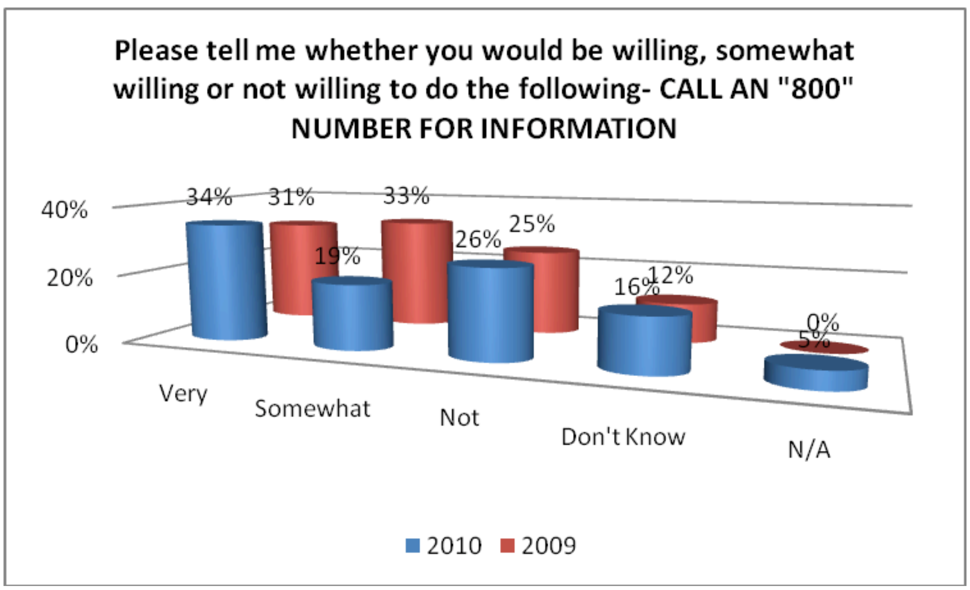
2) NOT THROW CIGARETTES ON THE GROUND



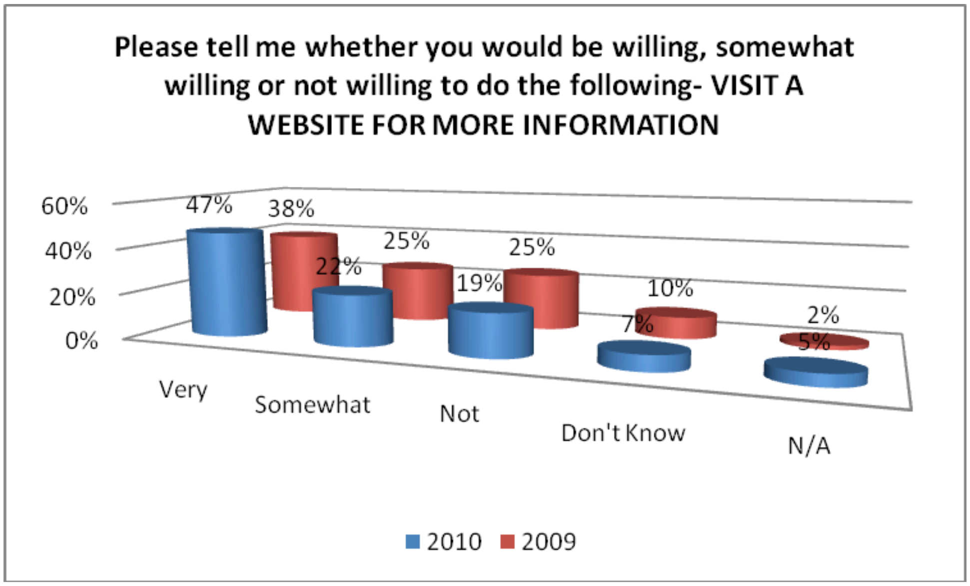
3) ***CLEAN UP LITTER IN PARK OR PICNIC AREAS***



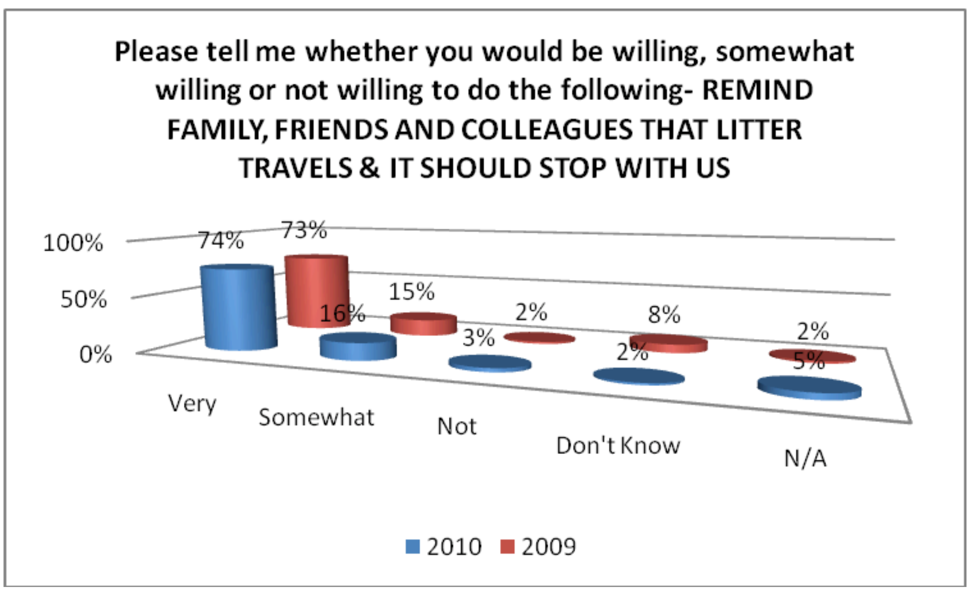
4) ***CALL AN 800 NUMBER FOR INFORMATION***



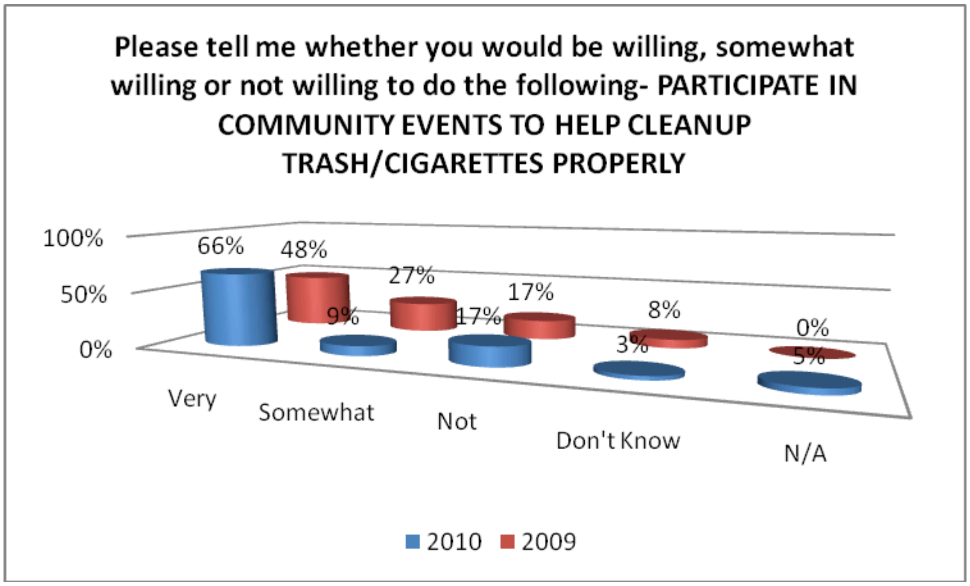
5) *VISIT A WEBSITE FOR MORE INFORMATION*



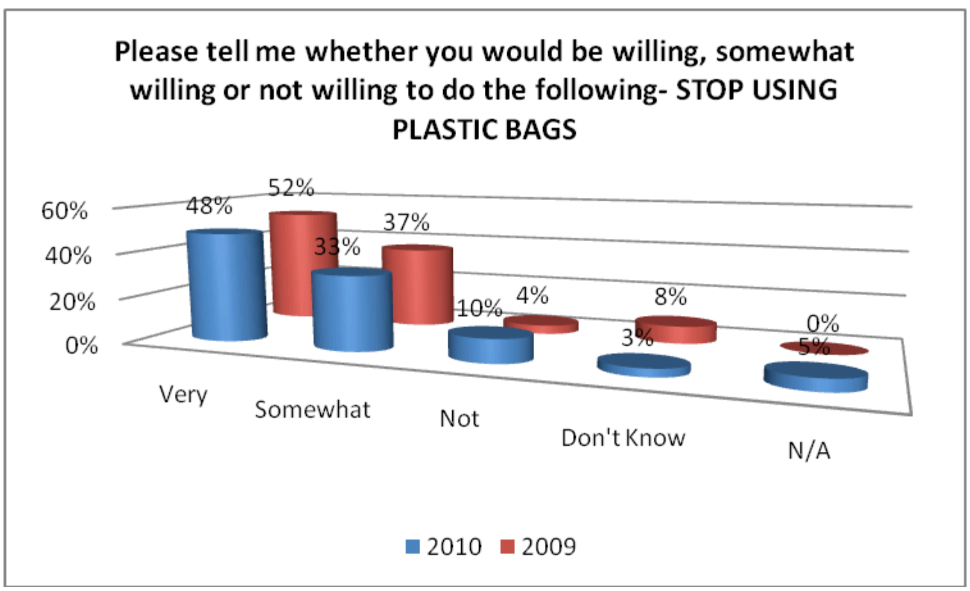
6) *REMIND FAMILY, FRIENDS AND COLLEAUGES THAT LITTER TRAVELS AND IT SHOULD STOP WITH US*



7) PARTICIPATE IN COMMUNITY EVENTS TO HELP CLEAN UP TRASH/CIGARETTES PROPERLY



8) STOP USING PLASTIC BAGS



Respondents said that of the eight options they would be most willing to ***not place trash on sidewalks or streets***, ***not throw cigarettes on the ground***, ***remind family, friends and colleagues that litter travels and it should stop with us*** and ***clean up litter in park or picnic areas***

The actions which respondents said they would be the least willing to do are ***call an 800 number*** or ***visit a website for information***, ***participate in community events to help clean up trash/cigarettes properly*** and ***stop using plastic bags***.

13.79% of respondents said ***not place trash on sidewalks or streets*** does ***not apply*** to them and ***15.52***% said ***not throw cigarettes on the ground*** does ***not apply*** to them, which are both significantly higher than in 2009.

Compared to 2009, respondents were much more likely to say they are ***very*** willing to ***participate in community events to help clean up trash/cigarettes properly,*** but much less likely to say they are ***somewhat willing*** and a little more likely to say they are ***very*** willing to ***visit a website for more information***. However, respondents were less likely to say they are ***very*** willing to ***not place trash on sidewalks or streets*** and ***not throw cigarettes on the ground***; this is partially due to a higher percentage of respondents saying these behaviors do not apply to them.

Asians, Hispanics, residents in the East, college grads, those who refused to state their income and females said they would be ***very*** willing to ***not place trash on sidewalks or streets*** more often than males and other ethnicities. Respondents aged 30-39, residents of the North/Central area and males said they would ***not*** be willing more often than other demographic groups. No one living in their home for more than 10 years said they would ***not*** be willing to do this, but this group also had the highest percentage of ***not-applicable*** responses.

Residents in the East and college grads would be willing to ***not*** throw ***cigarettes on the ground*** and females, 40-49 year olds and residents of the non-incorporated areas said this was not-applicable more often.

As in 2009, more of the residents in the East County would be very willing to ***clean up litter in park or picnic areas*** than those in the other regions; additionally, females and college grads also said ***very*** willing more often. All of the respondents in the non-incorporated areas said ***very*** or ***not-applicable***.

Males and college grads said they would be ***very*** willing to ***call an 800 number*** or ***visit a website for information,*** more often than females and respondents with less education. Renters, females, Asians and residents in the non-incorporated areas said they would ***not*** be willing to visit a website more often than others.

Respondents living in their homes for 1-5 years said they would ***not*** be willing to ***call an 800 number*** more often than those living in their homes 5 years or more, and as might be expected, residents 65 and older were most likely to say they are ***very*** or ***somewhat*** willing.

Respondents in the East and West areas, renters, and all of the African Americans and 30-39 year olds said they would be ***very*** willing to ***remind family, friends and colleagues that litter travels and it should stop*** more often than residents of the other areas, homeowners and other ethnicities.

No African Americans said they would ***not*** be ***very or somewhat*** willing to ***participate in community events to help clean up trash/cigarettes properly*** which is consistent with the

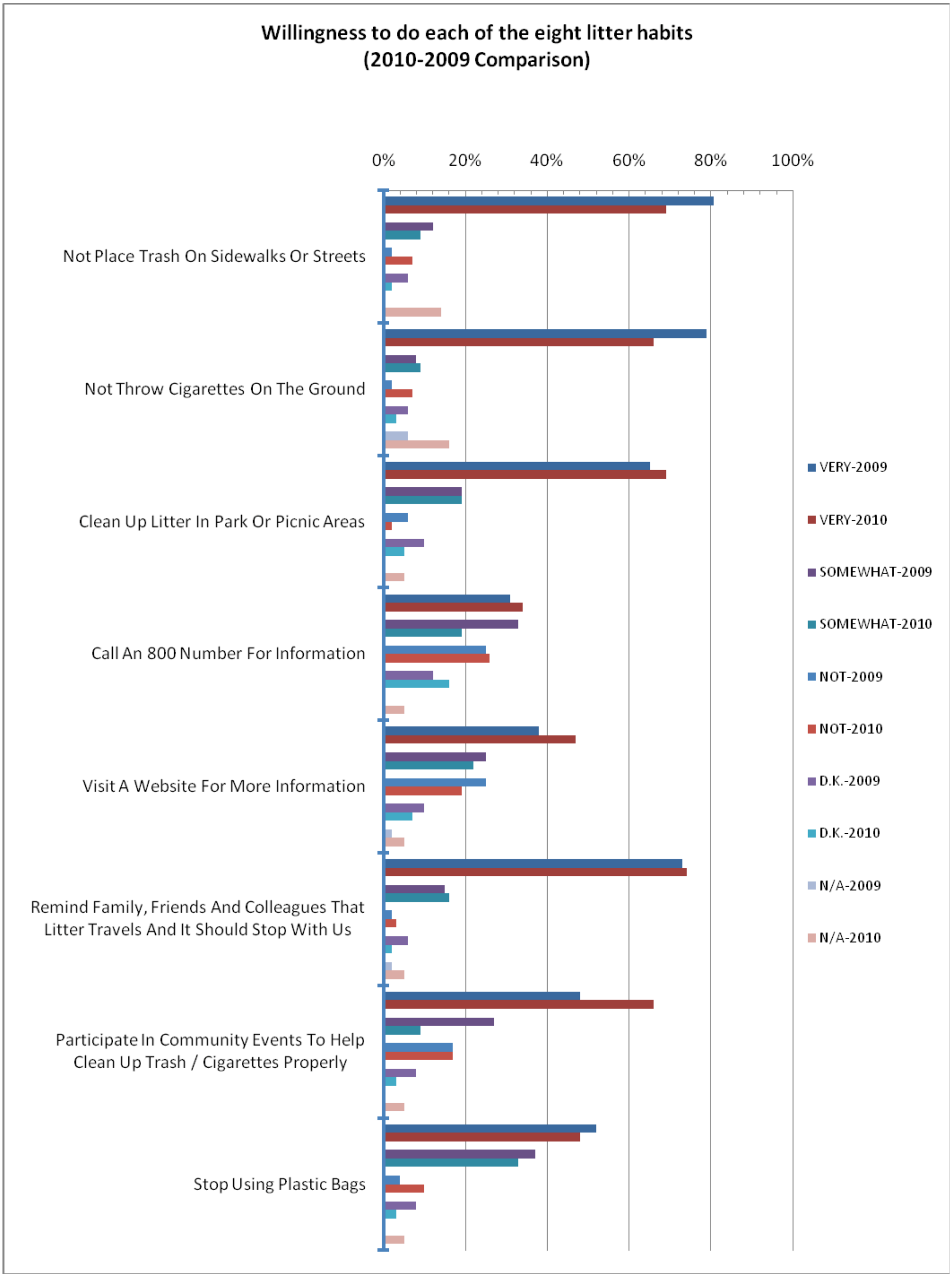
2009 study. 30-39 year olds and respondents in the East and West said ***very*** willing more often, and those in the non-incorporated areas, 50-59 year olds, Caucasians and females said ***not*** willing more often.

100% of respondents in the East, renters and those between the ages of 30-39 said they would be ***very*** or ***somewhat*** willing to ***stop using plastic bags***. Caucasians, 40-49 year olds, males and residents who refused to state their income said ***not*** willing more often than others.

Willingness to do each of the eight litter habits (numbers correspond to the habits listed above and are in percentages):

Black=2009 N=52 Red=2010 N=58	Not Place Trash On Sidewalks Or Streets	Not Throw Cigarettes On The Ground	Clean Up Litter In Park Or Picnic Areas	Call An 800 Number For Information	Visit A Website For More Information	Remind Family, Friends And Colleagues That Litter Travels And It Should Stop With Us	Participate In Community Events To Help Clean Up Trash / Cigarettes Properly	Stop Using Plastic Bags
VERY	80.77 68.97	78.85 65.52	65.37 68.97	30.77 34.48	38.46 46.55	73.08 74.14	48.08 65.52	51.92 48.28
SOMEWHAT	11.54 8.62	7.69 8.62	19.23 18.97	32.69 18.97	25.00 22.41	15.38 15.52	26.92 8.62	36.54 32.76
NOT	1.92 6.90	1.92 6.90	5.77 1.72	25.00 25.86	25.00 18.97	1.92 3.45	17.31 17.24	3.85 10.34
D.K.	5.77 1.72	5.77 3.45	9.62 5.17	11.54 15.52	9.62 6.90	5.77 1.72	7.69 3.45	7.69 3.45
N/A	0.00 13.79	5.77 15.51	0.00 5.17	0.00 5.17	1.92 5.17	1.92 5.17	0.00 5.17	0.00 5.17

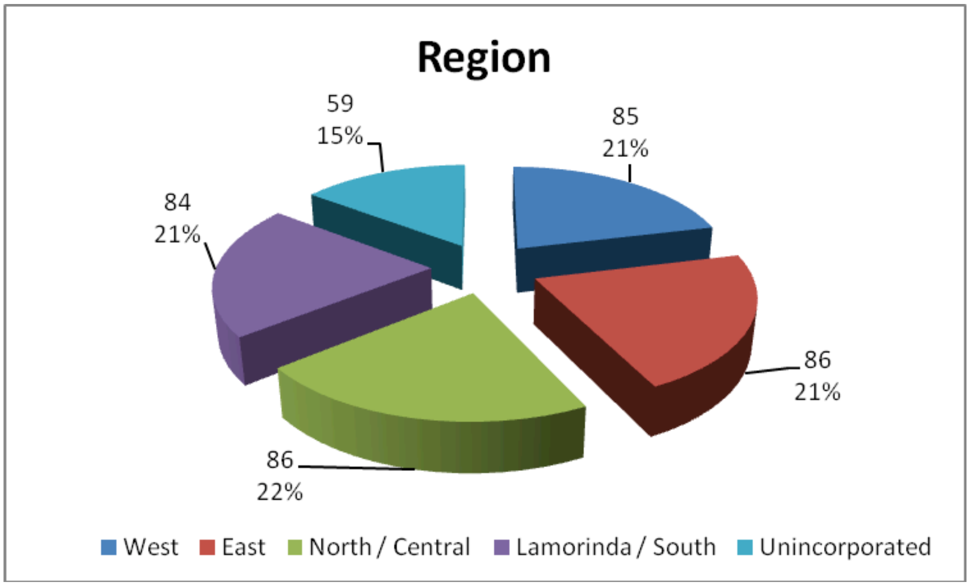
Numbers that are highlighted show a significant difference between 2009 and 2010.

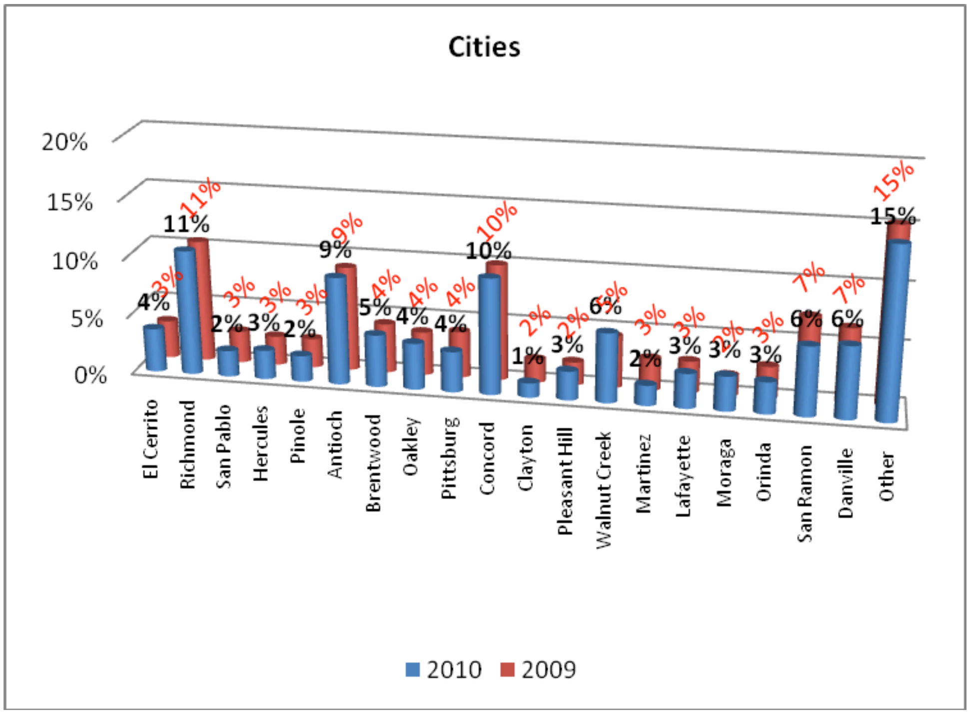


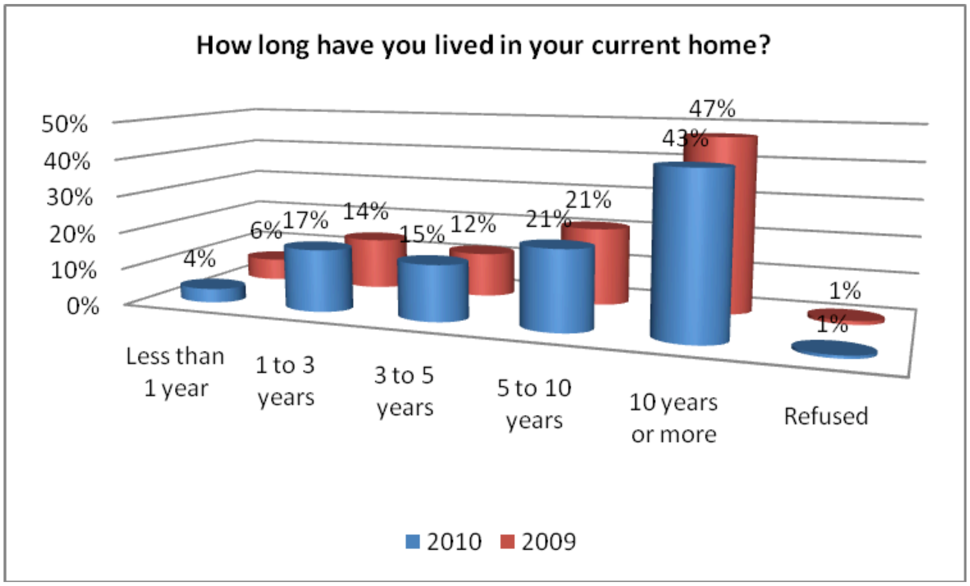
Willingness to do each of the eight litter habits
(2010-2009 Comparison)
0%
20%
40%
60%
80%
100%
Not Place Trash On Sidewalks Or Streets
Not Throw Cigarettes On The Ground
Clean Up Litter In Park Or Picnic Areas
Call An 800 Number For Information
Visit A Website For More Information
Remind Family, Friends And Colleagues That Litter Travels And It Should Stop With Us
Participate In Community Events To Help Clean Up Trash / Cigarettes Properly
Stop Using Plastic Bags
VERY-2009
VERY-2010
SOMEWHAT-2009
SOMEWHAT-2010
NOT-2009
NOT-2010
D.K.-2009
D.K.-2010
N/A-2009
N/A-2010

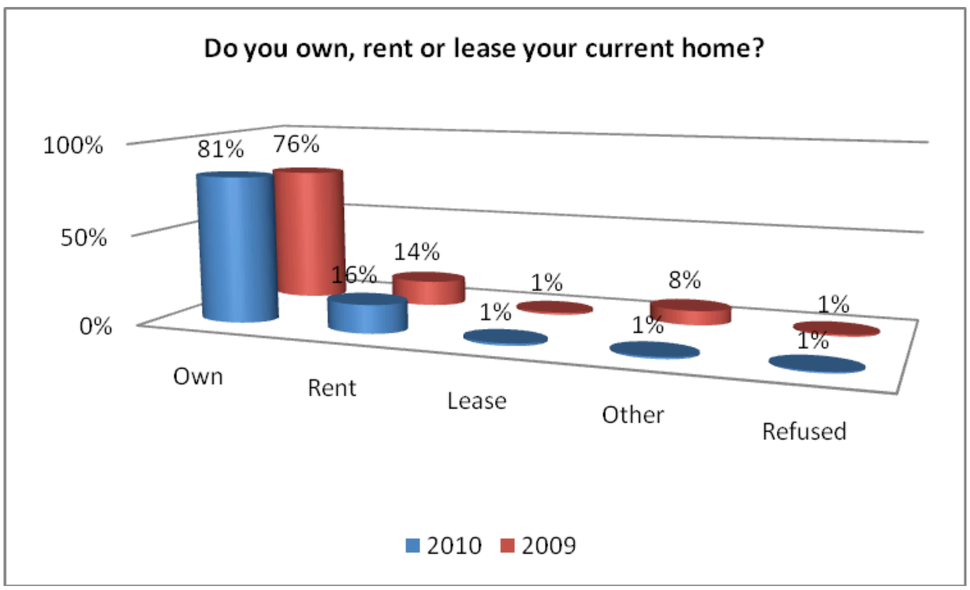
Appendix A

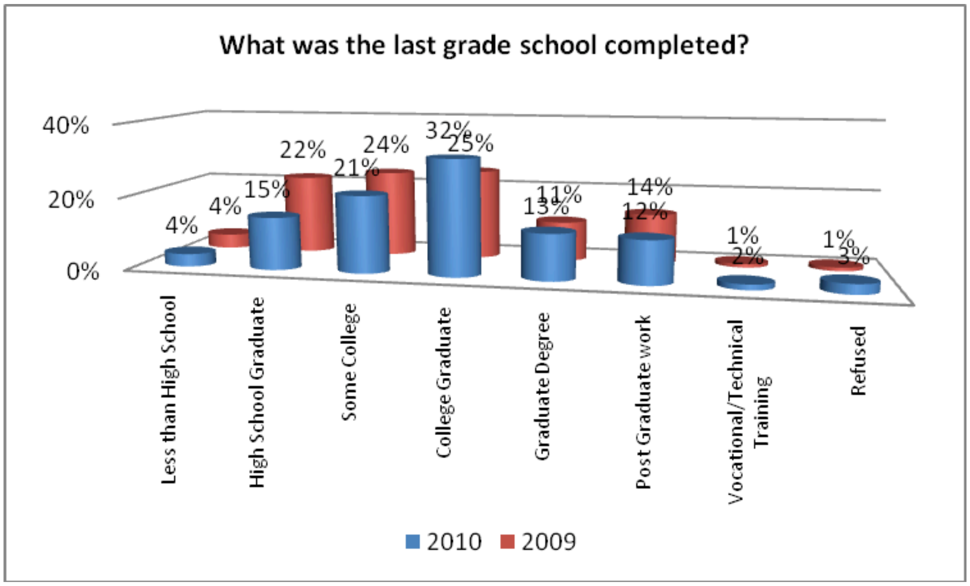
DEMOGRAPHICS

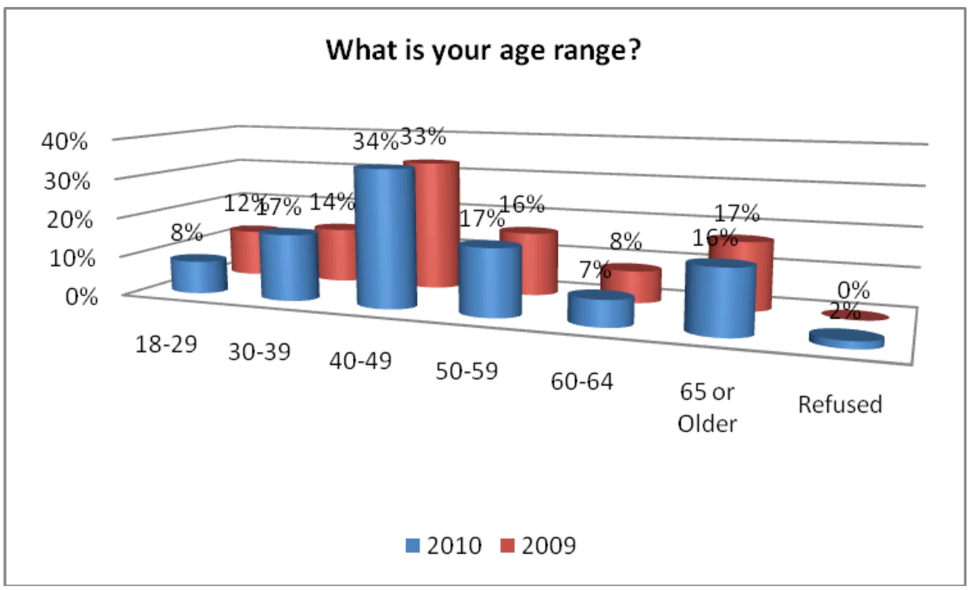


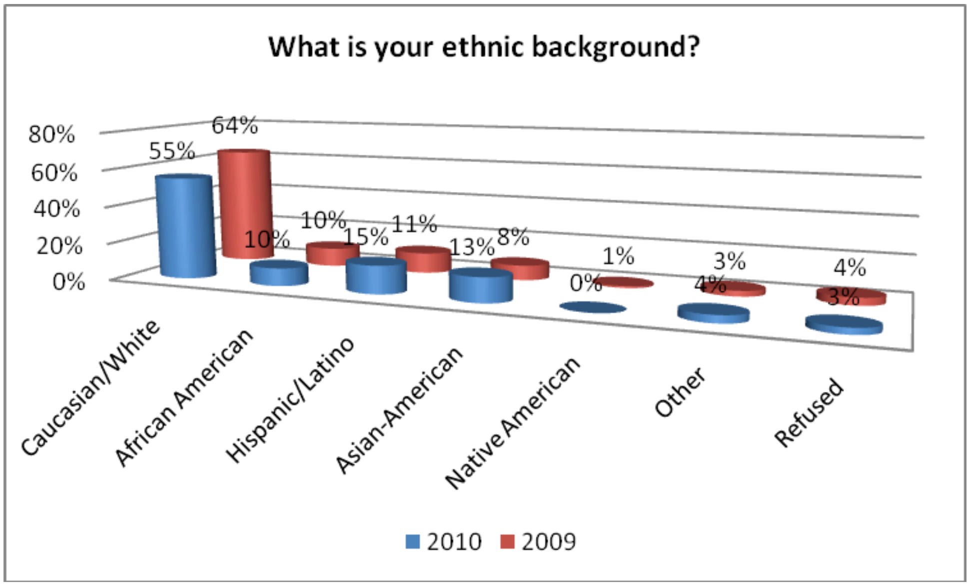



How long have you lived in your current home?
50%
40%
30%
20%
10%
0%
4%
6%
17%
14%
15%
12%
21%
21%
43%
47%
1%
1%
Less than 1 year
1 to 3 years
3 to 5 years
5 to 10 years
10 years or more
Refused
2010
2009

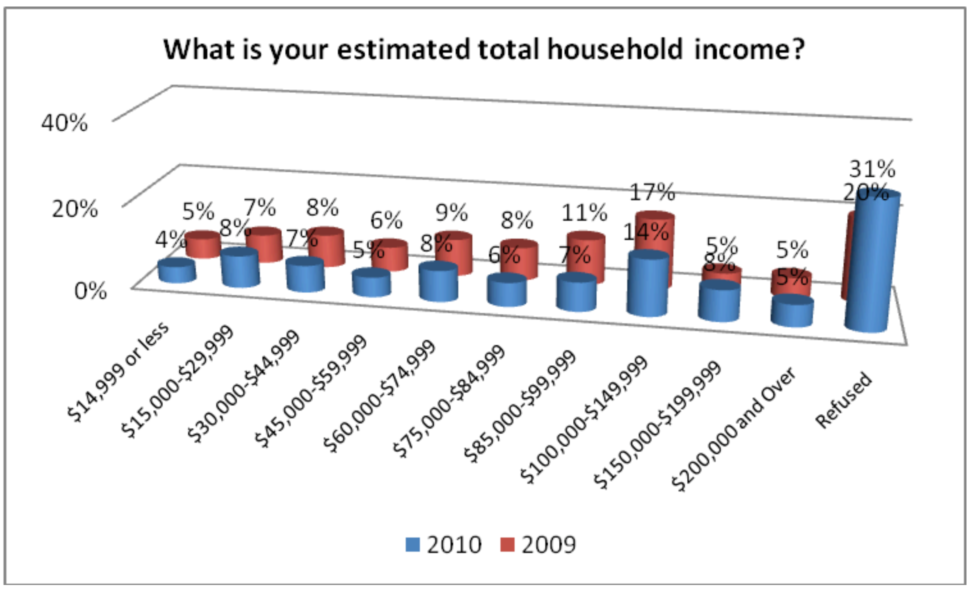

Do you own, rent or lease your current home?
100%
50%
0%
81%
76%
16%
14%
1%
1%
8%
1%
1%
1%
Own
Rent
Lease
Other
Refused
2010
2009


What was the last grade school completed?
40%
20%
0%
4%
4%
15%
22%
21%
24%
32%
25%
13%
11%
12%
14%
1%
2%
1%
3%
Less than High School
High School Graduate
Some College
College Graduate
Graduate Degree
Post Graduate work
Vocational/Technical Training
Refused
2010
2009

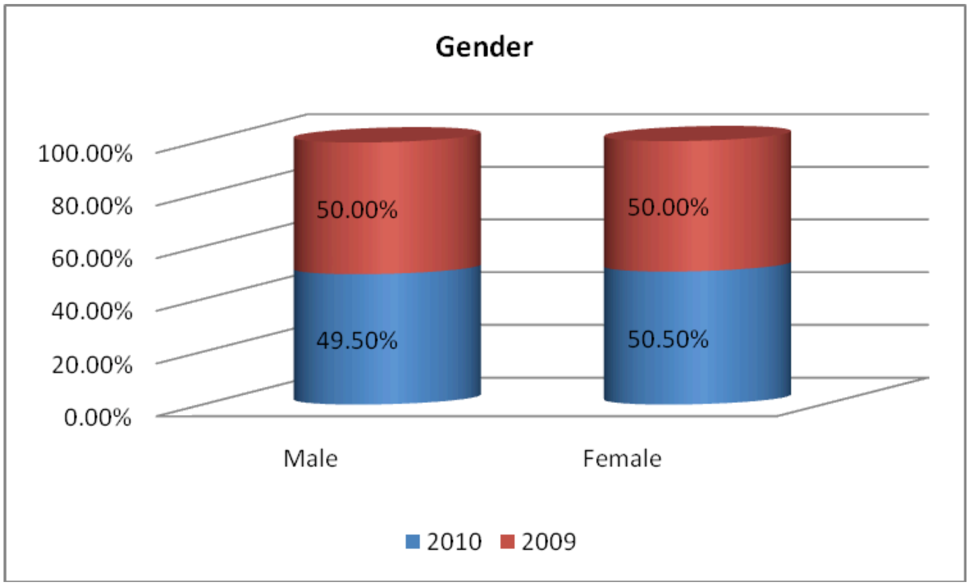

What is your age range?
40%
30%
20%
10%
0%
8%
12%
17%
14%
34%
33%
17%
16%
7%
8%
16%
17%
2%
0%
18-29
30-39
40-49
50-59
60-64
65 or Older
Refused
2010
2009



What is your ethnic background?
80%
60%
40%
20%
0%
55%
64%
10%
10%
15%
11%
13%
8%
0%
1%
4%
3%
3%
4%
Caucasian/White
African American
Hispanic/Latino
Asian-American
Native American
Other
Refused
2010
2009



What is your estimated total household income?
40%
20%
0%
4%
5%
8%
7%
7%
8%
5%
6%
8%
9%
6%
8%
7%
11%
14%
17%
3%
5%
5%
5%
31%
20%
$14,999 or less
$15,000-$29,999
$30,000-$44,999
$45,000-$59,999
$60,000-$74,999
$75,000-$84,999
$85,000-$99,999
$100,000-$149,999
$150,000-$199,999
$200,000 and Over
Refused
2010
2009


Gender
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
50.00%
49.50%
50.00%
50.50%
Male
Female
2010
2009

Appendix B
Questionnaire

INTRODUCTION:

Hello, my name is __________________ and I'm calling on behalf of Nichols Research. We're conducting a survey concerning what you've seen or heard about an important environmental issue. This is not a sales call and your answers are used in general statistics. It should only take about 6-8 minutes of your time. (IF NEEDED) **This is a study about environmental issues of importance to the residents of Contra Costa County.**

S1. Are you at least 18 years of age?

YES	1 (CONTINUE)
NO	2 (ASK TO SPEAK TO H/H >18 YRS)
REFUSED	3 (TERMINATE)

S2. Are you a resident of Contra Costa County?

YES	1 (CONTINUE)
NO	2 (TERMINATE)
REFUSED	3 (TERMINATE)

S3. What city do you live in or near?

		Number	Percentage
WEST			
	EL CERRITO	15	3.75%
	RICHMOND	43	10.75%
	SAN PABLO	9	2.25%
	HERCULES	10	2.50%
	PINOLE	9	2.25%
EAST			
	ANTIOCH	37	9.25%
	BRENTWOOD	18	4.50%
	OAKLEY	16	4.00%
	PITTSBURG	14	3.50%
CENTRAL			
	CONCORD	40	10.00%
	CLAYTON	5	1.25%
	PLEASANT HILL	10	2.50%
	WALNUT CREEK	24	6.00%
	MARTINEZ	7	1.75%
SOUTH			
	LAFAYETTE	12	3.00%
	MORAGA	12	3.00%
	ORINDA	11	2.75%
	SAN RAMON	24	6.00%
	DANVILLE	25	6.25%
Other		59	14.75%

QUESTIONNAIRE:

Q1 . Do you think litter impacts/pollutes local water bodies?

	Number	Percentage
YES	306	76.50%
NO	29	7.25%
MAYBE	31	7.75%
DON'T KNOW	34	8.50%

Q2 . How high would you rate your concern about litter polluting water?

	Number	Percentage
VERY	165	41.25%
SOMEWHAT	156	39.00%
LITTLE	58	14.50%
NO AT ALL	21	5.25%

Q3. In the past year, have you heard or seen any reports, advertising, or other information about how litter travels and builds up and what's being done to protect the County's water bodies from litter?

	Number	Percentage
YES (CONTINUE)	123	30.75%
NO (SKIP TO Q6)	262	65.50%
DON'T KNOW (SKIP TO Q6)	15	3.75%

Q4. [IF YES TO Q3] And where did you hear or see this information? Please list all that apply. (TRACK ALL RESPONSES)

	Number	Percentage
TELEVISION	50	40.65%
RADIO	5	4.07%
NEWSPAPER	38	30.89%
MAGAZINES	3	2.44%
GOVERNMENT AGENCIES	5	4.07%
BART POSTERS	2	1.63%
BUS SIGNS	3	2.44%
BILLBOARDS	11	8.94%
STENCILED STORM DRAINS	12	9.76%
EDUCATIONAL PROGRAMS	2	1.63%
ENVIRONMENTAL ORGANIZATIONS	1	0.81%
FRIENDS/RELATIVES/NEIGHBORS	4	3.25%
CHILDREN	2	1.63%
INTERNET OR WEB	3	2.44%
CLEAN WATER PROGRAM	0	0.00%
OTHER (Specify)	22	17.89%
REFUSED	0	0.00%

Q5. [IF YES TO Q3] What did this information mean or say to you?

Q6. Have you ever heard of the Contra Costa Clean Water Program?

	Number	Percentage
YES (CONTINUE)	123	30.75%
NO (SKIP TO Q12)	249	62.25%
DON'T KNOW (SKIP TO Q12)	28	7.00%

Q7. [IF YES TO Q6] Have you ever visited the Contra Costa Clean Water Program website?

	Number	Percentage
YES	4	3.25%
NO	118	95.93%
DON'T KNOW	1	0.81%

Q8. [IF YES TO Q7] What motivated you to visit the site?

	Number	Percentage
AN AD	0	0.00%
WEB SEARCH	0	0.00%
CHILDREN	0	0.00%
COMMUNITY GROUP	0	0.00%
CURIOUSITY	1	25.00%
CLEAN WATER PROGRAM	1	25.00%
OTHER (Specify)	2	50.00%
REFUSED	0	0.00%

Q9. [IF YES TO Q7] What information were you looking for?

Q10. [IF YES TO Q7] Were you able to find the information you needed?

	Number	Percentage
YES	2	50.00%
NO	1	25.00%
MAYBE	0	0%
DON'T KNOW	1	25.00%

Q11. [IF YES TO Q10] What do you recall that information to be?

____

____

Q12. Have you ever heard or seen advertisements about the Contra Costa Clean Water Program that mentioned the slogan "Litter travels but it can stop with you"?

	Number	Percentage
YES	55	13.75%
NO	313	78.25%
MAYBE	23	5.75%
DON'T KNOW	9	2.25%

Q13. Have you ever heard or seen advertisements about the Contra Costa Clean Water Program that included a message like "Fancy…litter?"

	Number	Percentage
YES	8	2.00%
NO	374	93.50%
MAYBE	10	2.50%
DON'T KNOW	8	2.00%

Q14. [IF YES TO Q12 or Q13] What did the ads say to you? What was the message the commercial was trying to get across. (VERBATIM)

____

____

Q15. [IF YES TO Q12 or Q13] Did the ads or messages make you rethink your litter habits or the litter habits of those around you? Please tell me whether you would be very willing, somewhat willing or not willing to do the following:

		Very	Somewhat	Not	Don't Know	N/A
NOT PLACE TRASH ON SIDEWALKS OR STREETS		40	5	4	1	8
	Percent	68.97%	8.62%	6.90%	1.72%	13.79%
NOT THROW CIGARETTES ON THE GROUND		38	5	4	2	9
	Percent	65.52%	8.62%	6.90%	3.45%	15.52%
CLEAN UP LITTER IN PARK OR PICNIC AREAS		40	11	1	3	3
	Percent	68.97%	18.97%	1.72%	5.17%	5.17%
CALL AN "800" NUMBER FOR INFORMATION		20	11	15	9	3
	Percent	34.48%	18.97%	25.86%	15.52%	5.17%
VISIT A WEBSITE FOR MORE INFORMATION		27	13	11	4	3
	Percent	46.55%	22.41%	18.97%	6.90%	5.17%
REMIND FAMILY, FRIENDS AND COLLEAGUES THAT LITTER TRAVELS & IT SHOULD STOP WITH US		43	9	2	1	3
	Percent	74.14%	15.52%	3.45%	1.72%	5.17%
PARTICIPATE IN COMMUNITY EVENTS TO HELP CLEANUP TRASH/CIGARETTES PROPERLY		38	5	10	2	3
	Percent	65.52%	8.62%	17.24%	3.45%	5.17%
STOP USING PLASTIC BAGS		28	19	6	2	3
	Percent	48.28%	32.76%	10.34%	3.45%	5.17%

Q16. How do you feel litter issues should be handled?

DEMOGRAPHICS:

Now in order to classify your responses along with others, I need to ask a few questions about you.

D1. What is your zip code? __________

Zip	Number	Percentage
92530	1	0.25%
94164	1	0.25%
94505	10	2.50%
94506	11	2.75%
94507	9	2.25%
94509	26	6.50%
94513	18	4.50%
94517	5	1.25%
94518	8	2.00%
94519	4	1.00%
94520	15	3.75%
94521	13	3.25%
94523	9	2.25%
94525	3	0.75%
94526	14	3.50%
94528	2	0.50%
94530	14	3.50%
94531	13	3.25%
94547	10	2.50%
94549	13	3.25%
94553	8	2.00%
94556	13	3.25%
94561	17	4.25%
94563	10	2.50%
94564	6	1.50%
94565	29	7.25%

94572	3	0.75%
94582	10	2.50%
94583	13	3.25%
94586	1	0.25%
94587	1	0.25%
94595	7	1.75%
94596	4	1.00%
94597	4	1.00%
94598	9	2.25%
94605	1	0.25%
94801	10	2.50%
94803	12	3.00%
94804	18	4.50%
94805	10	2.50%
94806	12	3.00%
94807	2	0.50%
94808	1	0.25%

D2. Do you own, rent or lease your current home?

	Number	Percentage
OWN	325	81.25%
RENT	63	15.75%
LEASE	5	1.25%
OTHER	4	1.00%
REFUSED	3	0.75%

D3. How long have you lived in your current home?

	Number	Percentage
LESS THAN 1 YEAR	15	3.75%
1 TO 3 YEARS	67	16.75%
3 TO 5 YEARS	60	15.00%
5 TO 10 YEARS	85	21.25%
10 YEARS OR MORE	170	42.50%
REFUSED	3	0.75%

D4. What was the last grade school completed?

	Number	Percentage
LESS THAN HIGH SCHOOL	14	3.50%
HIGH SCHOOL GRADUATE	58	14.50%
SOME COLLEGE	85	21.25%
COLLEGE GRADUATE	127	31.75%
GRADUATE DEGREE	51	12.75%
POST GRADUATE WORK	48	12.00%
VOCATIONAL/TECHNICAL TRAINING	6	1.50%
REFUSED	11	2.75%

D5. What is your age range?

	Number	Percentage
AGE 18 TO 29	33	8.25%
AGE 30 TO 39	67	16.75%
AGE 40 TO 49	137	34.25%
AGE 50 TO 59	67	16.75%
AGE 60 TO 64	26	6.50%
AGE 65 OR OLDER	63	15.75%
REFUSED	7	1.75%

D6. What is your ethnic background?

	Number	Percentage
CAUCASIAN/WHITE	220	55.00%
AFRICAN-AMERICAN	38	9.50%
HISPANIC/LATINO	60	15.00%
ASIAN-AMERICAN	53	13.25%
NATIVE AMERICAN	0	0.00%
OTHER (Specify)	16	4.00%
REFUSED	13	3.25%

D7. What is your estimate total household income?

	Number	Percentage
$14,999 OR LESS	16	4.00%
$15,000 TO $29,999	31	7.75%
$30,000 TO $44,999	26	6.50%
$45,000 TO $59,999	19	4.75%
$60,000 TO $74,999	30	7.50%
$75,000 TO $84,999	23	5.75%
$85,000 TO $99,999	28	7.00%
$100,000 TO $149,999	54	13.50%
$150,000 TO $199,999	30	7.50%
$200,000 AND OVER	21	5.25%
REFUSED	122	30.50%

That's all the questions I have. Thank you for your time, we appreciate your participation in this important research study.

INTERVIEWER: AFTER INTERVIEW COMPLETION, PLEASE FILL OUT THE FOLLOWING.

RECORD GENDER:

	Number	Percentage
MALE	198	49.50%
FEMALE	202	50.50%

RECORD LANGUAGE OF INTERVIEW:

	Number	Percentage
ENGLISH	398	99.50%
SPANISH	2	0.50%

DATE OF INTERVIEW: ____________________

Appendix C
VERBATIMS

S3: Other

Alamo
Crocket
Pacheco
Rodeo
Knightensen
Discovery
Bay
El Sobrante
Discovery
Bay
Bay Point
Rodeo
Discovery
Bay
Discovery
Bay
Alamo
Bay Point
Bay Point
El Sobrante
El Sobrante
Rodeo
Discovery
Bay
Bay Point
El Sobrante
El Sobrante
Crocket
Crocket
El Sobrante
Discovery
Bay
Discovery
Bay
Discovery
Bay
El Sobrante
El Sobrante
El Sobrante
El Sobrante
Discovery
Bay
Bay Point

Bay Point
Bay Point
Alamo
El Sobrante
El Sobrante
El Sobrante
Lafayette
Lafayette
Alamo
Discovery Bay
Discovery Bay
Alamo
Alamo
Alamo
Crocket
Bay Point
Bay Point
Bay Point
Bay Point
Bay Point
Bay Point
Alamo
Alamo
Alamo
Bay Point

Q4. Other

Water bill insert
Newsletter from water department
Water bill inserts, pamphlets
Science fair at son's school
Banners, flyers
Flyers'
Pamphlets
Water Bill Insert
Shoreline Recreation Area
At work
Girl scout activities
Water bill
Brochure
Girl scouts event
Water bill insert
Pest Control Business
Sign at a car wash
Moraga Pamphlet
Co-workers
Mailings
East Bay MUD Flyers
Water bill insert

Q5. What did this information mean or say to you?

Stop people from littering. No dumping in empty lots or pouring down storm drains.

We should cooperate and slow down pollution

Not to pollute by throwing garbage out or pouring chemicals in the storm drains

Recycle. Be careful about what you put in the trash.

To warn people how illegal dumping can harm humans and animals

Don't waste water

It's sad to me

Don't litter

What is put into our storm drains goes through waterways and into the bay without treatment

Litter was building up in drains, clean up was expensive, situation getting worse.

Be careful about what goes down storm drains

Don't remember

Don't litter

How somebody's garbage goes into the ocean and it's more damage than you think

That we have to be real careful where we dump our stuff

It just talked about the importance of not littering

To pick up trash. Try to help the hatcheries and fish

Be careful with our litter

Nothing much. Good message for other people

To help not pollute and don't waste water

A cartoon fish. "Don't litter in the ocean because I live there."

Think twice about throwing out litter from the car on the street

Don't put trash in water system. Put it in the proper place

We need to learn how to get rid of our waste/junk/trash

Don't litter because water is precious

Reinforced what I already know

We need to do something to save our water supply

All the chemicals we use go into local waterways

Storm drains leads to water waste

Be careful about what you do with your garbage/litter

It is social responsibility to prevent littering

It meant that litter should be cut down

Need to be more careful about pollution caused by littering/dumping

We need to stop littering

Reinforced my thinking/concerns about plastic/Styrofoam litter being thrown in local creeks, etc.

Don't be a litter bug

Water supply is subject to pollution by litter. It's very important to dispose of litter properly

I never litter

How car chemicals run into storm drains and into the bay

Litter is going into water supplier

Don't throw things out of the car or down the storm drains

Not much

Nothing

Don't know

To raise a concern to the community not to pollute

Means we have to take care of mother earth

That everyday's moving around stuff gets litter into the water and where it's not supposed to be

Someone is trying to help the problem

People need to change their attitude more

Don't Corrupt/pollute our water

Nothing specific. Just that they were worried about water pollution in the area

To be careful to not litter

Someone is trying to clean up the water

It says not to litter. It's a danger to our species

Keep the world clean

Made me more aware of how bad the situation is and that everyone needs to do right

More litter we have, the quicker the Earth is going to end

If we continue to pollute water then the water we use will be like garbage

Don't trash California

Someone is working on it

Be more careful about litter

It's everybody's business to take care of your garbage and not to litter

Someone is trying to do something about this problem

Highlights how people's litter impacts water quality and ends up in the bay

It gives info on how to clean up water pollutants

Talked about properly disposing medication and the harm it could do if not followed

I was disgusted that people aren't concerned, dump garbage anywhere

In the course of my work we learn extensively about issues/problems involving litter impacting the water supply

That litter is a threat to the water system

Storm drains lead directly to the bay/delta and any litter in drains goes there

Everything is deteriorating

Made me go out and get water filter

We should put more effort in cleaning up the water bodies

How pollution filters through the water system into creeks, etc.

Litter travels with you

Litter makes its way through water ways and ends up in the bay and oceans

Do not drop anything in the drain storms

Grease clogs drain and should be made aware

We should all be concerned about polluting water

Inform the public that litter can affect the water table

The build up of litter and pollutants endangers the water supply in county

Do not remember

Do not remember

It raises awareness and what you should and should not do to the water system

The water has a problem. The water is no good. You should use a water filter in your house

These programs made me mad. Will increase weed and pest control costs

Can not remember

Trash gets into water

That litter gets in our water not only by use putting it in the water

Do not remember

At my children's school, they talked about that everything flows/drains into the ocean

To keep the water clean

It was posted on a construction site I working at and said that we have to install a filter to filter water before it went into the storm drain system

My son was at an environmental program at Point Benita, and so they talked about it there, that all trash ends up in the ocean. My daughter has done environmental clean-up with the girls scouts and at the storm drains it said "Do not dump right into the Bay."

It was quite a problem because it impacts people , your whole environment. The board of supervisors in the county should make it ordinances saying "you can't litter."

That it is good for society to recognize that storm drains go straight into the ocean

Don't remember

It was about preventing pouring things into the sewer, but I had no idea it was for the Contra Costa County

That stuff can get into the water table from leaching

People need to clean up after themselves otherwise they are drinking polluted water

That litter can be bad for the water and even animals in the water. In our gathering, we talked about that subject of course. Especially with children to learn to take care of air and water, and recycling, using trash in a useful way when throwing food away.

That we have a serious issue enough to take another look into my old ways practicing in respect to recycling, pollution

How we can keep our water clean and how we can help

We talked at work. If it drains, it goes down the ocean

It meant that litter in water bodies is a problem that needs to be addressed before it gets worse

That littering destroys the beaches and when you dump anything into the gutters it goes directly into the ocean and affects our eco-system.

Says clean water program is protecting the water shed

That this is an issue that can't be ignored

This problem needs to be dealt with

Don't remember

That our county is trying to keep water as clean as they can and they need help to do that

Do not put dog feces into the storm drain. There was a picture of a fish right on the sidewalk

Do not litter

That we should stop littering. Pollution comes from run-offs

Too much litter
Washing chemicals down drains and throwing animal waste in plastic bags and down storm drains is an issue

We aren't doing enough to prevent pollution
Be careful what goes into our water system & sewage system. For example, flushing prescriptions & nail polish are bad

A reminder not to litter

Don't recall

Do not put litter down the drain

Litter is getting worst

Too many people litter and it gets into our water

Q8. Other

Work related
Co-worker

Q10. What do you recall that information to be?

Include PPM of different pollutants. This is not an alarmist website, but could be alarmist website if information is in tech terms that tend to alarm residents. Website should include comparative toxicity figures in layman's terms, for example, as toxic as a baby aspirin.

I don't remember

Q13. What did the ads say to you? What was the message the commercial was trying to get across?

At an individual level, we can help stop litter/pollution

Be aware of what's going on

Not to litter

That even though I am littering in the streets, it's going to end up in the oceans so watch out

People have the power to stop water pollution

We need to be concerned about litter and the effect it has on us\

Litter gets into storm drains and into the water bodies

If you see something on the ground, pick it up

Be careful how you dispose of litter

Put the litter in the waste can

Keep garbage/chemicals out of storm drains since they drain into local waters and the bay

It's our responsibility

You must not litter

Do not litter

Do not litter

Not to litter and throw your stuff away

We have the power to stop littering

Just to be careful with your everyday stuff. Stop and think what you're doing - don't litter

All of us should try to participate in picking up garbage and give donations to help keep streets clean

We need to not litter because it goes into our water

Everyone should take the responsibility to clean up their own litter. Dispose of it properly

We need to start picking up our litter to save the environment

Self responsibility

Made me aware that this problem is up to us to stop

Don't trash

That the only way to stop this problem is for us to stop throwing garbage around

Take responsibility for preventing litter from entering storm drains

Be real careful what you do with your litter

When you dispose of garbage where it should be put. Helps stop water/environment pollution.

I am more conscious about litter

People can stop litter from entering our water system

If you do your part, every little bit helps to stop pollution problems

Litter goes wherever we go

Litter travels the waterways and that can stop if we don't litter

Do not litter. Pick up any that you see

Stop littering

It made him more concerned about the issue and knows only we can stop this

Be more aware of taking care of putting garbage in the correct containers and picking it up

Stop throwing out your car or in your drains. You're polluting water

Bus message had a dog with a lot of dirt around him

On a bus, I saw a sign of dog licking an item with slogan "fancy litter"

Litter is a big issue that's effecting our water
I was tied to an effort to recycle I thought, but apparently it wasn't. We let people think run-off water goes through a treatment plant or something.

I don't remember
It reminded me of being a girl scout. I am an adult girl scout, so I learned to take care of trash, and that's what I am teaching my children

That litter gets into the water system

Don't litter

If each person stops littering then it will stop pollution. It only takes one person

We the people are also responsible for stopping water pollution and not just organizations

That we can all do something to stop water pollution

People need to realize they have the power to fix or add to the problem

Not to litter because one little paper can go/travel down to the ocean

I don't remember

Litter moves down stream

Don't litter

Control your litter

Everybody should stop littering

Do not litter. Recycle

D6. Other

Did not specify

Fiji

East Indian

Filipino

African/Asian American
Caucasian/Asian
American

East Indian

East Indian

East Indian

Sri Lankan

East Indian

East Indian

Middle Eastern

Afghani

Arabic

Brazilian

BAY AREA STORMWATER MANAGEMENT AGENCIES ASSOCIATON

Media Relations Program

March – June 2010

Final Report Submitted by

O'Rorke Inc.

Overview

O'Rorke Inc. was hired by the Bay Area Stormwater Management Agencies' Association to conduct three media pitches to satisfy media relations work as outlined in the MRP.

O'Rorke participated in meetings with the PIP committee to determine the pitch topics and then developed strategies for each working closely with project manager, Sharon Gosselin.

The three pitch topics were:

- pesticides
- car washing
- litter, relating specifically to plastic bags

Coverage

In all, the three pitches resulted in thirty-eight media placements: six in print; eleven on the radio; and twenty-one online (this included radio station and newspaper websites).

What follows is a brief synopsis of each pitch strategy and the coverage results. Attached are individual media reports for each pitch.

Pesticides

Working with the media relations campaign project manager, O'Rorke strategized a pitch on pyrethroid pesticides. Using materials developed for Our Water Our World, O'Rorke wrote a release about pyrethroids emerging as a new force in the market and detailed information about how one chemical will be banned only to have a new one take its place.

The pitch resulted in six placements. The Alameda Sun ran the story with the headline, "Exercise Caution When Choosing Pesticides." Another coverage highlight included Geoff Brosseau's interview on KMKY (Radio Disney), a station that has good reach among women because mothers listen to the station with their children.

Car Washing
To promote using professional car washes or simply washing on grass or gravel instead of paved surfaces, O'Rorke fcused on a public-affairs driven pitch with prepared PSA copy as the cornerstone.

This was very effective. PSAs aired on five stations, including the high profile KCBS and KOIT. Additionally, translating the PSAs allowed O'Rorke to secure placement with KIQI, a Spanish language station. Numerous stations included the PSA copy on their websites and Sharon Gosselin was interviewed on the subject by KEAR.

Overall, this pitch resulted in fourteen placements.

Litter/Plastic Bags
Because litter is such a major issues facing stormwater programs, this was an important topic to cover. Again working with the project manager and PIP committee, O'Rorke developed a press release focusing on plastic bags as a major source of littler and promoting reusable bags as a better choice. The release also featured several tips to help peopled remember to use their reusables.

For this pitch, O'Rorke used a two-pronged strategy. The first part consisted of doing "DJ drops" at five key radio stations. A DJ drop is when a press release ad leave behind is brought to a station's morning show along with some food and refreshments for the morning show crew. In this case, we brought food, the press release and a few reusable chico-style bags to each station. The results were fantastic: two of the five stations covered the story that day. A third included some mention on air and requested copy to use online.

Coverage highlights included a two-minute discussion of plastic bags by Sarah & Vinnie of the immensely popular Radio Alice (KLLC) and a "Fog Files" segment on KFOG.

The second piece of the pitch consisted of sending the release out to other stations not covered by the drops and also to print. For print, O'Rorke also include a courtesy photo of a plastic bag on a storm drain. The second round of pitching resulted in several print and online placements. At this writing, two additional placements are still pending with Asian Week and Diablo magazine.

Overall, at this time, the litter pitch resulted in eighteen placements.

Media Coverage: Pesticides

Print

- Alameda Sun. “Exercise Caution When Choosing Pesticides.” 4/29/2010.
- Danville Weekly. “Danville asks residents to think twice before buying pest control products.” 5/18/2010.

Online

- Alameda Sun. “Exercise Caution When Choosing Pesticides.” 4/29/2010.
- Danville Weekly. “Danville asks residents to think twice before buying pest control products.” 5/18/2010.

Radio

- KEAR-AM. Interview w/ Geoff Brosseau completed Monday 5/10 at 8:15 a.m. The two five-minute segments aired Monday 5/10 at 11:04 a.m. and 4:04 p.m., and Tuesday 5/11 at 11:04 a.m. and 4:04 p.m.
- KMKY-AM (Radio Disney). Interview w/ Geoff Brosseau completed Wednesday 5/19 at 11 a.m. Scheduled to air first weekend in June.

Media Coverage –Car Washing

Online--PSAs

- KISS-FM (98.1)
- KMEL-FM (106.1)
- WILD 94.9
- KKSF-FM (103.7)
- STAR 101.3
- GREEN 960
- 910 KNEW
- KCBS-AM 740 – Online beginning 7/10, one (1) week prior to radio air date

Radio—PSAs and interview

- KMKY-AM (1310)
- KIQI-AM (1010)
- KCBS-AM (740) – 7/20-7/21; one (1) or two (2) times, Mon-Fri.
- KSQQ-FM 96.1 – Currently on air; 7/1 through next week
- KOIT-FM 96.5 – Running since 6/25; will continue to air for one (1) additional week from today 7/2
- KEAR-AM – Interview w/ Sharon Gosselin completed Thursday 7/15 at 10:00 a.m. The three five-minute segments will air Monday 7/19, Tuesday 7/20 and Wednesday 7/21

Media Coverage: Litter/Plastic Bags

Online

- KISS-FM (98.1)
- KMEL-FM (106.1)
- WILD 94.9
- KKSF-FM (103.7)
- STAR 101.3
- GREEN 960
- 910 KNEW
- PleasantonWeekly.com. "Grab Bag." Week of 7/12/10.
- TriValleyViews.com. "Grab Bag." Week of 7/12/10.
- San Ramon Express.com. "Grab Bag." Week of 7/12/10.
- DanvilleExpress.com. "Grab Bag." Week of 7/12/10.

Radio

- KLLC-FM (ALICE 97.3) – DJ Drop; on-air mention
- KFOG-FM (105.3) – DJ Drop; on-air mention
- KMEL-FM (106.1)

Print

- Lamorinda Weekly
- Orinda News (September)
- Rossmoor News
- Tri-City Voice

Pending

- AsianWeek
- Diablo Magazine

DRAFT

FOR IMMEDIATE RELEASE CONTACT: Geoff Brosseau
(650) 365-8620

PRESS RELEASE

SPRING INTO ACTION
Bay Area Stormwater Agencies Ask Consumers to Exercise Caution When Choosing Pesticides

April 20, 2010—Spring has sprung. With Spring comes new life and new opportunities to make better decisions for your yard and garden and for the environment.

With all the new growth, pests are not far behind. As gardeners figure out how to keep pests from bugging them too much, the Bay Area Stormwater Management Agencies Association (BASMAA) is asking consumers to make careful choices when purchasing pest control products.

After the highly publicized voluntary recalls of diazinon and chlorpyrifos (Dursban) as home and garden pesticides, consumers could easily think that most products on store shelves are safer. But this is not the case. In the wake of the recalls a new class of pesticides has come into prominence: pyrethroids.

"We have a situation where some highly toxic chemicals were taken off the market only to be replaced by newer—and just as toxic—chemicals," says James Scanlin, chair of BASMAA. "It's a vicious cycle that can leave consumers very confused and has a negative impact on the environment."

Pyrethroids are a class of pesticide designed to kill a wide variety of pests, such as lawn grubs and ants. But pyrethroids are also highly toxic to beneficial insects like ladybugs, earthworms, and lacewings, which help to keep problem pests in-check. Once beneficial bugs are eliminated, pests are free to multiply without the natural checks and balances that beneficial insects provide. According to a 2010 report prepared for the San Francisco Estuary Project, pyrethroid pesticides "remain the highest priority….because they have been linked to widespread toxicity in California surface waters."

"Pyrethroids came into wider use after bans on chlorpyrifos and diazinon took effect," explains Mr. Scanlin "They are found in easily over 900 products." Yard and garden pesticides are a particular problem when it comes to stormwater pollution. Once they wash off from rain and watering, pesticides flow into storm drains, polluting local creeks and the Bay, harming fish and other aquatic life.

BASMAA, a consortium of stormwater programs in the San Francisco Bay region, wants to help residents make less-toxic choices while maintaining beautiful yards and gardens.

BASMAA offers these tips when dealing with garden pests:

- Try less-toxic methods before making a purchase. Go to OurWaterOurWorld.org for tips and information. Sometimes biological controls (like bringing beneficial bugs into your yard and garden) can do the trick without any chemicals.

- Read labels. The word "pyrethroid" will not appear on a label, but look out for the following active ingredients: permethrin, bifenthrin, cyfluthrin, cypermethrin, deltamethrin, lambdacyhalothrin, and tralomethrin. A quick tip: active ingredient names ending in "-thrin" are usually in the pyrethroid class. The exception to this is pyrethrin which is produced naturally from the chrysanthemum flower – though can still be toxic to aquatic life. To download a free pocket guide that gives examples of products without pyrethroids, go to OurWaterOurWorld.org

- When shopping, seek out the least toxic products. Look for shelf signs with the Our Water, Our World name and logo, which call out the best choices in each category. Participating stores include Orchard Supply Hardware, Sloat Garden Centers, Ace Hardware Stores, Home Depot, and many other local nurseries and garden centers. To find a store near you, go to OurWaterOurWorld.org.

Final BASMAA Carwash PSA's Spring 2010

A: Love washing your own car? Keep doing it – but wash it on the lawn or on gravel or go to a car wash. Here's why: When you wash your own car in your driveway or street, you're also washing off pollutants like copper from brake pads and other chemicals. In many places, this runoff goes right to the storm drain untreated and from there it pollutes our waters. At the car wash, runoff water is collected and treated. Check out baywise.org for more information. (:30)

B: Be green this summer. Instead of washing your car on the driveway, wash it on a lawn or gravel. Here's why: when you wash your car in your driveway or street, copper from brake pads and other chemicals wash off, too – right into the nearest storm drain and into the Bay – untreated. For more pollution prevention tips, check out baywise.org. (:20)

C: Love washing your own car? Keep doing it – but don't do it in your paved driveway or street, where water runs off into the storm drain. Try washing your car on a grassy area or gravel instead. Why? To limit runoff. When you wash your car, you're also washing off pollutants like copper from brake pads and other chemicals. From there, they go right to the Bay. See baywise.org for more information. (:30)

D: Be green! Wash your car on a lawn or gravel. Here's why: when you wash your car in your driveway, copper from brake pads and other chemicals wash off, too – into the nearest storm drain and the Bay – untreated. For more tips, check out baywise.org. (:10)

Draft

PAPER OR PLASTIC? NO THANKS, I'VE GOT MY OWN
Bay Area Stormwater Management Agencies in reusable bag push to reduce water pollution

June XX, 2010—With a plastic bag ban in the offing for California this year, the Bay Area Stormwater Management Agencies Association (BASMAA), wants residents to start taking action now to break the plastic bag habit.

"Noting 'bring bag' at the top of your shopping list is an easy addition," said James Scanlin of BASMAA, a consortium of municipal stormwater pollution prevention programs from around the region. "By the end of 2010, California may have a plastic bag ban in place, so we are prepping residents to start using reusable bags now."

By now, seeing a plastic bag perched on a tree branch or hugging the pavement near a storm drain is a normal sight. Often these bags find their way into storm drains, local waterways, and eventually the ocean. Plastic debris like this represents nearly 90 percent of floating marine debris, according to the California Coastal Commission.

"Plastic bags are a huge environmental issue," says Scanlin of BASMAA. "Plastic never breaks down. It's little bits of litter, including plastics, that have added up to the immense island of garbage floating in the Pacific." According to the Earth Resource Foundation, over 100,000 marine animals die from plastic entanglement each year because they mistake plastic bags for food.

An analysis by the California State Assembly shows that Californians use 19 million plastic bags per year. From their very production (which entails use of petroleum), to the litter they create, to the havoc they have wreaked on the world's oceans, plastic bags are a major environmental issue.

BASMAA is asking Bay Area residents to make a renewed push toward using reusable bags. There are incentives for consumers, too: While many supermarkets have long offered five-cent bag credits, big box retailers like Target are now doing the same.

BASMAA offers these tips to residents to ensure they have reusables at the ready:

- Keep a rolled up or Chico-style bag in your purse to have handy for quick shopping trips.

- Leave reusable bags by the front door near keys, cell phones and other must-have items.

- Place some in the trunk or on the front passenger seat of your car so they're easily available when running errands.

- Just say no! If buying a small item, just refuse a plastic bag from the store clerk.

Contra Costa Monitoring and Assessment Program

Summary of Benthic Macroinvertebrate Bioassessment Results (2009)

Prepared for:

Contra Costa Clean Water Program
255 Glacier Drive
Martinez, CA 94553

Prepared by:

Armand Ruby Consulting
in association with
Brown and Caldwell

June 17, 2010

Preface and Acknowledgements

Many volunteers have assisted in collecting the bioassessment data described in this report. In 2009, participating groups included: Earth Team, Friends of Five Creeks, Friends of Orinda Creeks, Friends of the Creeks, Friends of Alhambra Creek Watershed, Friends of Marsh Creek Watershed, Friends of Mt. Diablo Creek Watershed, Friends of Pinole Creek Watershed, students from Los Medanos College, and the San Pablo Watershed Neighbors Education and Restoration Society. 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 Watershed 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.

Volunteers calculate stream discharge in Wilkie Creek

Title page photo: A group of volunteers after a sunny day in Rodeo Creek

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 took over primary responsibility for the collection of bioassessment data in 2007.

BMIs are composed primarily of insect larvae, mollusks, and worms. They 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.

In 2009 the Contra Costa Volunteer Creek Monitoring Program conducted bioassessments at 35 creek sampling stations, within 14 of the 29 major watersheds in Contra Costa County. The spring 2009 field data collection effort involved 64 volunteers and approximately 708 volunteer hours, county-wide. BMI samples and associated habitat quality data were collected using the 2007 California Surface Water Ambient Monitoring Program (SWAMP) protocols. To provide a measurement of Aquatic Life Use condition at these stations, a preliminary Benthic Index of Biotic Integrity (B-IBI) score was calculated from the BMI identification results for each station, using a method developed previously for creeks in Contra Costa County. Ranges of B-IBI scores were then assigned to poor, marginal, fair, good, and very good categories.

Results from 2009 indicate that 71% of creek stations sampled in Contra Costa County scored in the very good, good, or fair categories. Stations in Pine and San Ramon Creeks (Walnut Creek Watershed), Wildcat Creek, and Marsh Creek scored the highest of all stations sampled (B-IBI scores equal to or above 40). The lowest IBI scores (18 or lower) were calculated for stations in the lower reaches of Marsh, Mt. Diablo, Cerrito, Pine, and Rheem Creeks. Generally, lower scores were obtained from samples in lower reaches of the respective watersheds, where higher-density urban land uses typically predominate.

For 2009 data, physical habitat quality (“PHAB”) scores (based on a semi-quantitative scoring system) were positively, though weakly, correlated with B-IBI scores. Physical habitat condition is typically related to the degree of development of the watershed.

Watershed-wide average B-IBI scores were calculated from the 2009 data to allow for broad inter-watershed comparisons. Among the 14 monitored watersheds there is a wide range in average scores, from San Ramon, Wildcat, and Alhambra Creeks, ranked first, second, and third, respectively, with average B-IBI scores in the “good” category, to Rheem and Cerrito Creek watersheds, ranked in the “marginal” category. Most watersheds had average scores in the “fair” category. Because all sites cannot be monitored every year, in any given year the mix of sites selected for monitoring strongly influences watershed-wide average scores.

Annual variability in average IBI scores is attributable to a number of factors, including site selection, antecedent (preceding) rainfall, and other climatological conditions.

New Zealand mudsnails (*Potamopyrgus antipodarum*) were present in a sample collected from the Baxter Creek site (BAX030).

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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. CCMAP is the principal monitoring vehicle for the Contra Costa Clean Water Program (CCCWP)[1], serving to fulfill monitoring requirements in the Joint Municipal NPDES Permits (Permits) issued 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. This report summarizes the methods and results of bioassessment data collection in 2009 under the CCMAP.

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 reach 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 CCMAP in subsequent years. To assess the condition of aquatic life uses, a watershed-based sampling design is employed, where creeks within particular watersheds are typically monitored for (at least) two consecutive years before monitoring resources are moved to other watersheds.

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.

Left: Two Friends of Orinda Creeks volunteers perform a titration for Alkalinity in upper San Pablo Creek

[1]The Contra Costa Clean Water Program is comprised of Contra Costa County, all nineteen of its 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

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. Beginning in 2007, all CCMAP bioassessment sample collection and field observations were performed by the Volunteer Creek Monitoring Program. The spring 2009 field data collection effort involved 64 volunteers and approximately 708 volunteer hours, county-wide.

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.

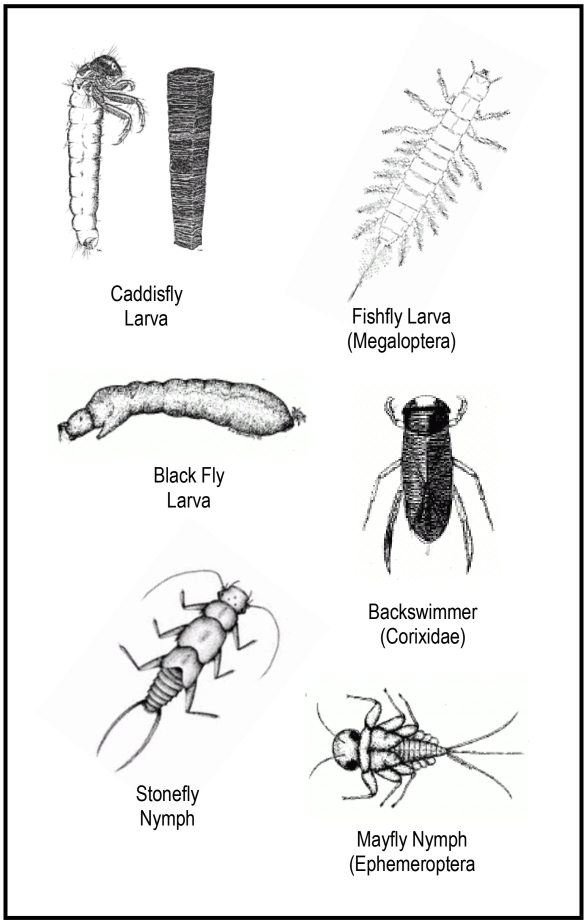


Figure 1. Examples of benthic macroinvertebrates (BMIs) used by the Contra Costa Clean Water Program as indicators of aquatic life use condition.

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.

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 2009 are shaded.

The locations of creek stations sampled during 2009 are presented graphically in Figure 2. Specific information on the locations of the 2009 CCMAP sampling stations is presented in Table 3.

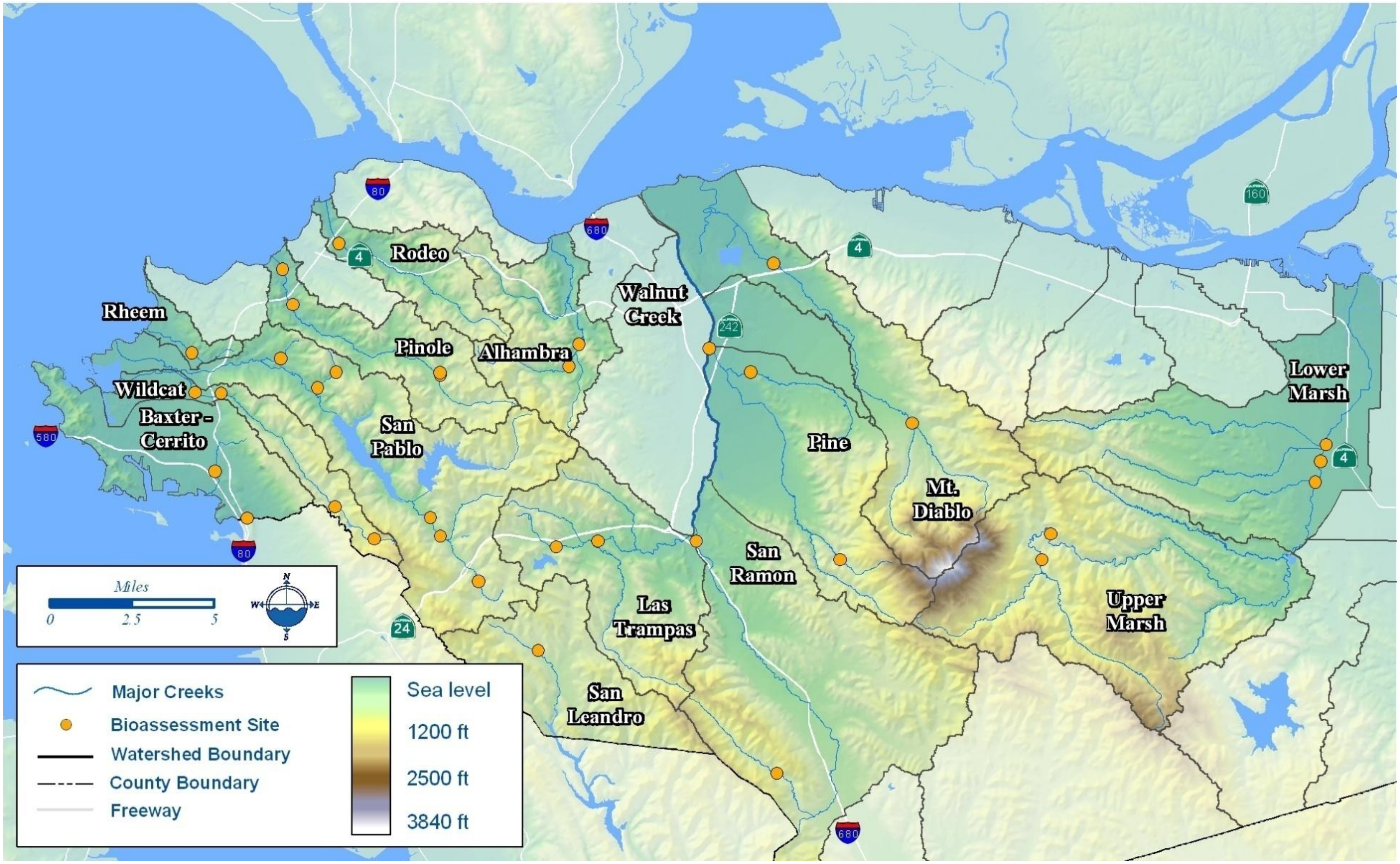


Figure 2. Benthic Macroinvertebrate (BMI) bioassessment stations sampled under the Contra Costa Monitoring and Assessment Program (CCMAP) in 2009.

Table 3. Benthic Macroinvertebrate (BMI) bioassessment stations sampled in 2009.

Code	Waterbody	Location	Latitude	Longitude
Alhambra Creek Watershed				
ALH130	Alhambra Creek	Alhambra Cr. below Arroyo del Hambre	37.97423	-122.12595
ALH150	Arroyo del Hambre	Arroyo del Hambre above Castle Creek Court	37.96720	-122.13048
Baxter Creek Watershed				
BAX030	Baxter Creek	Booker T. Anderson Park	37.91898	-122.3261
Cerrito Creek Watershed				
CER010	Cerrito Creek	Pacific East Mall	37.89807	-122.306957
Marsh Creek Watershed				
MSH045	Lower Marsh Creek	Marsh Cr Trail off Sand Creek Rd – Pinn Bros	37.93796	-121.70740
MSH052	Lower Marsh Creek	Between Dainty and Balfour	37.93090	-121.71048
MSH061	Lower Marsh Creek	Creekside Park	37.92159	-121.71306
MSH130	Upper Marsh Creek	County Detention Center	37.89722	-121.86031
MSH140	Upper Marsh Creek	210 Tumbleweed Court	37.87817	-121.86908
Mt. Diablo Creek Watershed				
MTD020	Mt. Diablo Creek	Diablo Creek Golf Course (hole 16)	38.01861	-122.02602
MTD060	Mt. Diablo Creek	Clayton Library	37.94405	-121.93749
Pinole Creek Watershed				
PNL010	Pinole Creek	Pinole Creek at Senior Center	38.00722	-122.29030
PNL029	Pinole Creek	Pinole Library Demonstration Garden	37.92431	-122.28441
PNL100	Periera Creek	Bear Creek Road- upstream of footbridge	37.96392	-122..20161
PNL110	Pinole Creek	Bear Creek Road – upstream of natural drop	37.96249	-122.20126
Rodeo Creek Watershed				
RDO009	Rodeo Creek	Downstream of Viewpoint Blvd.	38.01989	-122.25908
Rheem Creek Watershed				
RHM030	Rheem Creek	Contra Costa Community College	37.97034	-122.33972
San Leandro Watershed				
SLE208	Moraga Creek	Miramonte HS	37.84205	-122.14434
San Pablo Creek Watershed				
SPA110	Wilkie Creek	Santa Rita Rd by De Anza School	37.96883	-122.29048
SPA130	Castro Creek	Castro Ranch Rd US of Olinda/Hillside	37.95592	-122.26992
SPA133	Castro Creek	EBRPD land near Conestoga Way; below pond outfall & U/S of confluence	37.96336	-122.25959
SPA175	San Pablo Creek	Wagner Ranch Nature Area	37.89966	-122.20531
SPA190	San Pablo Creek	EBMUD Orinda Treatment Plant	37.89163	-122.19960
SPA240	San Pablo Creek	Upstream of Camino Encinas Road	37.87250	-122.17861
Pine Creek (Walnut Creek Watershed)				
WAL200	Pine Creek	Via de Mercados	37.97669	-122.05198
WAL220	Gallindo Creek	Trailside Circle	37.96664	-122.02862
WAL290	Little Pine Creek	Mt. Diablo State Park – Northwest entrance	37.88426	-121.97717
Las Trampas Creek (Walnut Creek Watershed)				
WAL365	Lafayette Creek	Village Center	37.88780	-122.13505
WAL375	Las Trampas Creek	Leigh Creekside Park	37.89120	-122.11207
San Ramon Creek (Walnut Creek Watershed)				
WAL500	San Ramon Creek	Creekside Street	37.89147	-122.05728
WAL730	Bollinger Creek	Chen's property off Bollinger Canyon Road	37.78973	-122.01040
Wildcat Creek Watershed				
WIL060	Wildcat Creek	At Vale Road	37.96027	-122.36750
WIL070	Wildcat Creek	Alvarado Park at Buckeye Picnic Area	37.95237	-122.32105
WIL130	Wildcat Creek	¼ mile up Lone Oak Picnic Area trail	37.95319	-122.33836
WIL180	Wildcat Creek	Big Springs Picnic Area	37.88979	-122.23681

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

The 2007 SWAMP protocols were followed by CCMAP citizen monitors during the 2007-09 sampling. In accord 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, 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. See the sample field data sheet (Appendix E) for details on the observations recorded by the PHAB team. See Appendix F for completed field sheets used during actual sampling.

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

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.

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 25 cm^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 E.

As indicated in the SWAMP protocols, measurements of in-stream and riparian habitat and ambient water chemistry always accompany bioassessment samples. Physical habitat measurements were 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 habitat. A summary of physical habitat scores for all bioassessment stations monitored in the current year is provided in Appendix A.

Left: Students at Los Medanos College calculating reach gradient

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 B.

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 sample based on a nine sq. ft. sampling area).

2.5.2 Benthic Indices of Biotic Integrity

An Index of Biotic Integrity (IBI) is an index that reduces complex information about biological community structure into a simple numerical value based on measures of taxonomic richness (number of taxa); taxonomic composition (e.g., insects vs. non-insects); taxonomic diversity; feeding groups (e.g., shredders, scrapers, or predators); habits (e.g., burrowing, clinging, or climbing taxa); and tolerance to stressors. Typically, separate metrics are used from each of these categories to develop a multi-metric index (IBI) for a particular region of interest (e.g., Western U.S., California or Contra Costa County) to assess the biological condition in creeks.

Table 4. Six general steps typically used to develop an Index of Biotic Integrity (IBI)

1.	Classify stream types into classes and select reference sites
2.	Select potential metrics
3.	Evaluate metrics to select most robust ones
4.	Score metrics and combine scores into IBI
5.	Assign rating categories to IBI score ranges
6.	Evaluate IBI and refine

Barbour *et al*. (1999) identified six general steps involved in the development of an IBI (Table 4); each step can be modified based on the needs of the region or availability of research tools. Benthic macroinvertebrate IBIs (B-IBI) recently developed for Southern and Northern California wadeable streams and the status of the San Francisco Bay B-IBI are discussed here, along with steps used to develop a preliminary B-IBI for Contra Costa creeks.

Northern and Southern California B-IBIs

Benthic Indices of Biotic Integrity (B-IBIs) were recently developed for coastal Northern California (Oregon border to Marin County) and Southern California (Mexico Border to Monterey County) using the steps presented in Table 4 (Ode et al., 2005; Rhen and Ode, 2006). Of 71 possible metrics, eight were selected for the Northern California B-IBI and seven for the Southern California B-IBI (Table 5). Four metrics were selected in common for the Northern and Southern California B-IBIs.

Table 5. Metrics selected for development of the Southern and Northern California B-IBIs.

B-IBI Metric	Southern California	Northern California
Coleoptera Richness	x	x
EPT Richness (Ephemeroptera + Plecoptera + Trichoptera)	x	x
Predator Richness	x	
Diptera Richness		x
% Collector individuals	x	
% Noninsect Taxa		x
% Tolerant	x	x
% Intolerant Taxa	x	x
% Non-Gastropoda Scraper Individuals		x
% Predator Taxa	x	
% Shredder Taxa		x

San Francisco Bay Area B-IBI

To better understand the biological integrity of Bay Area creeks, the Bay Area Macroinvertebrate Bioassessment Information (BAMBI) network[3] has begun to develop a provisional B-IBI for San Francisco Bay Area Creeks. The Bay Area B-IBI is being developed using data collected from Contra Costa, Alameda, Santa Clara, San Mateo, Napa, Marin, Sonoma and Solano counties, and will fill a geographical data gap created by the Northern and Southern California B-IBIs. 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 for applicability in the Bay Area. As a result, a preliminary B-IBI for Contra Costa was developed. To determine which metrics are applicable, IBI development steps 1-5 were followed (see Table 4). The following paragraphs briefly describe this process.

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. There are many definitions of the term “reference condition” ranging 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, most reference condition approaches seek to identify a compromise, the “least disturbed condition” in region. In regions like the San Francisco Bay Area, it is necessary to select sites that represent the “best attainable” condition given application of best management practices 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.

The bioassessment programs in Contra Costa County have attempted to include information about minimally impacted conditions at selected “reference” stations to supplement data collected at BMI

[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.

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 6 were selected to represent reference conditions in Contra Costa County.

Table 6. 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. Ideally, reference conditions would represent each set of sampling sites with significantly different BMI assemblages due to natural conditions. 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

Selection of the most appropriate bioassessment metrics for an IBI is a critical phase in the creation of an IBI and typically undergoes the most revision in subsequent refinement of an index. Ideal metrics differ from region to region (hence the need for regional IBIs), but share common characteristics. Most critically, "core" metrics should be able to discriminate between known reference stations and stations with known impacts.

A series of techniques was used to select appropriate metrics in the development of the preliminary Contra Costa B-IBI, following United States Environmental Protection Agency recommendations (Barbour *et al*. 1999, Hughes *et al*.1998, McCormick *et al*. 2001). However, since similar techniques were used in the development of the Northern and Southern California B-IBIs, the 11 metrics selected in these indices were used as the starting point for the Contra Costa B-IBI, instead of testing all possible metrics (~71). 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 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 7 presents the scoring ranges for the five metrics included in the preliminary Contra Costa County B-IBI.

Table 7. Scoring ranges for the five metrics included in the preliminary Contra Costa County Benthic-IBI and scoring categories that define biotic condition.

IBI 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

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 scores for each site, using the scoring categories defined in Table 7, and the B-IBI score for each site is calculated by simply summing the component metric scores. The resulting B-IBI scores are then divided into scoring categories that define thresholds of biotic condition as shown at the bottom of Table 7. 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 2009, over 15,000 individual macroinvertebrate organisms were taxonomically identified from the 35 sampling stations in the 14 Contra Costa County watersheds monitored. These organisms comprised 111 distinct BMI taxa. Table 8 provides an overview of distribution by major taxonomic grouping, county-wide. A complete list of taxa identified in Contra Costa County samples in 2009 is included in Appendix D.

Table 8. Percentages of all organisms identified within various BMI groups (2009)

GROUPS OF BENTHIC MACROINVERTEBRATES IDENTIFIED	% OF ALL ORGANISMS
Aquatic Insects/Spiders/Crustaceans (Arthropoda)	86.73%
Aquatic Insects:	
True Flies (Diptera)	52.11%
Mayflies (Ephemeroptera)	14.64%
Caddisflies (Trichoptera)	1.55%
Stoneflies (Plecoptera)	1.52%
Beetles (Coleoptera)	0.78%
Dragonflies and Damselflies (Odonata)	0.56%
Acari	0.49%
Amphipoda	6.13%
Ostracoda	8.90%
Alderflies and Dobsonflies (Megaloptera)	0.05%
Segmented Worms (Annelida)	5.58%
Hirudinea	0.04%
Polychaeta	0.05%
Oligochaetes	5.48%
Coelenterata	0.01%
Snails and Clams (Mollusca)	7.53%
Flat Worms (Platyhelminthes)	0.15%
Other (Nematomorpha)	0.01%

3.1.1 Most Dominant Taxa

Over 55% of the organisms identified in 2009 belonged to one of five taxa (Table 9). Dipterans were the most common taxa identified, occupying three of the top five taxonomic frequencies.

Table 9. Five most frequently identified benthic macroinvertebrate taxa identified in samples collected in 2009**.**

TAXON	TAXONOMIC GROUP	COMMON NAME	TOLERANCE VALUE (0-10)*	% OF ALL ORGANISMS
Simulium	Diptera	Black flies	6	14.23%
Orthocladiinae	Diptera	Non-biting midges	5	13.71%
Baetis	Ephemeroptera	Baetid mayflies	5	10.95%
Ostracoda	Ostracoda	Seed shrimp	8	8.90%
Chironomini	Diptera	Non-biting midges	6	7.73%
			Total	**55.52%**

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

The 2009 taxonomic results were less dominated by Dipterans than in 2008; in 2009 the frequency of Dipteran identifications was very similar to 2007. However, as in 2008, the 2009 results were relatively low in Oligochaetes compared with 2007, when Oligochaetes were the number-one-ranked taxa identified. Chironomids have remained among the top five taxa for the past several years; however, their abundance is lower in recent years than during the 2001-06 period, when they cumulatively represented 30% 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 freshwater habitats (Epler, 2001). 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.

3.1.2 Functional Feed Groups (FFGs)

Without a relatively diverse variety of food types (e.g., fine and coarse particulate organic material, algae and other BMIs), an imbalance in BMI community structure occurs, reflecting stressed conditions. 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.

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.

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. BMI communities at sampling stations in Contra Costa County are dominated by generalist FFGs (see 2009 distribution, Figure 3). Specialized feeders, such as scrapers, shredders and predators, are typically considered to be the more sensitive types of BMIs and are generally well represented in healthy streams. Organisms from specialized FFGs are identified in Contra Costa creeks, but to a lesser degree than collector-gatherers and collector-filterers.

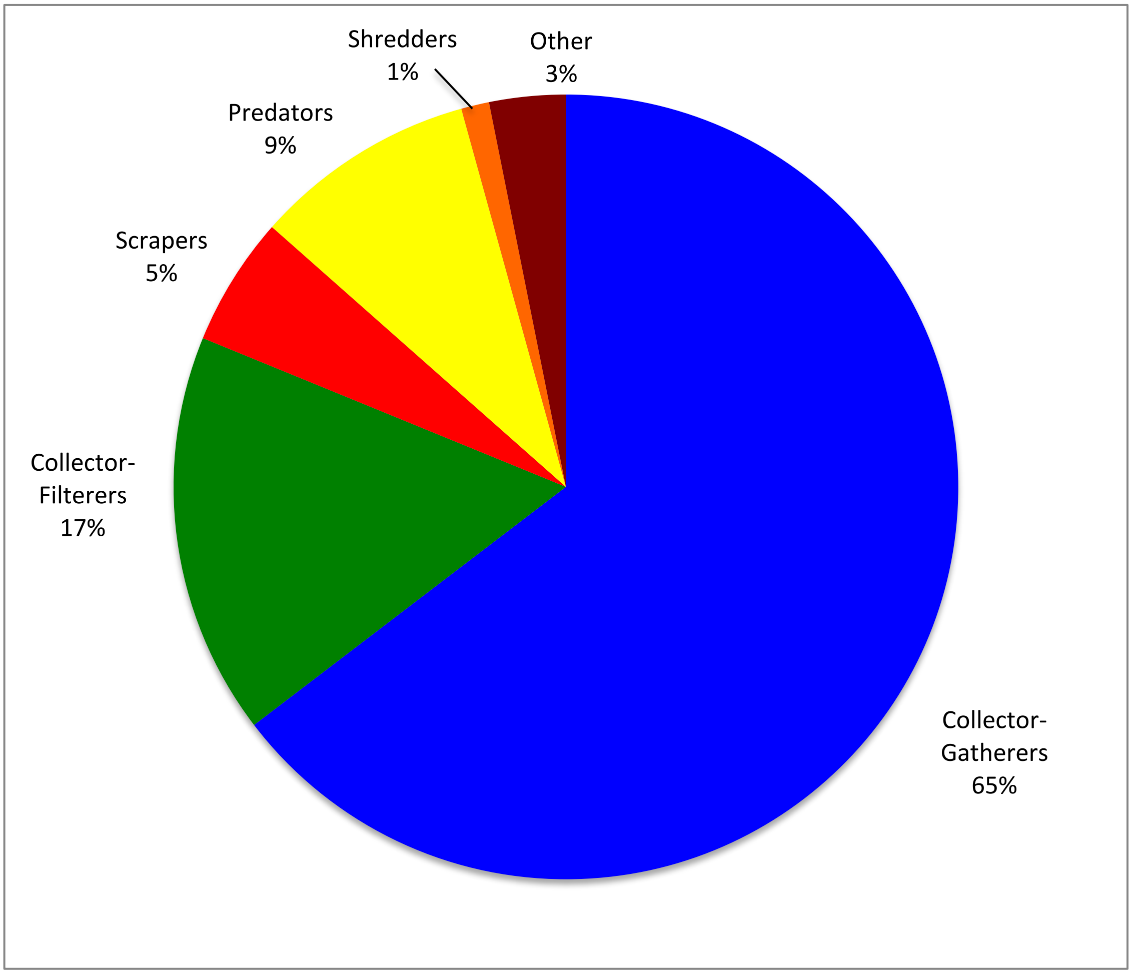


Figure 3. Percentages of organisms identified in functional feeding groups in 2009.

3.2 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 each creek sampling station and event. B-IBI scores presented in this report represent the most up-to-date evaluation of bioassessment data on a "county-wide" basis.

Results from 2009 indicate that roughly 71% of creek stations sampled in Contra Costa County scored in the very good, good or fair categories (Figure 4). Stations in Pine and San Ramon Creeks (Walnut Creek Watershed), Wildcat Creek, and Marsh Creek scored the highest of all stations sampled (B-IBI scores equal to or above 40). The lowest IBI scores (18 or lower) were calculated for stations in the lower reaches of Marsh, Mt. Diablo, Cerrito, Pine, and Rheem Creeks.

To assess the general condition of aquatic life uses on a watershed scale, average B-IBI scores were calculated for the 12 Contra Costa watersheds monitored during 2009, using the average score of all stations within the watershed boundaries (Figure 5, Table 10).

The individual metrics and scores used to calculate the B-IBI scores are presented in Appendix C.

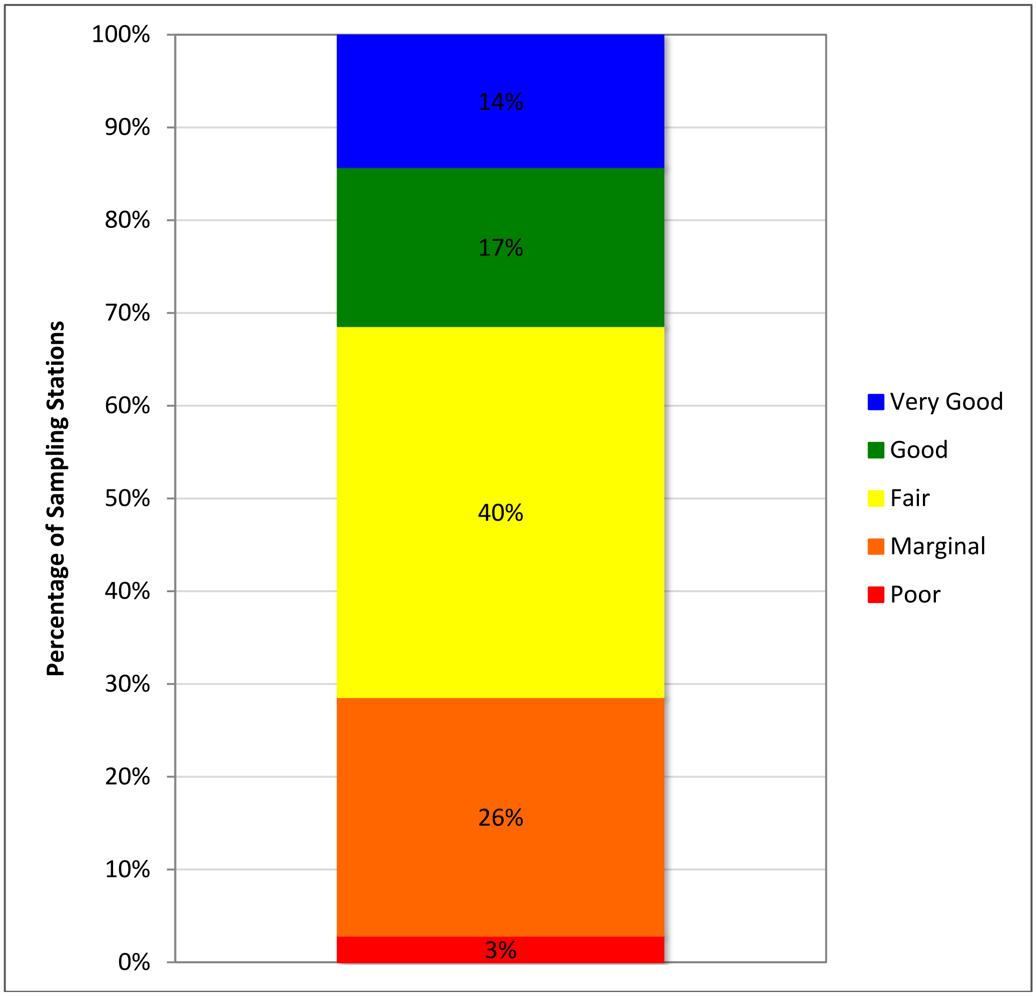


Figure 4. Percentage of Contra Costa County creek stations in each B-IBI scoring category, based on 2009 data.

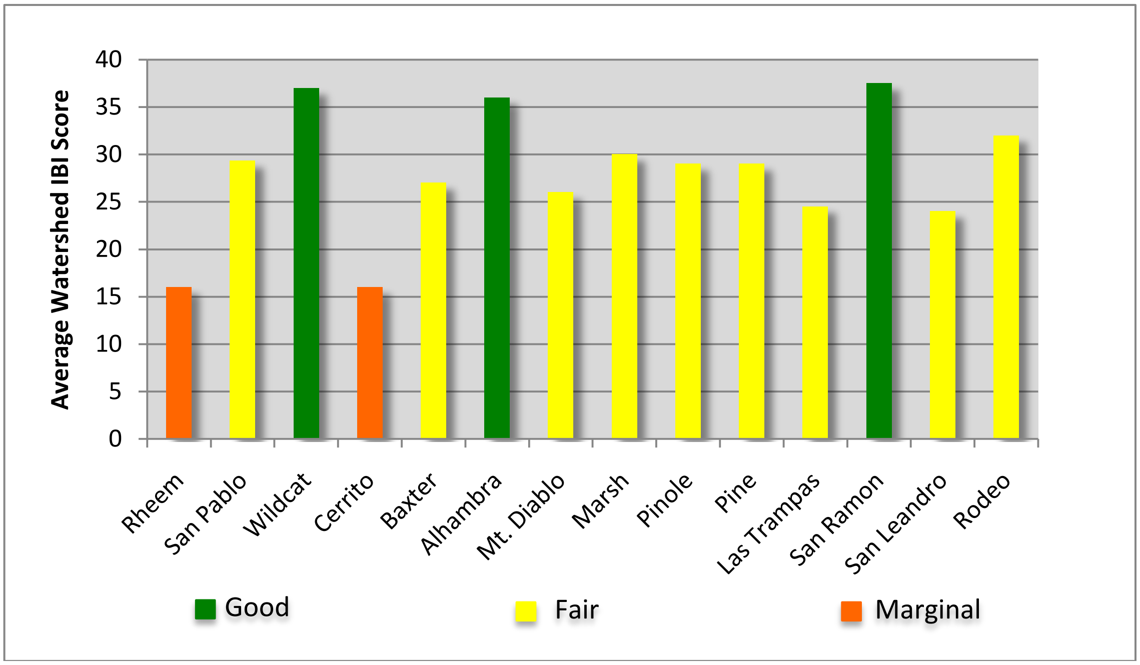


Figure 5. Average 2009 B-IBI Score by watershed

Note: the Las Trampas, Pine and San Ramon Creek sites are located within the Walnut Creek watershed.

Table 10. Average B-IBI Watershed Score and Ranking, 2009 Data

1	San Ramon	37.5
2	Wildcat	37.0
3	Alhambra	36.0
4	Rodeo	32.0
5	Marsh	30.0
6	San Pablo	29.3
7	Pinole	29.0
8	Pine	29.0
9	Baxter	27.0
10	Mt. Diablo	26.0
11	Las Trampas	24.5
12	San Leandro	24.0
13	Rheem	16.0
14	Cerrito	16.0

3.3 ANNUAL VARIABILITY IN B-IBI SCORES

BMI communities naturally vary spatially and temporally. The CCMAP standardizes the monitoring approach to attempt to minimize the variability due to the sampling regime, by collecting samples from the same stream reaches on a recurring basis, 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 IBI scores, as discussed below.

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. An analysis of annual variation in B-IBI scores from 2001-2006 (EOA, 2007) revealed that it was not possible to discern any notable or consistent temporal trends in the BMI monitoring data. A longer time frame is often needed to illustrate temporal trends, as sufficient data must be accumulated to overcome the inherent noise (innate variation) in the data.

3.3.1 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.

3.3.2 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.

3.3.3 Climate

Differences in annual climate, particularly antecedent rainfall (rainfall that occurs in the period prior to sampling), could influence annual average B-IBI statistics. In fact, the 2005-06 rainfall year was dramatically different than both 2006-07 and 2007-08 (see Table 11). The 2006 BMI samples were collected following a hydrologic year with over 27 inches of rainfall, more than three times the amount received in 2006-07, and more than twice the amount received in 2007-08. 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.

As shown in Table 11, the 2008-09 rainfall year was similar in total accumulation to the previous (2007-08) hydrologic year, but nearly twice as much as the 2006-07 year. However, rainfall was higher during the spring period that preceded the 2009 BMI sampling than during the 2008 or 2007 spring.

Table 11. 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

3.3.4 Year-to-Year Comparisons

For the three most recent years of BMI sampling (2007-09), 15 sites were sampled consecutively in all three years. The average annual results of the IBI scoring and the individual metrics used in computing the IBI scores are shown in Table 12 for the 15 sites sampled in these three years. Overall, the 2009 results tended to be similar to the 2007 results, and represented moderate improvements with respect to the 2008 results. The very dry spring experienced in 2008 may have had a detrimental effect on overall (average) results. This contrasts with the comparison of 2006 to 2007 results (Armand Ruby Consulting, 2008), in which a very wet spring in 2006 produced much lower IBI scores than the following, more normal water year in 2007. However, the individual B-IBI scores for the 13 sites sampled in 2007-09 are shown in Appendix H, with highest year highlighted for each site. This chart does not show any consistent pattern year-to-year.

Table 12. Average* Annual B-IBI Score and Metrics, 2007-09 Data

	2007	2008	2009
Total IBI	32.6	29.0	**33.1**
Beneficial Metrics:			
EPT Taxa	**3.7**	2.8	3.6
Number Diptera Taxa	7.8	7.1	**8.1**
Number Predator Taxa	**6.3**	4.7	5.7
Detrimental Metrics:			
% Collectors	**69%**	70%	71%
% Non-Insecta Taxa	35%	**29%**	33%

* Average scores for 15 sites monitored in all three years; best (highest beneficial and lowest detrimental) scores are highlighted for each metric.

3.4 POTENTIAL FACTORS AFFECTING AQUATIC LIFE USES

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). Limited data are currently available on food availability, stream hydrology and water quality, and therefore no analyses were performed on these factors. The effects of watershed-scale urbanization (via elevation) and reach-scale physical habitat quality were examined using available data in the 2007 report (EOA, 2007).

3.4.1 Urbanization

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. In previous studies, the effects of urbanization on BMIs have been evaluated using indicators such as percent impervious surfaces and percent urban area in upstream land areas. Although data were not available for these urbanization indicators, information on other indicator, elevation, was available to assess correlation between urbanization and IBI scores.

Due to historical development patterns, urbanization in Contra Costa County typically increases as elevation decreases. In the 2001-06 BMI report analysis (EOA, 2007), elevation did not correlate well with B-IBI score. Additional analysis of the relationship should be performed, to assess whether other indicators of urbanization, such as population density, are correlated with BMI measurements.

For the 2009 BMI sample results, monitoring sites were characterized as being in “lower”, “middle”, or “higher” reach ranges, and the minimum, mean, and maximum B-IBI scores for each group were compared (see Figure 6). The results of these comparisons support the idea that upper regions of watersheds, which are generally less developed that lower regions, tend to have higher B-IBI scores. The mean and maximum in each category consistently increased from lower to middle to upper ranges of the watersheds tested in 2008. These spatial trends are consistent with those observed in the 2007 data (ARC, 2008).

3.4.2 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).

As in 2007 and 2008, the 2009 PHAB scores were positively correlated with the B-IBI scores. The relationship was statistically significant ($p = 0.044$), but the correlation was again weak ($r^2 = 0.12$). 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.

3.4.3 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. 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 figure, section 3.5.2), perhaps indicating that the invasive colonization may be in the early stages.

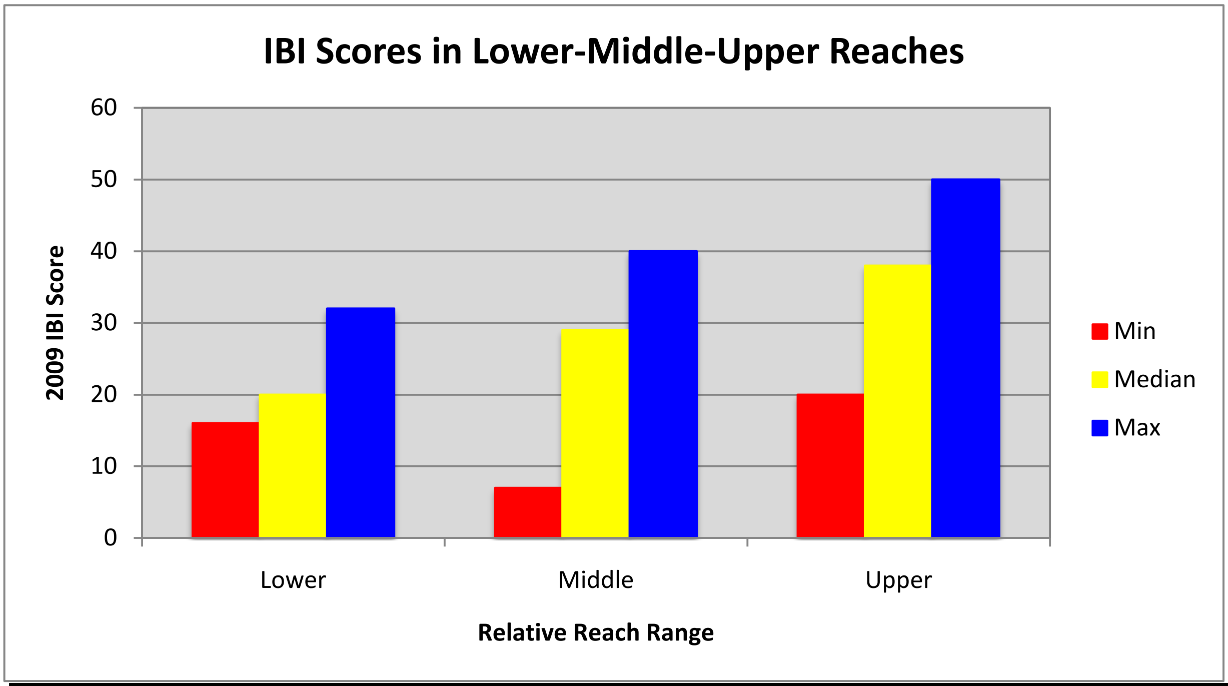


Figure 6. Comparisons of IBI Scores in Lower, Middle and Upper Creek Stations, 2009 Data

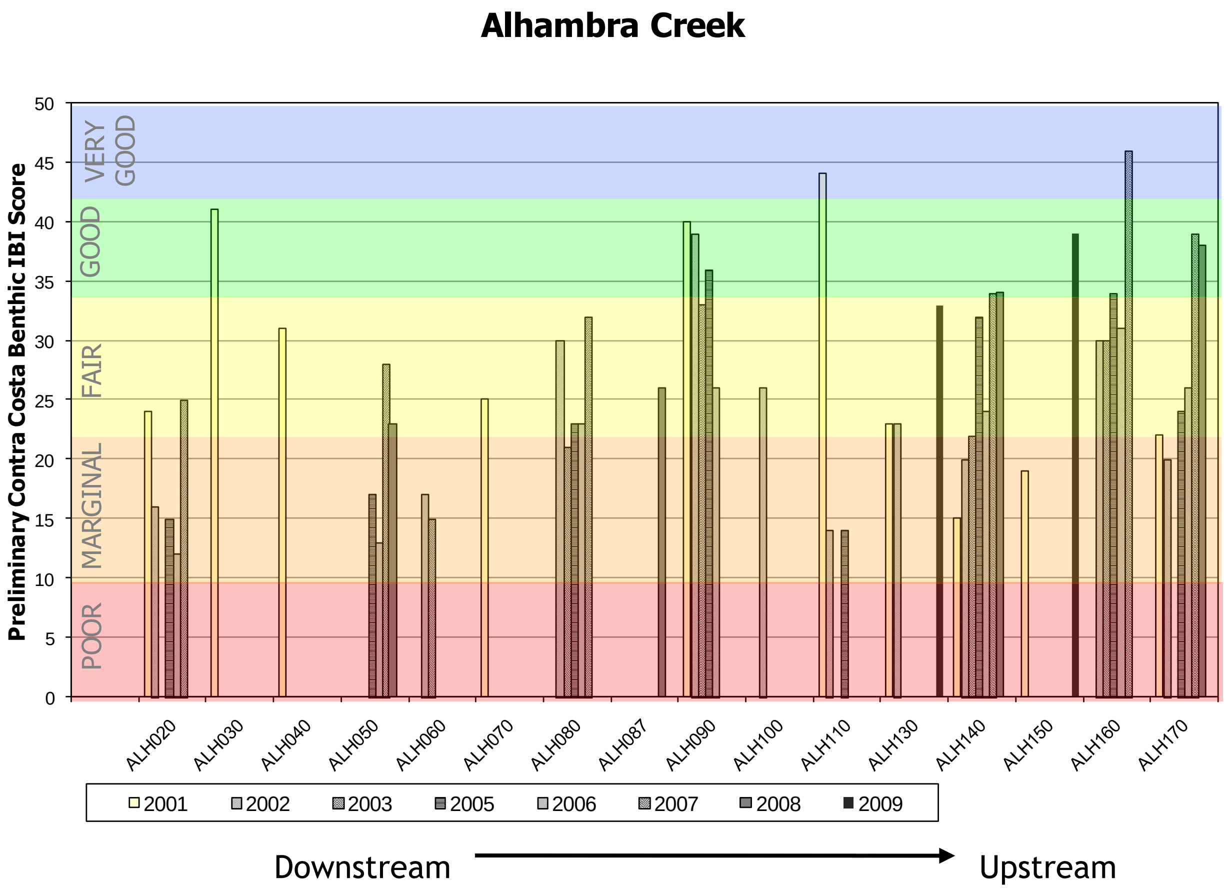
3.5 WATERSHED-SPECIFIC OBSERVATIONS

This section includes graphical presentations of all BMI monitoring results from 2001-09, 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.

Several 2009 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: MSH061, SLE208, SPA175, SPA190, WIL080, WAL200, WAL290, WAL365, and WAL375. 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.

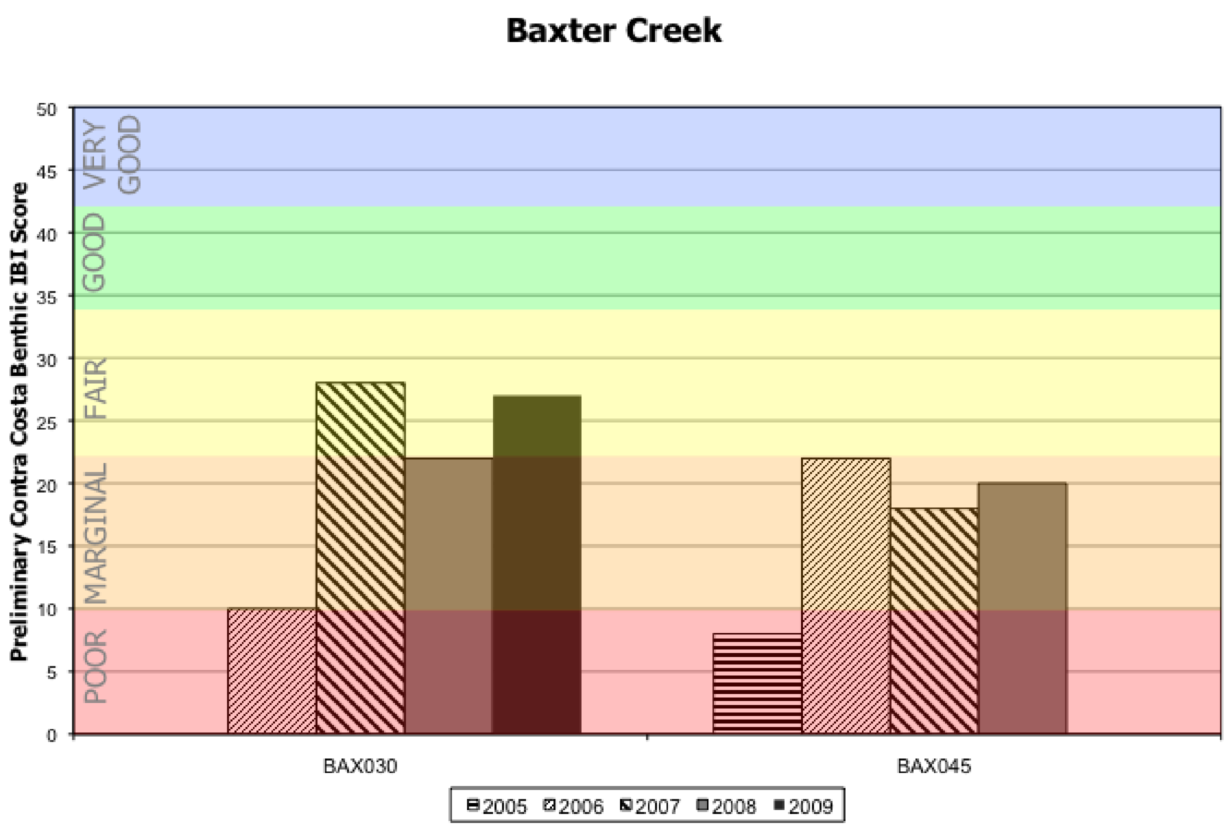
3.5.1 Alhambra Creek Watershed

Within the Alhambra Creek watershed the general condition of aquatic life uses in creeks appears to be fairly good, relative to other watersheds in Contra Costa County, as illustrated by the B-IBI scores.



3.5.2 Baxter Creek Watershed

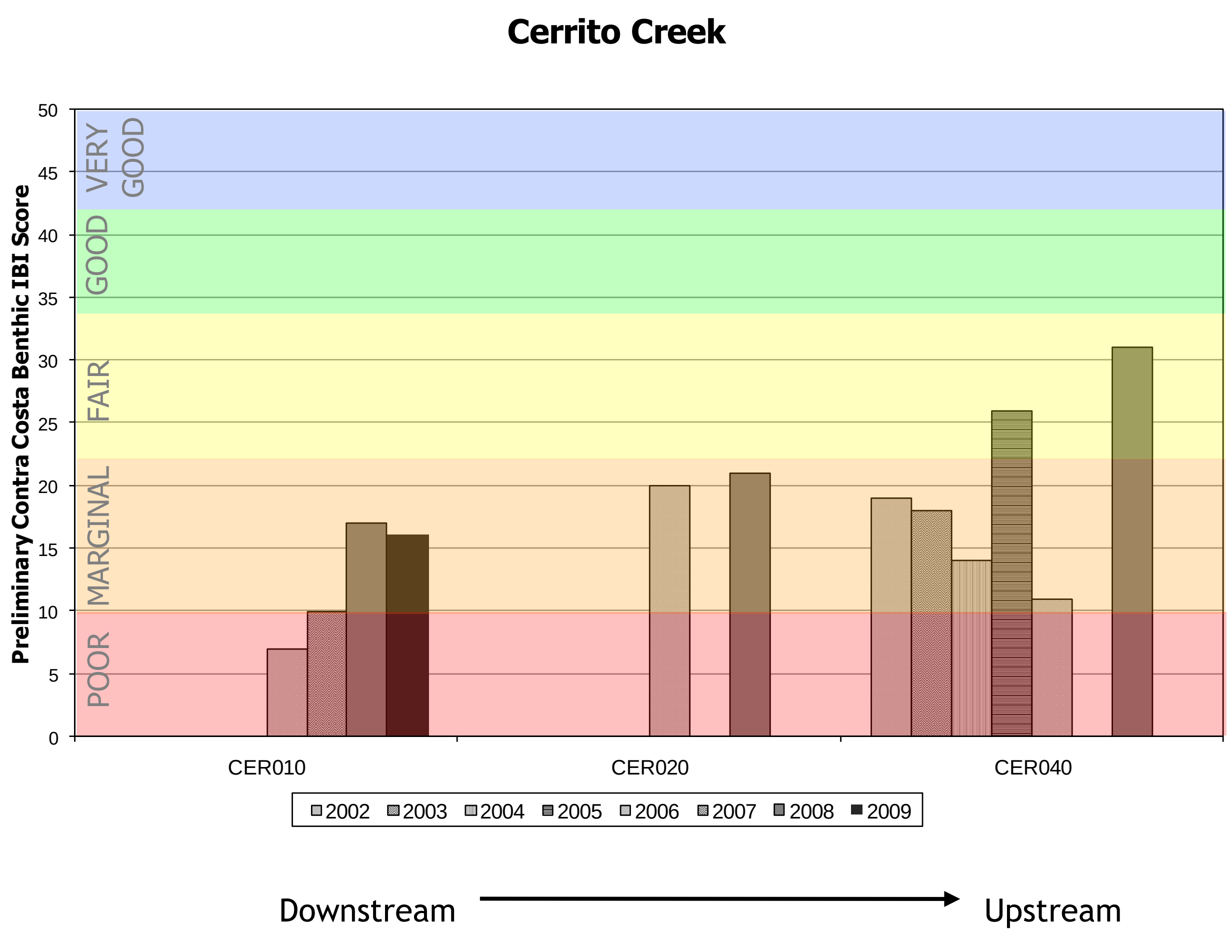
Baxter Creek watershed is made up of predominately urban land uses, and creek channels have been heavily altered due the historical effects of urbanization. Therefore, it is not unexpected that stations within this watershed would generally have B-IBI scores within the poor to marginal categories. These stations are dominated by short-lived, tolerant benthic macroinvertebrates that generally indicate stress on a system. In 2009, for the first time, New Zealand mudsnails (*Potamopyrgus antipodarum*) were positively identified in a sample collected from a site on Baxter Creek (BAX030).



Downstream → Upstream

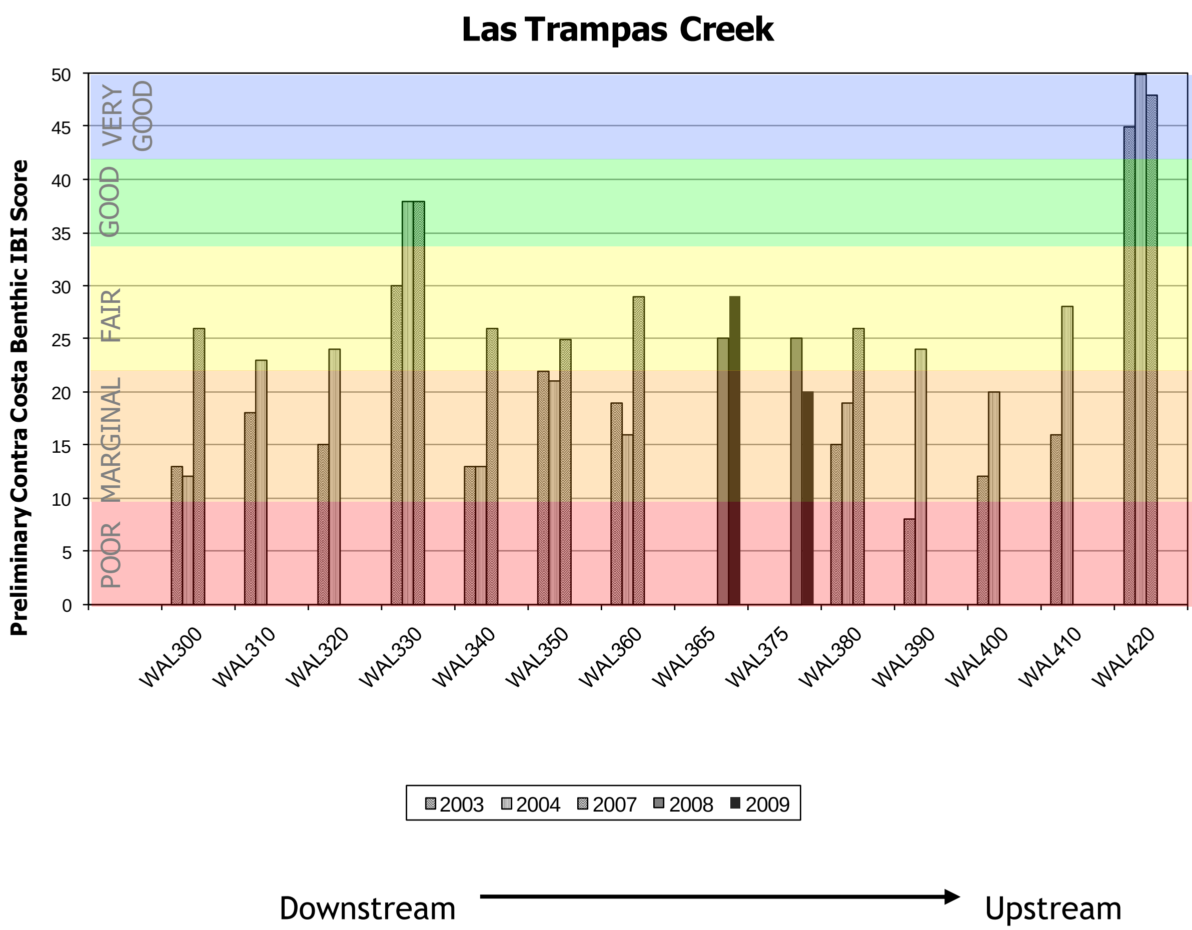
3.5.3 Cerrito Creek Watershed

Cerrito Creek watershed is also made up of predominately urban land uses, and creek channels have been heavily altered due the historical effects of urbanization. Therefore, it is not unexpected that stations within this watershed would generally have B-IBI scores within the poor to fair categories. These stations are dominated by short-lived, tolerant benthic macroinvertebrates that generally indicate stress on a system.



3.5.4 Las Trampas Creek Watershed

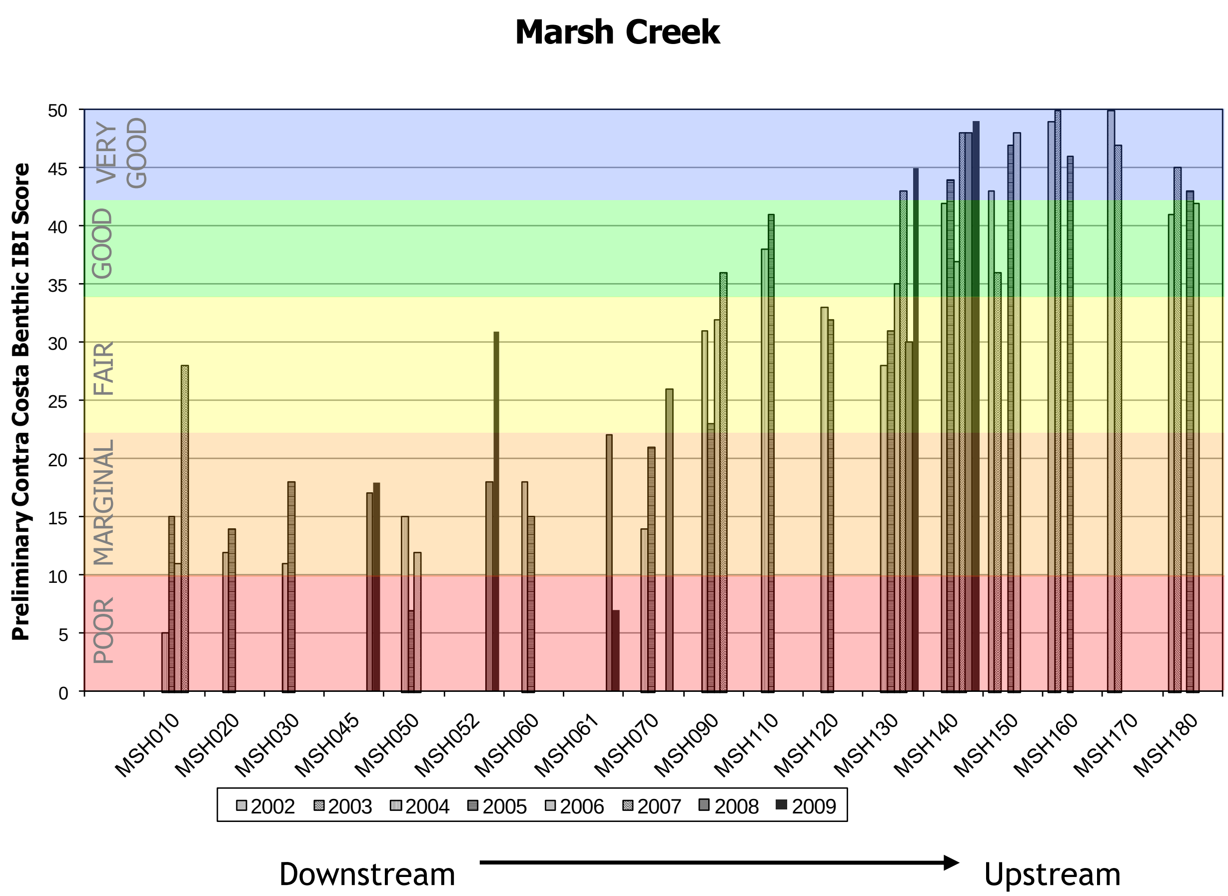
With the exception of stations WAL330 andWAL420, B-IBI scores for stations in the Las Trampas creek watershed have been fair to marginal. Stations WAL330 (Reliez Creek) and WAL420 (Las Trampas Creek) are located in the upper Walnut Creek watershed and predominately drain open space land uses and relatively large parcels of land. In contrast, other stations in the watershed are surrounded by residential and commercial development.



Note: the Las Trampas Creek sites are located within the Walnut Creek watershed.

3.5.5 Marsh Creek Watershed

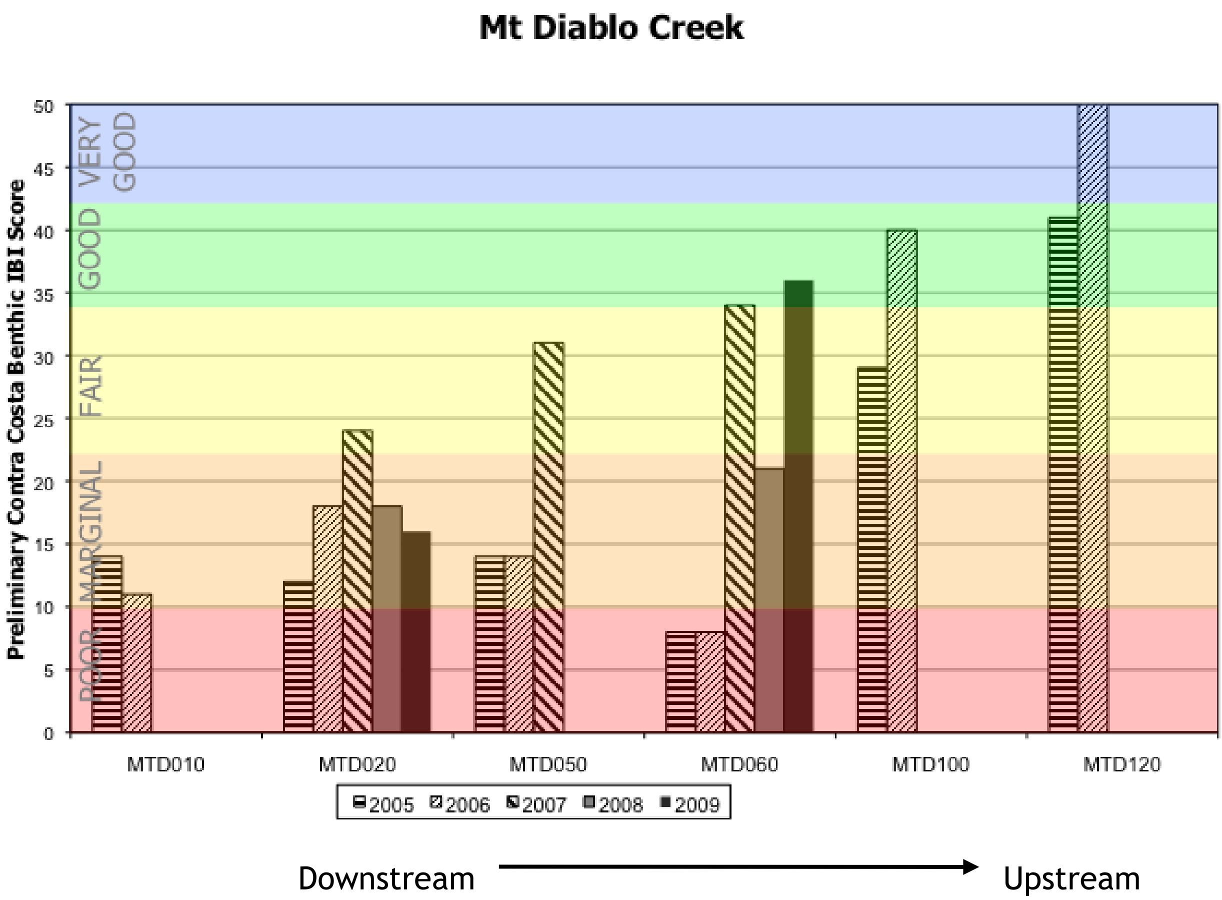
In contrast to the upper watershed, stations in the lower watershed consistently generally score in the poor to marginal categories, and are dominated by short-lived tolerant benthic macroinvertebrates that generally indicate stress on a system. The low scores at stations in the Lower March Creek watershed, 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. However, the sites in the Upper Marsh Creek watershed, above the dam (MSH090 and above), 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

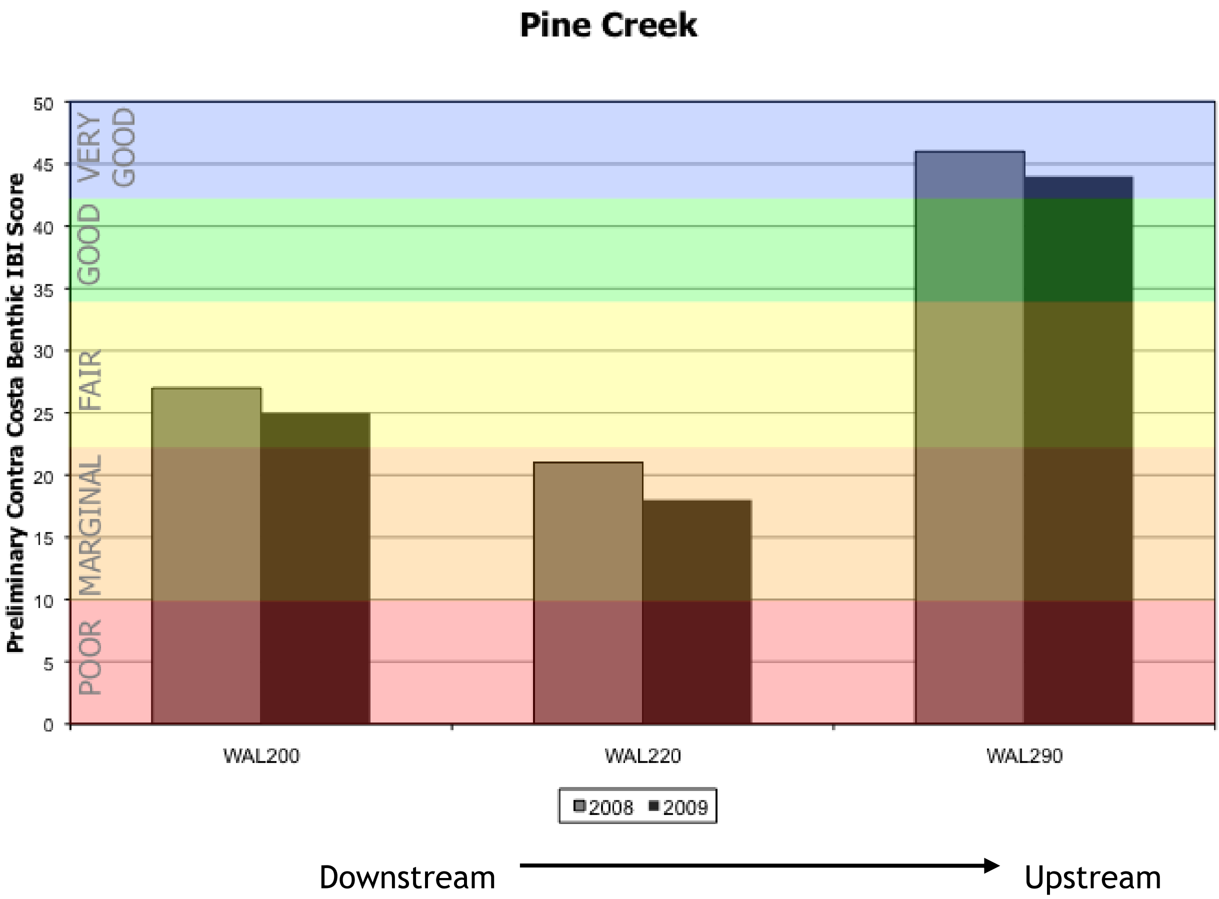
3.5.6 Mt. Diablo Creek Watershed

In this watershed there is a fairly clear progression in B-IBI scores from lower to upper watershed. Stations in the upper watershed, particularly MTD120, had B-IBI scores in the good to very good categories. Scores in the mid to lower watershed stations (below MTD100) were much lower, falling into the marginal and poor categories. These lower watershed stations were generally dominated by short-lived tolerant BMIs that generally indicate stress on a system. Lower scores at these stations could indicate that degraded physical habitat and/or water quality may be impacting benthic communities.



3.5.7 Pine Creek Watershed

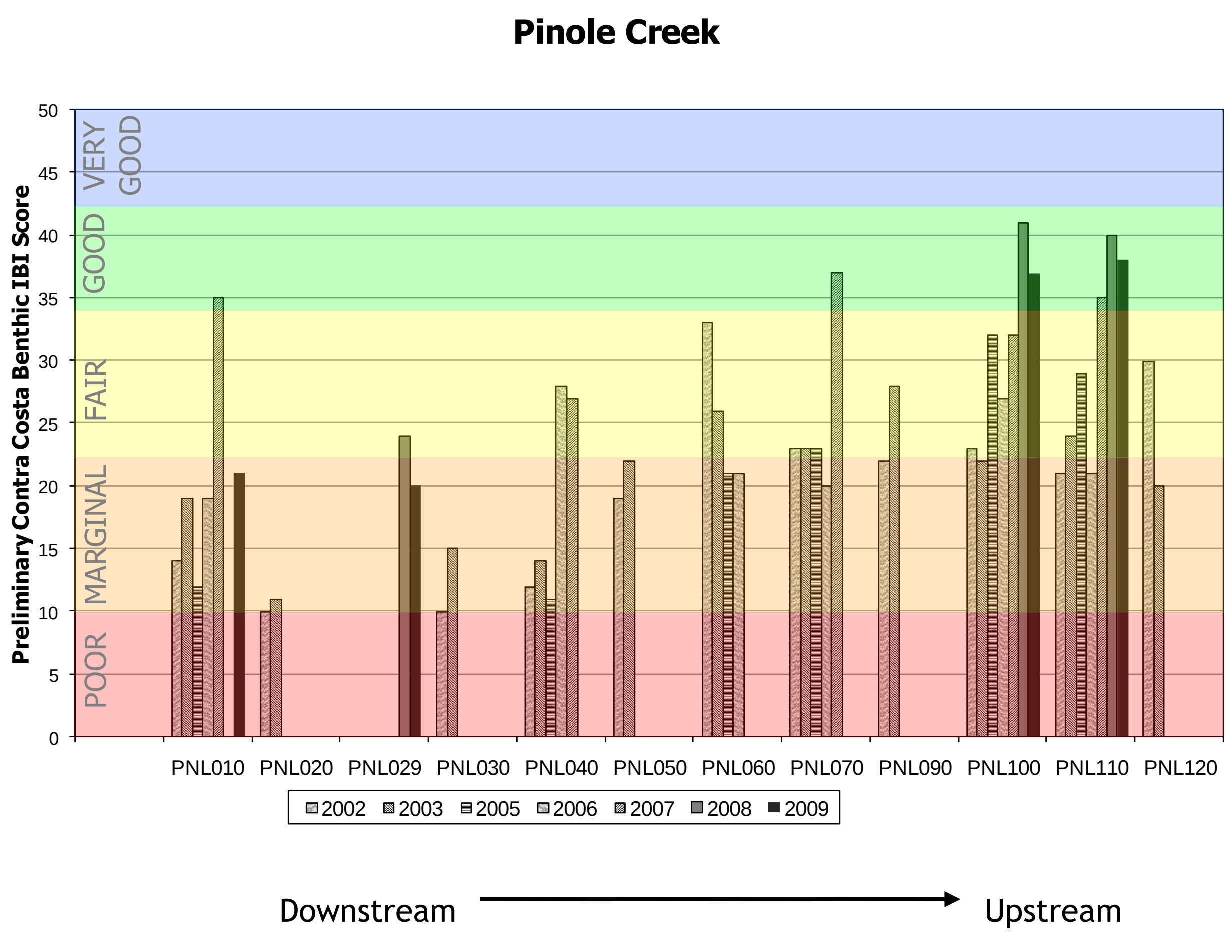
Pine Creek watershed was monitored for the first time in 2008, with marginal to very good results, trending higher at the upper watershed site, in the typical pattern. In 2009, scores dropped slightly.



Note: the Pine Creek sites are located within the Walnut Creek watershed.

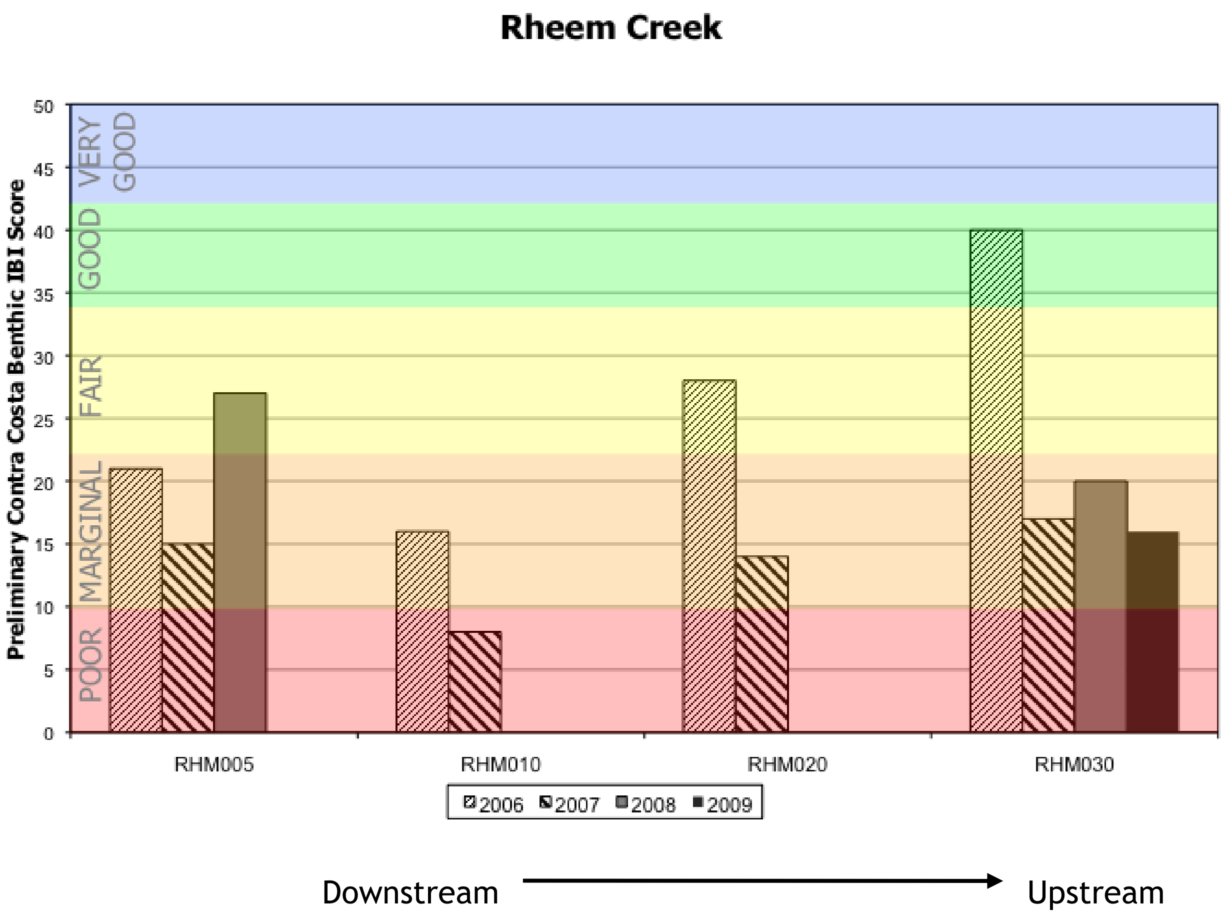
3.5.8 Pinole Creek Watershed

Aquatic life use conditions in creeks within the Pinole Creek watershed appear to be relatively good compared to other watersheds in the County. Throughout this watershed scores range from poor to good.



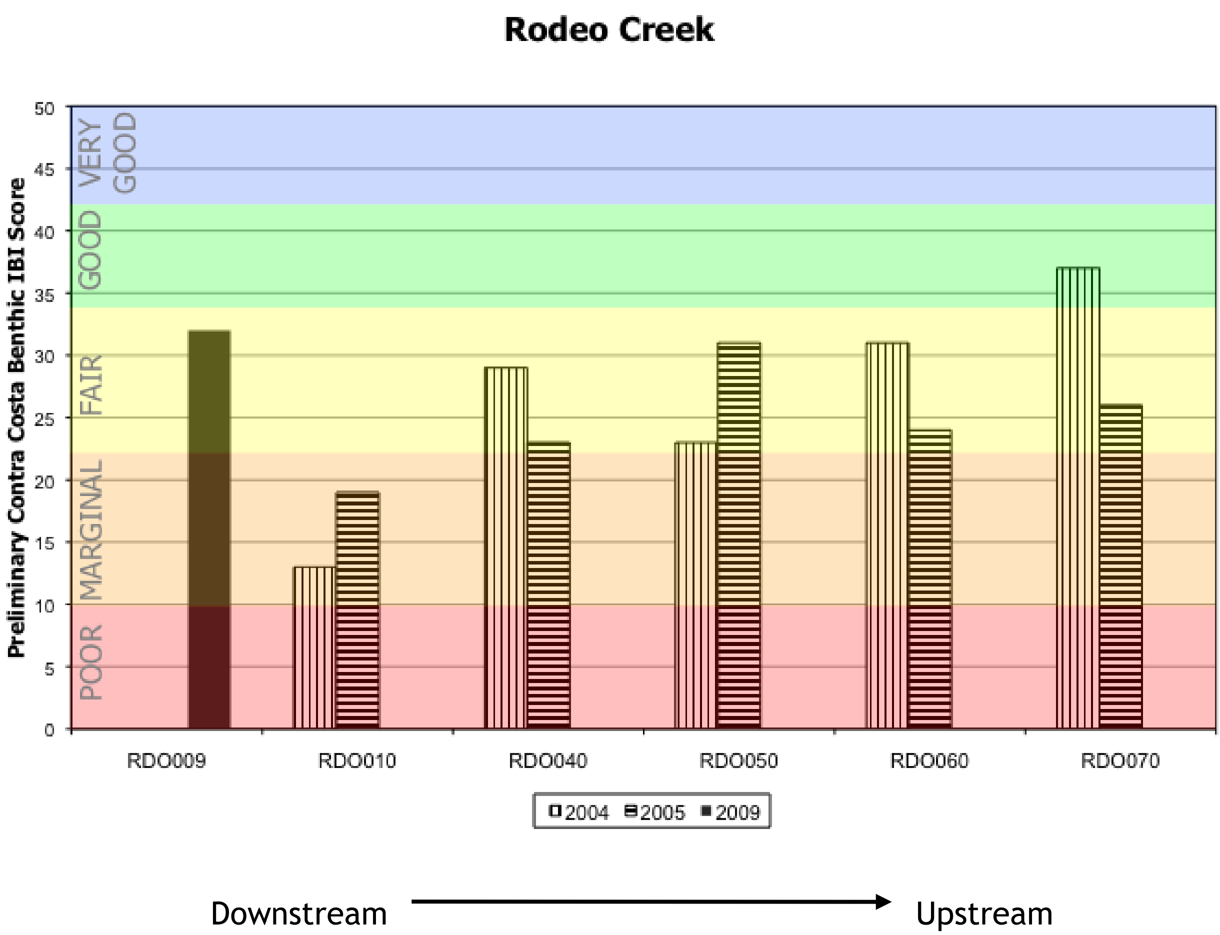
3.5.9 Rheem Creek Watershed

Results have been mixed for stations within Rheem creek. Scores were in the marginal to good B-IBI categories during the 2006 sample collection, but scores dropped into the poor to marginal categories with the 2007 sample results, followed by improvement into the marginal to fair categories for the two sites sampled in 2008. In 2009, only the furthest upstream station was sampled, showing a drop in IBI score from 2008. Stations in the lower watershed are dominated by short-lived tolerant benthic macroinvertebrates that generally indicate stress on a system. Reduced physical habitat quality at all stations in the watershed may partially explain benthic community composition. The Rheem Creek 2007B-IBI scores were consistently lower than the 2006 scores, contrary to most other Contra Costa watersheds.



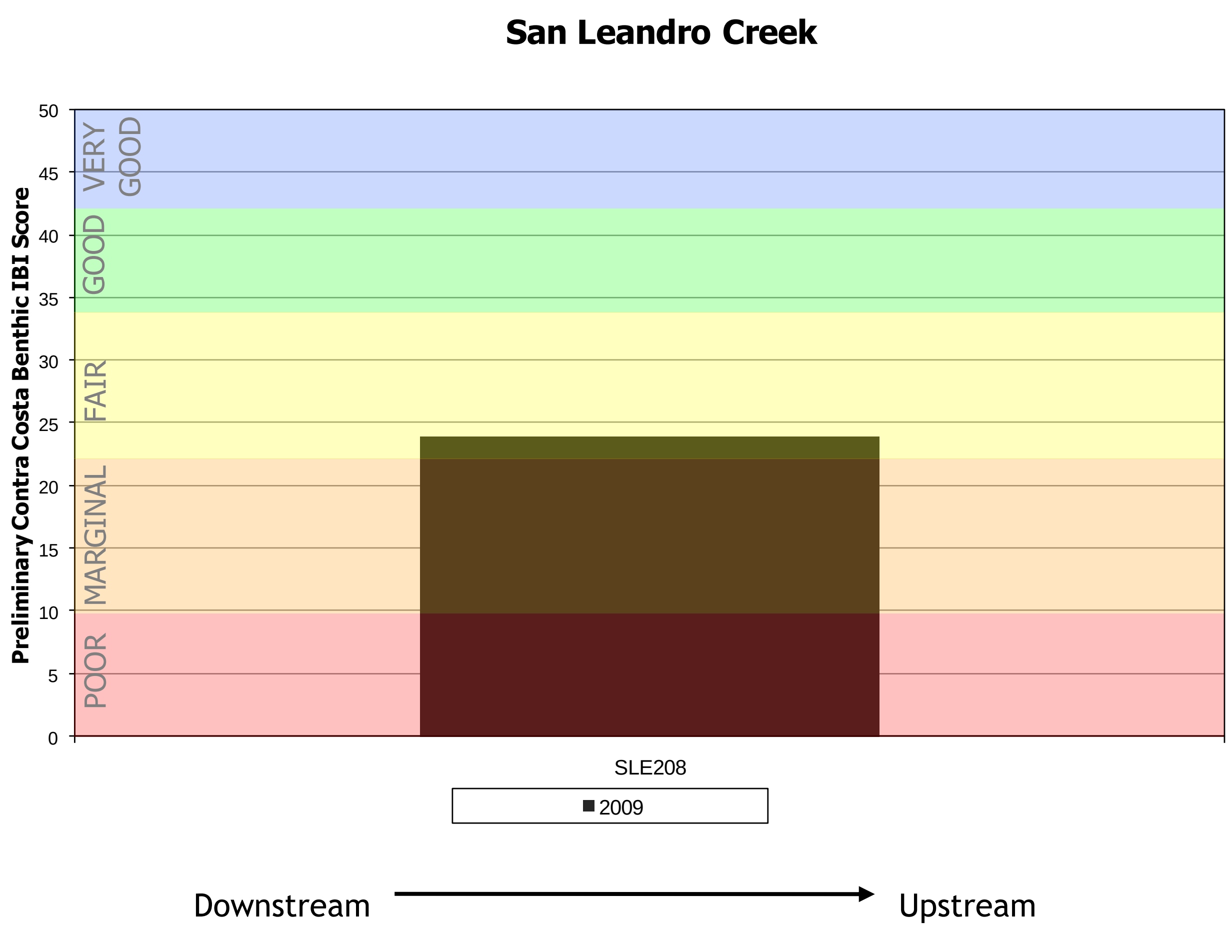
3.5.10 Rodeo Creek Watershed

The farthest-downstream portion of Rodeo Creek (site RDO009 is new in 2009, slightly downstream of site RDO010) appears improved compared to earlier measurements made nearby in 2004 and 2005. This may not indicate a trend, however, as It is possible that this variability is due to difference in hydrology or in measurement protocol.



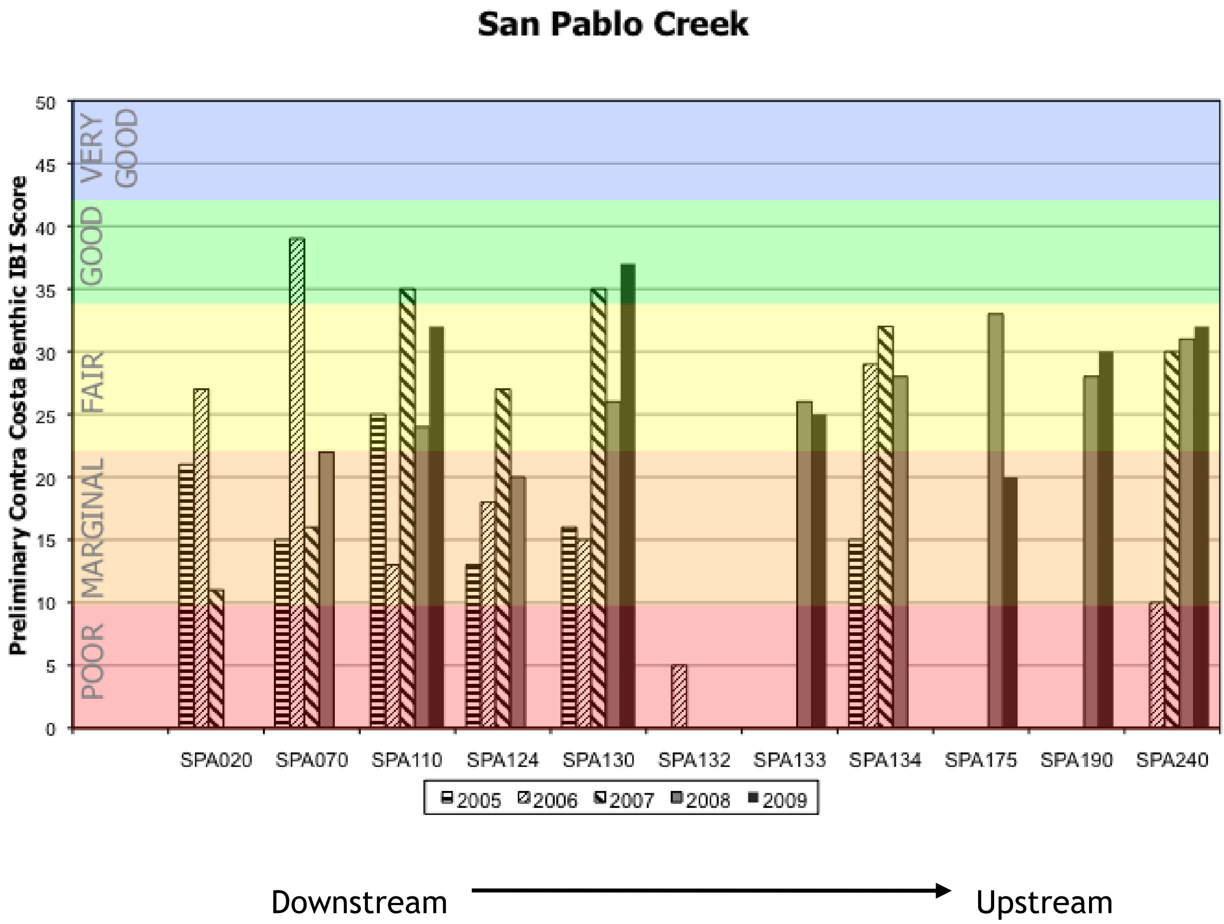
3.5.11 San Leandro Creek Watershed

A site on Moraga Creek, in the San Leandro Creek watershed, was monitored for the first time in 2009.



3.5.12 San Pablo Creek Watershed

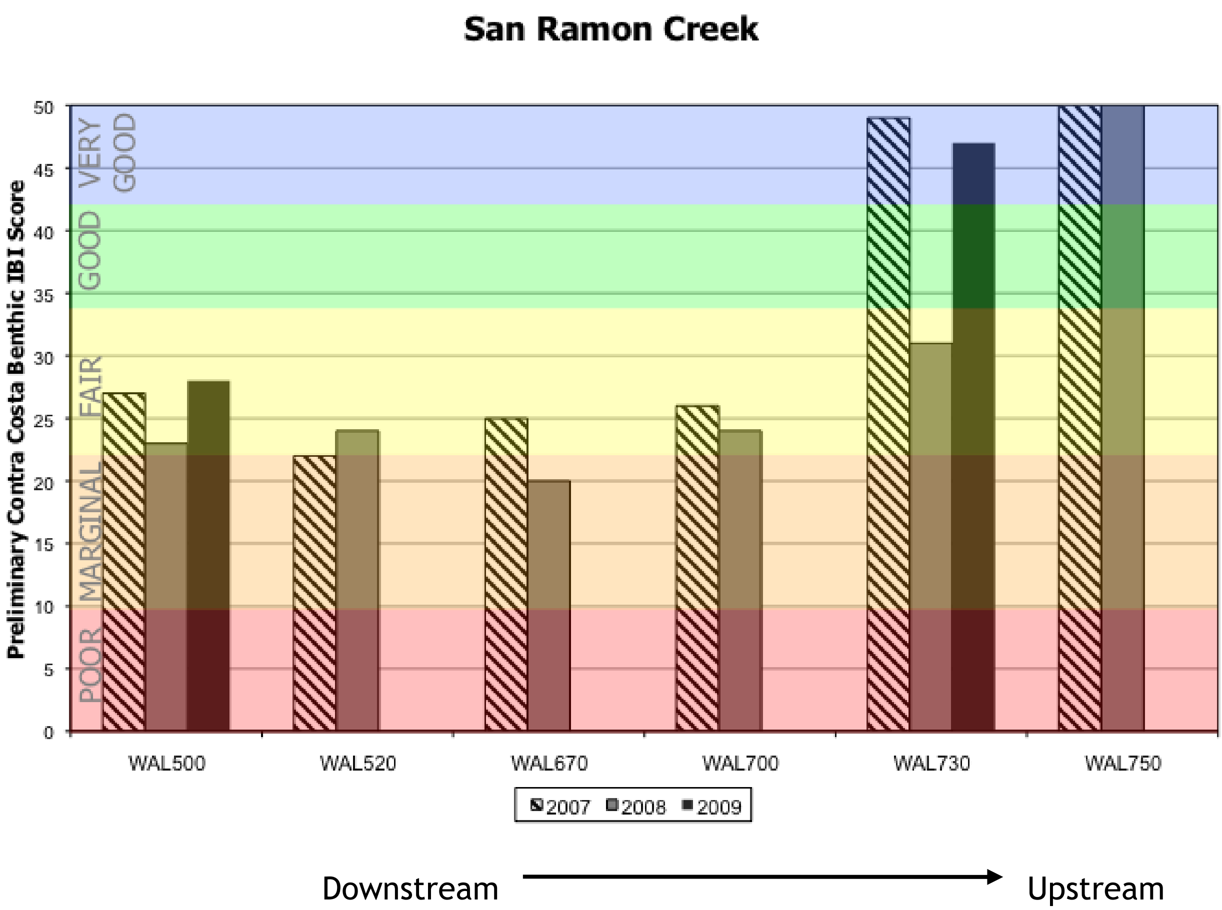
The condition of aquatic life uses in creek stations located in the San Pablo Creek watershed appears to be highly variable from site to site and year to year.



Note: San Pablo Reservoir is located between sites SPA134 and SPA175.
Note also: 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.

3.5.13 San Ramon Creek Watershed

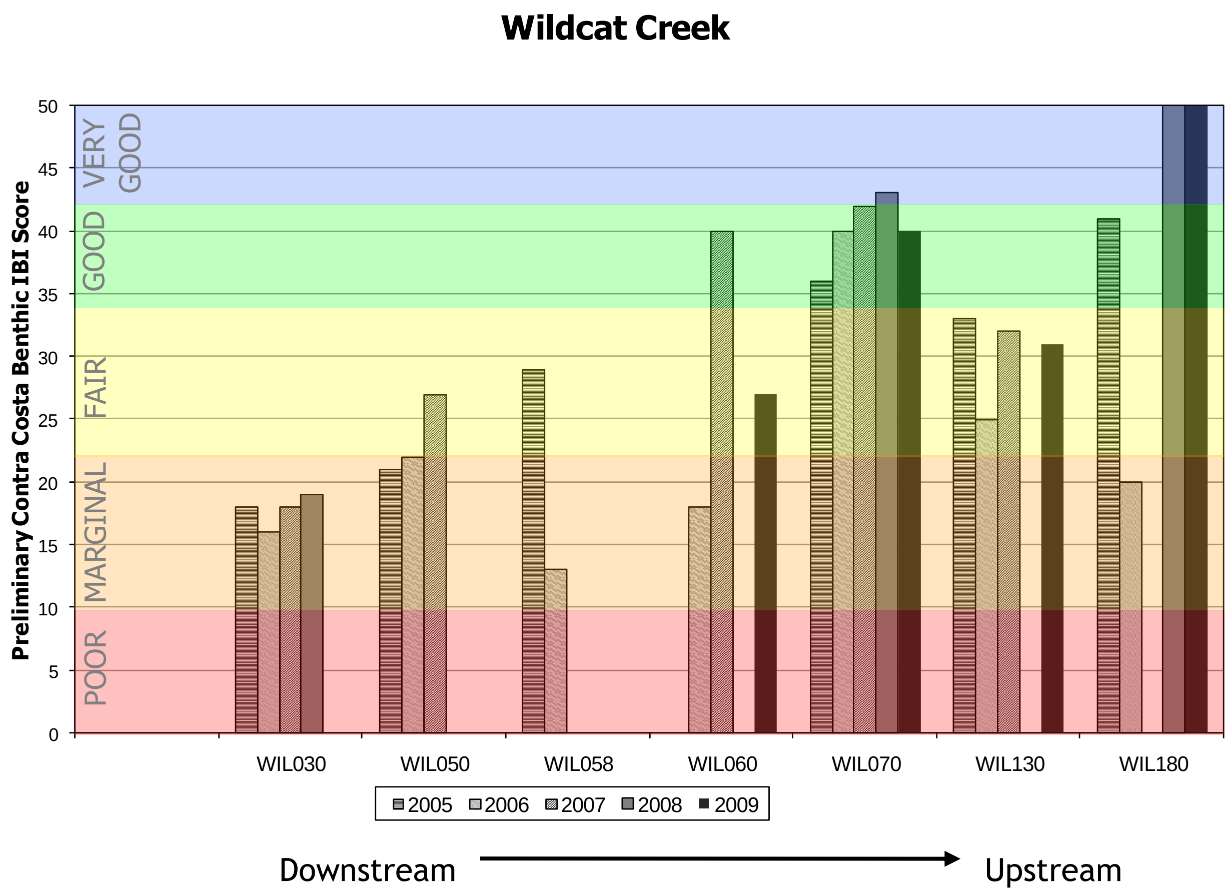
The San Ramon Creek watershed was monitored for the first time in 2007. The condition of aquatic life uses in the creek stations located in the San Ramon Creek watershed appears to be marginal to very good.



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

3.5.14 Wildcat Creek Watershed

Stations in the Wildcat Creek watershed have marginal to very good B-IBI scores.



4.0 CONCLUSIONS AND RECOMMENDATIONS

In 2009 the Contra Costa Volunteer Creek Monitoring Program conducted bioassessments at 35 creek sampling stations, within 14 of the 29 major watersheds in Contra Costa County, using the current (2007) California Surface Water Ambient Monitoring Program (SWAMP) protocols. To provide a measurement of Aquatic Life Use condition at these stations, a preliminary Benthic Index of Biotic Integrity (B-IBI) was calculated for each station, using an approach developed previously for creeks in Contra Costa County. Ranges of B-IBI scores were then assigned to poor, marginal, fair, good, and very good categories.

Results from 2009 indicate that roughly 71% of creek stations sampled in Contra Costa County scored in the very good, good, or fair categories. Stations in Pine and San Ramon Creeks (Walnut Creek Watershed), Wildcat Creek, and Marsh Creek scored the highest of all stations sampled (B-IBI scores equal to or above 40). The lowest IBI scores (18 or lower) were calculated for stations in the lower reaches of Marsh, Mt. Diablo, Cerrito, Pine, and Rheem Creeks. Generally, lower scores were obtained from samples in lower reaches of the respective watersheds, where higher-density urban land uses typically predominate.

For 2009 data, physical habitat quality ("PHAB") scores (based on a semi-quantitative scoring system) were positively, though weakly, correlated with B-IBI scores. Physical habitat condition is typically related to the degree of development of the watershed.

Watershed-wide average B-IBI scores were calculated from the 2009 data to allow for broad inter-watershed comparisons. Among the 14 monitored watersheds there is a wide range in average scores, from San Ramon, Wildcat and Alhambra Creeks, ranked first, second, and third, respectively, with average B-IBI scores in the "good" category, to Rheem and Cerrito Creek watersheds, ranked in the "marginal" category. Most watersheds had average scores in the "fair" category. Because all sites cannot be monitored every year, in any given year the mix of sites selected for monitoring strongly influences watershed-wide average scores.

Annual variability in average IBI scores is attributable to a number of factors, including monitoring site selection for that year, as well as antecedent (preceding) rainfall, and other climatological conditions.

New Zealand mudsnails (*Potamopyrgus antipodarum*) were present in a sample collected from a Baxter Creek site (BAX030).

Recommendations

The following recommendations are made for CCMAP monitoring and data analysis:

- Continue analysis of the influence of climatic factors - such as seasonal rainfall - on annual average B-IBI scores and the underlying metrics. Following completion of the 2010 BMI monitoring, include the full ten years of BMI monitoring results in an analysis of the correlation of hydrographic factors with the B-IBI scores and underlying metrics, and with annual changes in the relative species assemblages. Include consideration of: BMI sample timing (seasonally), antecedent conditions prior to sampling, and duration and intensity of major rainfall events. Derive recommendations applicable to future BMI monitoring, including for example guidance regarding the appropriate timeframe for BMI sample collection.
- Assess the effects of the types of sites selected (e.g., relative numbers of sites in low-medium-high elevation ranges) on annual average B-IBI scores. Derive recommendations applicable to future BMI monitoring, including for example guidance regarding appropriate BMI sample site selection criteria.
- Perform additional analysis regarding the influences of land use and physical habitat factors on benthic status, for example by analysis of indicators of degree of urbanization (such as

population density or percentage watershed impervious surface), canopy cover, or type of channel construction vs. B-IBI score.

- Perform additional analysis regarding the influences of various water quality parameters on B-IBI scores. Include consideration of the potential effects of urban runoff pollutants. Derive recommendations for acquisition of additional data needed for this analysis as part of the monitoring to be performed under the Municipal Regional Stormwater Permit.
- Incorporating the results of the previous four recommendations, perform an analysis of the ten-year BMI monitoring data set in an effort to answer the five key management questions shown in Table 1. For management questions 3 and 4 in particular, additional water quality data will be necessary.
- In the annual site selection process, attempt to include sites distributed throughout the high, middle and lower elevation ranges of each watershed monitored, to avoid skewing the average annual results to any one range. To aid in the analysis of year-to-year variability, attempt to monitor some sites for a minimum of 3 years in succession, before taking a year or two off.
- To facilitate standardization in site naming and locations, refer to the master list of current-year sampling locations each year prior to commencing field work, and provide field personnel with field data sheets that are pre-printed with site name, site code and location, which will then be field-verified.
- Note any adjustments to the CCMAP that may be required by the monitoring provisions of the NPDES Municipal Regional Permit for stormwater discharges (MRP), with respect to site locations, monitoring methods, or reporting requirements.
- Accommodate assessment of the presence of the New Zealand mud snail within the BMI identification process. Continue to pay careful attention to decontamination of sampling equipment to prevent cross-contamination of monitoring sites. Work with DF&G to identify an acceptable means of assessing the presence of this invasive species.

5.0 REFERENCES

Armand Ruby Consulting (ARC). (2008). Contra Costa Monitoring and Assessment Program, Summary of Benthic Macroinvertebrate Bioassessment Results (2007). Prepared for Contra Costa Clean Water Program. September.

Barbour, M.T., J. Gerritsen, B. D. Snyder, and J. B. Stribling. (1999). Revision to rapid bioassessment protocols for use in streams and rivers: periphyton, BMIs and fish. EPA 841-D-97-002.US Environmental Protection Agency, Washington, DC.

Cressey, S. and C.A. Sommers. (2002) Alhambra Creek Watershed Rapid Bioassessment Pilot Project Report. Prepared for the Contra Costa Clean Water Program. Martinez, CA. February 12.

_____. (2003) Contra Costa Monitoring and Assessment Plan (CCMAP) – 2002 Rapid Bioassessment Project Report. Prepared for the Contra Costa Clean Water Program. Martinez, CA. March 17.

_____. (2004) Contra Costa Monitoring and Assessment Plan (CCMAP) – 2003 Rapid Bioassessment Project Report. Prepared for the Contra Costa Clean Water Program. Martinez, CA. February 18.

_____. (2005) Contra Costa Monitoring and Assessment Plan (CCMAP) – 2004 Rapid Bioassessment Project Report. Prepared for the Contra Costa Clean Water Program. Martinez, CA. August 18.

_____. (2006) Contra Costa Monitoring and Assessment Plan (CCMAP) – 2005 Rapid Bioassessment Project Report. Prepared for the Contra Costa Clean Water Program. Martinez, CA. August 16.

Contra Costa Community Development Department (CDD). (2003). Contra Costa Watershed Atlas. Martinez, CA.

Cummins, K. W. and M.J. Klug (1979). Feeding Ecology of Stream Invertebrates. Annual Review of Ecology and Systematics, Vol. 10, 1979 (1979), pp. 147-172

Eisenberg, Olivieri and Associates (EOA). (2006). Contra Costa Citizen Monitoring Program Rapid Bioassessment Report. Prepared for the Contra Costa Community Development Department. December.

Eisenberg, Olivieri and Associates (EOA). (2007). Preliminary Assessment of Aquatic Life Use Condition in Contra Costa Creeks; Summary of Benthic Macroinvertebrate Bioassessment Results (2006). Prepared for the Contra Costa Clean Water Program. June 22, 2007.

Epler, J.H. (2001). Identification Manual for the Larval Chironomidae of North and South Carolina. USEPA Grant #X984170-97. September 27.

Gerth, W. J., and A. T. Herlihy. 2006. The effect of sampling different habitat types in regional macroinvertebrate bioassessment surveys. Journal of the North American Benthological Society 25:501–512.

Hughes, R. M., P. R. Kaufmann, A. T. Herlihy, T. M. Kincaid, L. Reynolds, and D. P. Larsen. (1998). A process for developing and evaluating indices of fish assemblage integrity. Canadian Journal of Fisheries and Aquatic Sciences 55:1618–1631.

Karr, J. R. and E. W. Chu. 1999. Restoring life in running waters – better biological monitoring. Island Press, Covelo, CA.

McCormick, F. H., R. M. Hughes, P. R. Kaufmann, D. V. Peck, J. L. Stoddard, and A. T. Herlihy. (2001). Development of an index of biotic integrity for the Mid-Atlantic Highlands Region. Transactions of the American Fisheries Society 130:857–877.

Ode, P.R., A. Rhen, A., J. May. (2005). Quantitative Tool for Assessing the Integrity of Southern Coastal California Streams. Environmental Management Vol. 35, No. 4, pp. 493–504.

Ode, P.R. 2007. Standard operating procedures for collecting macroinvertebrate samples and associated physical and chemical data for ambient bioassessments in California. California State Water Resources Control Board Surface Water Ambient Monitoring Program (SWAMP) Bioassessment SOP 001.

Rhen, A.C. and P. Ode. (2006). Development of a Benthic Index of Biotic Integrity (B-IBI) for Wadeable Streams in Northern Coastal California and its Application to Regional 305(b) Assessment. Draft Report. Prepared by the California Dept. of Fish and Game, Aquatic Bioassessment Laboratory. Rancho Cordova, CA.

SUMMARY OF FIELD MEASUREMENTS AND PHYSICAL HABITAT ASSESSMENT SCORES FOR SITES SAMPLED IN 2009

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
ALH130	Alhambra Creek	Alhambra Cr. below Arroro del Hombre	5/17/2009	10:00	17.0	7.78	81.10%	7.70	2053	336	150	124
ALH150	Arroyo del Hambre	Arroyo del Hambre above Castle Creek Ct.	5/17/2009	15:00	21.6	7.74	88.60%	7.80	2453	384	150	101
BAX030	Baxter Creek	Booker T. Anderson Park	4/30/2009	10:30	14.7	7.07	71.00%	7.60	1134	323	150	116
CER010	Cerrito Creek	Pacific East Mall	4/30/2009	15:15	17.9	14.52	205.50%	7.80	5620	444	150	103
MSH045	Lower Marsh Creek	Marsh Cr. Trail Off Sand Cr. Rd. - Pinn Bros.	4/19/2009	9:30	16.2	7.85	80.50%	7.60	2135	200	150	109
MSH052	Lower Marsh Creek	Between Dainta and Balfour	5/9/2009	14:00	22.7	11.61	136.90%	7.80	3485	230	150	115
MSH061	Lower Marsh Creek	Creekside Park	4/19/2009	13:30	18.1	6.51	69.50%	7.60	733	110	150	127
MSH130	Upper Marsh Creek	County Detention Center	5/1/2009	10:00	14.8	7.47	93.63%	7.70	389.7	300	150	138
MSH140	Upper Marsh Creek	210 Tumbleweed Ct.	5/9/2009	9:30	13.7	9.38	90.82%	7.80	1419	328	150	147
MTD020	Mt Diablo Creek	Diablo Cr. Golf Course (hole 16)	5/24/2009	16:30	na	na	na	7.80	na	360	150	82
MTD060	Mt Diablo Creek	Clayton Library	5/24/2009	11:00	na	na	na	7.60	na	340	150	125
PNL010	Pinole Creek	Pinole Creek at Senior Center	5/18/2009	15:00	23.0	10.90	126.42%	7.80	2984	368	150	121
PNL029	Pinole Creek	Pinole Library Demonstration Garden	4/16/2009	9:30	10.5	12.55	114.00%	na	1556	408	150	133
PNL100	Periera Creek	Bear Cr. Road - upstream of footbridge	4/16/2009	15:30	14.3	11.77	115.40%	na	725	300	150	125
PNL110	Pinole Creek	Bear Cr. Road - upstream of natural drop	5/18/2009	10:30	15.2	6.82	68.47%	7.60	2245	288	150	125
RDO009	Rodeo Creek	Downstream of Viewpoint Blvd.	5/31/2009	10:00	18.8	1.45	16.01%	7.20	3909	584.1	150	91
RHM030	Rheem Creek	Contra Costa Community College	5/22/2009	10:00	13.8	8.33	81.10%	7.70	1823	375	150	109
SLE208	Moraga Creek	Miramonte HS	5/23/2009	14:00	13.0	7.43	70.20%	7.70	1013	350	150	126
SPA110	Wilkie Creek	Santa Rita Rd by De Anza School	5/7/2009	9:30	15.4	7.72	77.80%	7.60	2057	212	150	129
SPA130	Castro Creek	Castro Ranch Rd. US of Olinda/Hillside	6/14/2009	9:30	13.8	8.75	85.10%	7.70	1467	396	150	150
SPA133	Castro Creek	Wagner Ranch Nature area	5/10/2009	11:00	13.5	6.81	66.60%	7.80	2525	392	150	131
SPA175	San Pablo Creek	EBRPD land near Conestoga way	5/16/2009	15:30	15.7	7.54	76.10%	7.70	135.3	44	150	165
SPA190	San Pablo Creek	EBMUD Orinda Treatment Plant	5/16/2009	10:00	15.0	9.23	92.30%	7.80	1423	340	150	135
SPA240	San Pablo Creek	Upstream of Camino Encinas Rd.	5/23/2009	9:10	12.6	9.00	15.50%	7.80	895	300	150	127
WAL200	Pine Creek	Via de Mercados	5/15/2009	10:00	18.5	11.31	120.90%	7.70	2148	420	150	118
WAL220	Gallindo Creek	Trailside Circle	4/22/2009	14:30	20.7	8.39	94.83%	7.60	3138	372	150	140
WAL290	Little Pine Creek	Mt. Diablo State Park - NW entrance	4/22/2009	10:00	17.7	7.25	76.00%	7.70	112.5	362	150	130
WAL365	Lafayette Creek	Village Center	5/6/2009	10:30	14.6	9.08	89.60%	7.70	998	320	150	119
WAL375	Las Trampos Creek	Leigh Creekside Park	6/2/2009	10:00	17.9	10.33	103.00%	8.00	1309	360	150	115
WAL500	San Ramon Creek	Creekside Street	4/20/2009	15:30	20.1	4.97	55.70%	7.70	1660	400	150	138
WAL730	Bollinger Creek	Chen's property off Bollinger Canyon Rd.	4/20/2009	10:00	15.3	10.12	101.10%	7.65	1077	336	150	135
WIL060	Wildcat Creek	At Vale Rd.	4/23/2009	14:00	14.7	10.68	105.80%	7.80	1177	322	150	119
WIL070	Wildcat Creek	Alvarado Park at Buckeye Picnic Area	4/25/2009	10:00	12.8	(na)	84.13%	7.80	1080	318	150	149
WIL130	Wildcat Creek	1/4 mile up Lone Oak Picnic Area Trail	4/14/2009	14:30	9.7	5.50	47.50%	na	(na)	316	150	153
WIL180	Wildcat Creek	Big Springs Picnic Area	4/14/2009	10:00	8.0	2.42	19.00%	na	428	108	150	141

Note: Site names and locations have been standardized. All other information in this table is derived directly from the field data sheets.
Note: the Las Trampas, Pine and San Ramon Creek sites are located within the Walnut Creek watershed.

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 2009 data collection effort.

2009 QC SUMMARY–Completeness/Representativeness

The following 2009 samples contained less than the expected 500 organisms, indicating relatively low abundance of BMI organisms at these 9 sites (and confirmed in the duplicate sample at WAL375):

SPA175
SPA190
WIL080
MSH061
WAL200
WAL290
WAL365
WAL375
WAL375dup
SLE208

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.

2009 QC SUMMARY - Field Duplicates

Four field duplicate samples were submitted to the BSI lab and analyzed in 2009. 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 2009 duplicates, the average RPD was 23% for the standard set of BMI metrics (so these metrics were on average 77% similar). An acceptable level of difference between duplicates is normally considered to be 20-25%.

2009 QC SUMMARY – Inter-lab Comparisons

Inter-lab comparative analysis was performed by the Aquatic Bioassessment Laboratory–Chico (ABL), at California State University, Chico. The QC analysis was performed in accordance to the Southwest Association of Freshwater Invertebrate Taxonomists (SAFIT)'s Standard Taxonomic Effort Document (STE) 28 November 2006 version (Richards and Rogers, 2006). Results of the inter-laboratory quality control indicated that the taxonomy was performed to level 1 standard taxonomic effort, but there were instances of taxonomic discrepancies involving Callibaetis, Agabus and Corticacarus. These taxa were reexamined by the original taxonomist and changes were made where appropriate prior to final metric calculations.

The raw inter-laboratory QC data files are available through the CCMAP.

INDIVIDUAL METRICS AND CALCULATED B-IBI SCORES FOR SITES SAMPLED IN 2009

Waterbody Name	Site	Collection Date	EPT Taxa	Metric Score	Number Diptera Taxa	Metric Score	Number Predator Taxa	Metric Score	% Collectors	Metric Score	% Non-insect Taxa	Metric Score	Total IBI
Alhambra	ALH130	5/17/09	3	3	10	10	9	9	92	3	28	8	**33**
Alhambra	ALH150	5/17/09	4	4	11	10	9	9	81	8	24	8	**39**
Baxter	BAX030	4/30/09	1	1	6	10	3	3	34	10	53	3	**27**
Cerrito	CER010	4/30/09	0	0	6	10	2	2	97	1	53	3	**16**
Marsh	MSH045	4/19/09	1	1	5	8	1	1	94	3	40	5	**18**
Marsh	MSH052	5/9/09	4	4	6	10	3	3	74	10	47	4	**31**
Marsh	MSH061	4/19/09	0	0	3	4	1	1	99	1	63	1	**7**
Marsh	MSH130	5/1/09	7	7	10	10	8	8	75	10	13	10	**45**
Marsh	MSH140	5/9/09	11	10	10	10	11	10	71	10	19	9	**49**
Mt. Diablo	MTD020	5/24/09	0	0	5	8	1	1	95	2	44	5	**16**
Mt. Diablo	MTD060	5/24/09	4	4	7	10	6	6	42	10	38	6	**36**
Pinole	PNL010	5/18/09	2	2	7	10	3	3	95	2	47	4	**21**
Pinole	PNL029	4/16/09	2	2	5	8	4	4	98	1	43	5	**20**
Pinole	PNL100	4/16/09	4	4	8	10	6	6	83	7	17	10	**37**
Pinole	PNL110	5/18/09	2	2	12	10	9	9	79	9	27	8	**38**
Rodeo	RDO009	5/31/09	2	2	5	8	5	5	72	10	33	7	**32**
Rheem	RHM030	5/22/09	1	1	5	8	2	2	96	2	54	3	**16**
San Leandro	SLE208	5/23/09	1	1	8	10	2	2	88	5	36	6	**24**
San Pablo	SPA110	5/7/09	1	1	10	10	4	4	81	8	20	9	**32**
San Pablo	SPA130	6/14/09	3	3	10	10	8	8	84	7	21	9	**37**
San Pablo	SPA133	5/10/09	1	1	7	10	5	5	95	2	33	7	**25**
San Pablo	SPA175	5/16/09	1	1	7	10	1	1	100	0	27	8	**20**
San Pablo	SPA190	5/16/09	2	2	7	10	3	3	82	8	29	7	**30**
San Pablo	SPA240	5/23/09	3	3	7	10	4	4	78	10	42	5	**32**
Pine	WAL200	5/15/09	3	3	5	8	2	2	82	8	50	4	**25**
Pine	WAL220	4/22/09	2	2	5	8	3	3	99	1	47	4	**18**
Pine	WAL290	4/22/09	5	5	8	10	13	10	55	10	18	9	**44**
Las Trampas	WAL365	5/6/09	1	1	8	8	4	4	76	10	38	6	**29**
Las Trampas	WAL375	6/2/09	2	2	4	6	2	2	94	3	30	7	**20**

San Ramon	WAL500	4/20/09	1	1	7	10	3	3	64	10	47	4	**28**
San Ramon	WAL730	4/20/09	8	8	12	10	12	10	79	9	17	10	**47**
Wildcat	WIL060	4/23/09	4	4	8	10	5	5	97	1	29	7	**27**
Wildcat	WIL070	4/25/09	8	8	7	10	6	6	82	8	26	8	**40**
Wildcat	WIL130	4/14/09	4	4	7	10	5	5	88	5	29	7	**31**
Wildcat	WIL180	4/14/09	11	10	9	10	10	10	54	10	12	10	**50**

Taxonomic list of benthic macroinvertebrates identified in samples from Contra Costa County stream sites, spring 2009.

Phylum / Class / Order / Family / Final ID	CTV[1]	FFG[2]
Arthropoda		
Insecta		
Coleoptera		
Dytiscidae		
Agabus	8	p
Ametor	5	p
Laccophilus	5	p
Sanfillipodytes	5	p
Stictotarsus	5	p
Elmidae		
Optioservus	4	sc
Gyrinidae		
Gyrinus	5	p
Haliplidae		
Peltodytes	5	mh
Hydrophilidae		
Cymbiodyta	5	p
Enochrus	5	cg
Diptera		
Cyclorrhaphous/Brachycera	6	
Diptera (undetermined)		
Ceratopogonidae		
Bezzia/ Palpomyia	6	p
Ceratopogonidae	6	p
Probezzia	6	p
Chironomidae		
Chironomini	6	cg
Orthocladiinae	5	cg
Pseudochironomini	5	cg
Tanypodinae	7	p
Tanytarsini	6	cg
Dixidae		
Dixa	2	cg
Dixella	2	cg
Dixidae	2	cg
Meringodixa chalonensis	2	cg
Dolichopodidae		
Dolichopodidae	4	p
Empididae		
Clinocera	6	p
Empididae	6	p
Neoplasta	6	p
Trichoclinocera/Clinocera	6	p
Ephydridae		

Ephydra	6	sh
Ephydridae	6	
Muscidae		
Muscidae	6	p
Pelecorhynchidae		
Glutops	3	p
Psychodidae		
Pericoma/Telmatoscopus	4	cg
Psychoda	10	cg
Sciomyzidae		
Sciomyzidae	6	p
Simuliidae		
Prosimulium	3	cf
Simulium	6	cf
Stratiomyidae		
Caloparyphus/Euparyphus	8	cg
Euparyphus	8	cg
Stratiomys	8	cg
Tabanidae		
Tabanidae	8	p
Tipulidae		
Antocha	3	cg
Dicranota	3	p
Hexatoma	2	p
Limonia	6	sh
Rhabdomastix	3	p
Tipula	4	om
Ephemeroptera		
Ameletidae		
Ameletus	0	cg
Baetidae		
Baetis	5	cg
Callibaetis	9	cg
Fallceon quilleri	4	cg
Procloeon	4	cg
Ephemerellidae		
Drunella	0	cg
Ephemerella	1	cg
Heptageniidae		
Cinygmula	4	sc
Heptageniidae	4	sc
Leptophlebiidae		
Paraleptophlebia	4	cg
Siphlonuridae		
Siphlonurus	7	cg
Megaloptera		
Corydalidae		
Neohermes	0	p
Orohermes crepusculus	0	p
Sialidae		
Sialis	4	p
Odonata		

Aeshnidae		
Aeshnidae		p
Anax	8	p
Aeshna	5	p
Coenagrionidae		
Argia	7	p
Coenagrionidae		p
Zoniagrion exclamationis	9	p
Cordulegastridae		
Cordulegaster dorsalis	3	p
Lestidae		
Archilestes	9	p
Plecoptera		
Capniidae		
Capnia	1	sh
Capniidae	1	sh
Chloroperlidae		
Chloroperlidae	1	p
Nemouridae		
Malenka	2	sh
Nemouridae	2	sh
Perlidae		
Calineuria californica	1	p
Perlodidae		
Baumanella alameda	2	p
Isoperla	2	p
Kogotus nonus	2	p
Perlodidae	2	p
Taeniopterygidae		
Taenionema	2	om
Trichoptera		
Glossosomatidae		
Agapetus	0	sc
Hydropsychidae		
Hydropsyche	4	cf
Hydroptilidae		
Hydroptila	6	ph
Oxyethira	3	ph
Lepidostomatidae		
Lepidostoma	1	sh
Odontoceridae		
Parthina	0	sh
Polycentropodidae		
Polycentropus	6	p
Rhyacophilidae		
Rhyacophila	0	p
Sericostomatidae		
Gumaga	3	sh
Malacostraca		
Amphipoda		
Anisogammaridae		
Ramellogammarus	6	cg

Corophiidae		
Americorophium spinicorne	4	cf
Crangonyctidae		
Crangonyx	4	cg
Stygobromus	4	cg
Hyalellidae		
Hyalella	8	cg
Tanaidacea		
Tanaidae		
Sinelobus stanfordi		
Arachnoidea		
Acari		
Acari	5	p
Eylidae		
Eylais	5	p
Hygrobatidae		
Atractides	8	p
Hygrobates	8	p
Lebertiidae		
Lebertia	8	p
Mideopsidae		
Mideopsis	5	p
Pionidae		
Pionidae	5	p
Sperchontidae		
Sperchon	8	p
Ostracoda		
Ostracoda	8	cg
Annelida		
Hirudinea		
Arhynchobdellida		
Erpobdellidae		
Erpobdella punctata	8	p
Erpobdellidae	8	p
Oligochaeta		
Oligochaeta	5	cg
Lumbricida		
Megadrili		cg
Polychaeta		
Polychaeta		cf
Coelenterata		
Hydrozoa		
Hydroida		
Hydridae		
Hydra	5	p
Mollusca		
Bivalvia		
Veneroida		
Corbiculidae		
Corbicula	10	cf
Sphaeriidae		
Pisidium	8	cf

APPENDIX D - Benthic Macroinvertebrate Taxa Identified in Contra Costa County, 2009, cont'd

Gastropoda		
Basommatophora		
Lymnaeidae		
Lymnaeidae	6	sc
Physidae		
Physa	8	sc
Planorbidae		
Gyraulus	8	sc
Helisoma	6	sc
Menetus	7	sc
Hypsogastropoda		
Hydrobiidae		
Hydrobiidae	8	sc
Potamopyrgus antipodarum	8	sc
Nemertea		
Enopa		
Tertastemmatidae		
Prostoma	8	p
Platyhelminthes		
Turbellaria		
Turbellaria	4	p

1) 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

APPENDIX E – 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

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 in-crease	
Evidence of fires in reach or immediately upstream (<500 m)	NO		< 1 year		< 5 years	
Dominant landuse/ landcover in area surrounding reach	Agriculture		Forest		Range-land	
	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							
Rapid		Center Upstream					
Riffle							
Run		Center Down-stream		Right Bank	eroded	vulnerable	stable
Glide							
Pool							
Dry		Center Right					

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							
Rapid		Center Upstream					
Riffle							
Run		Center Down-stream		Right Bank	eroded	vulnerable	stable
Glide							
Pool							
Dry		Center Right					

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							
Rapid		Center Upstream					
Riffle							
Run		Center Down-stream		Right Bank	eroded	vulnerable	stable
Glide							
Pool							
Dry		Center Right					

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%)	
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: H

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: I

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: J**

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							
Rapid		Center Upstream					
Riffle							
Run		Center Down-stream		**Right Bank**	eroded	vulnerable	stable
Glide							
Pool							
Dry		Center Right					

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

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							
Rapid		Center Upstream					
Riffle							
Run		Center Down-stream		**Right Bank**	eroded	vulnerable	stable
Glide							
Pool							
Dry		Center Right					

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 F – Completed Physical Habitat (PHAB) Field Data Sheets and SWAMP Stream Characterization Forms, 2009

Completed Physical Habitat field data sheets and SWAMP Stream Habitat Characterization Forms from all sites collected in 2009 (on CD-ROM).

APPENDIX G – 2009 MONITORING SITE PHOTOGRAPHS

Photos from all sites monitored in 2009 (on CD-ROM)

APPENDIX H - COMPARISON OF B-IBI SCORES FOR SITES MONITORED IN 2007-09

Waterbody Name	Site Code	B-IBI 2007	B-IBI 2008	B-IBI 2009
Baxter Creek	BAX030	28	22	27
Cerrito Creek	CER010	10	17	16
Upper Marsh Creek	MSH130	43	30	45
Upper Marsh Creek	MSH140	48	48	49
Mt. Diablo Creek	MTD020	24	18	16
Mt. Diablo Creek	MTD060	34	21	36
Periera Creek	PNL100	32	41	37
Pinole Creek	PNL110	35	40	38
Rheem Creek	RHM030	17	20	16
Wilkie Creek	SPA110	35	24	32
Castro Creek	SPA130	35	26	37
San Pablo Creek	SPA240	30	31	32
San Ramon Creek	WAL500	27	23	28
Bollinger Creek	WAL730	49	31	47
Wildcat Creek	WIL070	42	43	40
	Average:	32.6	29.0	33.1

Highlighted cells indicate highest average BMI IBI score for that site.

CONTRA COSTA
CLEAN WATER
PROGRAM

Thomas Dalziel
Interim Program Manager

July 1, 2010

Bruce H. Wolfe, Executive Officer
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

CALIFORNIA REGIONAL WATER
JUL 1 2010
QUALITY CONTROL BOARD

Dear Mr. Wolfe:

This letter is to inform you that as per provision C.8.a.i of the Municipal Regional Permit, the Contra Costa Clean Water Program and all twenty-one (21) of its co-permittees affirm their participation in the Regional Monitoring Coalition (RMC) for the remainder of the permit term.

Co-permittees voted to affirm their individual participation in the RMC at the June 16, 2010 Management Committee meeting. Minutes of that meeting are attached documenting a vote in the affirmative from all twenty-one (21) of the Program's co-permittees (see "Action Item A"). As per the language of our Program Agreement, each Management Committee representative's vote is binding on their jurisdiction.

We appreciate the Water Board's role in fostering regional cooperation among stormwater programs by allowing us the option to create a regional framework for monitoring. We look forward to continued collaboration and the generation of meaningful water quality monitoring data in the years to come.

Sincerely,

Thomas Dalziel
Interim Program Manager
Contra Costa Clean Water Program

JC:TD:kh
G:\NPDES\WAM_Monitoring Cmte\BASMAA Monitoring_POCs Committee\RMC Workplan\Ltr to B. Wolfe re RMC 7-1-10.doc

Attachment

CONTRA COSTA
CLEAN WATER
PROGRAM

CALIFORNIA REGIONAL WATER
JUL 1 2010
QUALITY CONTROL BOARD

LETTER OF TRANSMITTAL

TO: **Mr. Bruce H. Wolfe, Executive Officer**
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

DATE: **July 1, 2010**

SUBJECT: **Contra Costa Clean Water Program's 2009/2010 Trash Hot Spot Submittal**

We are transmitting to you [ ] by mail, [X] by messenger, [ ] by ________the following items:

Copies	Description
1-DVD	CCCWP Trash Hot Spot Submittal Spreadsheet Folder of Trash Hot Spot Photo Documentation

These items are transmitted as checked below:

[ ] For approval
[x] For your use
[x] As requested
[ ] For review and comment

[ ] Approved as submitted
[ ] Approved as noted
[ ] Returned for corrections
[ ] ______ copies retained for our files

[ ] Reviewed/no additional comments
[ ] Reviewed/see additional comments
[ ] Return _______ corrected prints

Sincerely,

Thomas E. Dalziel
Interim Program Manager

G:\NPDES\MOC\Trash Hot Spot Submittal 060110\FINAL SUBMITTAL\TRANSMTL LTR SF 09 10.doc

Central Contra Costa Sanitary District

HHWCF Pollutant of Concern Tracking Log - Totals for July 2009 to June 2010

Mercury Containing Devices	# of Items or Units				Total Pounds Hg
Thermostats - 3 gms per unit	159	ea	477	Grams	1.05
Thermometers - 1gm / thermometer	2,227	ea	2,227	Grams	4.90
Elemental Hg					78.50
Switches - Pounds (-10% for container)	6.60	lbs.	6.00	lbs.	6.00
Mercury Batteries - 3,125 mg/lb batteries	15.00	lbs.	46,875	Milligrams	0.10
Fluorescent Lamps - 5.7mg/ft	270,026	Feet	1,539,148	Milligrams	3.39
				Grand total Hg in Lbs.	**93.94**

Description

Thermostats - Each HVAC type thermostat contains approximately 3 grams of Hg in each ampule.

Thermometers - A number of studies report that mercury containing thermometers contain between 0.5 and 3 grams depending on their size. As a result, the fever sized thermometer (1gram Hg / thermometer) will be used to calculate the quantity of mercury in thermometers.

Switches - As there are no standard sizes or quantities of mercury in switches, all switches will be weighed and 10% their gross weight will be subtracted to account for its container.

Mercury Batteries - Studies show that button cell batteries contain up to 25 mg of mercury in each battery. Since there is a wide variety in the sizes of button cells, the following is assumed: There are roughly 250 cells in one pound. Using the average of 12.5 mg/cell accounts for all sizes. Therefore, 250 cells x 12.5 mg = 3,125 mg of mercury/pound of cells.

Fluorescent Lamps - Based on numerous studies, fluorescent lamps have as little as 3.5 mg mercury with some having as much as 60 mg. For this report, 22.8 mg / 4ft. Lamp (or 5.7mg / foot of lamp) was used. 22.8 mg is the average concentration for a four foot lamp produced after 1994.

West County Haz Waste

HHWCF Pollutant of Concern Tracking Log - Totals for July 2009 to June 2010

Mercury Containing Devices	Qty	Unit	X factor	unit	Mg Hg	Pounds Hg
Hg containing waste	135	lbs				Undeterminable w data provided
Fluorescent Lamps - all sizes	162904	feet	5.70	mg/foot	928553	2.05
Thermometers	38	ea	1000	mg/therm	38000	0.08
					966,553	**2.13 Grand Total hg in pounds**

Description

Fluorescent Lamps - Based on numerous studies, fluorescent lamps have as little as 3.5 mg mercury and as much as 60 mg. For this report, 22.8 mg / 4ft. Lamp (or 5.7mg / foot of lamp) was used. 22.8 mg is the average concentration for a four foot lamp produced after 1994.

For West County, the data provided was that 20,363 pounds of fluorescent bulbs were recycled. Bulbs weigh approximately 0.125 lbs per foot of bulb

Thermometers - A number of studies report that mercury containing thermometers contain between 0.5 and 3 grams depending on their size. As a result, the fever sized thermometer (1gram Hg / thermometer or 1,000 mg/thermometer) will be used to calculate the quantity of mercury in thermometers.

Delta Diablo Sanitation District

HHWCF Pollutant of Concern Tracking Log - Totals for July 2009 to June 2010

Mercury Containing Devices	Qty	Unit	X factor	unit	Mg Hg	Pounds Hg
Hg containing thermostats/switches etc.	13	lbs				Undeterminable w data provided
Hg containing waste (other)	36	lbs				Undeterminable w data provided
Fluorescent Lamps - 4' straight tube	59508	Feet	5.70	mg/ft	339196	
Fluorescent Lamps - 8' straight tube	13072	Feet	5.70	mg/ft	74510	
Fluorescent Lamps - CFLs	2488	Feet	5.70	mg/ft	14182	
Fluorescent Lamps - U-tube/circular	960	Feet	5.70	mg/ft	5472	
					433360	**0.96 Grand total Hg in Pounds**

Description

Thermostats - Each HVAC type thermostat contains approximately 3 grams of Hg in each ampule.

Thermometers - A number of studies report that mercury containing thermometers contain between 0.5 and 3 grams depending on their size. As a result, the fever sized thermometer (1gram Hg / thermometer) will be used to calculate the quantity of mercury in thermometers.

Switches - As there are no std sizes or quantities of mercury in switches, all switches will be weighed and 10% their gross weight will be subtracted to account for its container.

Mercury Batteries - Studies show that button cell batteries contain up to 25 mg of mercury in each battery. Since there is a wide variety in the sizes of button cells, the following is assumed: There are roughly 250 cells in one pound. Using the average of 12.5 mg/cell accounts for all sizes. Therefore, 250 cells x 12.5 mg = 3,125 mg of mercury/pound of cells.

Fluorescent Lamps - Based on numerous studies, fluorescent lamps have as little as 3.5 mg mercury and some as much as 60 mg. For this report, 22.8 mg / 4ft. Lamp (or 5.7mg / foot of lamp) was used. 22.8 mg is the average concentration for a four foot lamp produced after 1994.

CONTRA COSTA CLEAN WATER PROGRAM
ORGANIZATIONAL STRUCTURE

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
- Budgetary
- Conflict Resolution

MANAGEMENT COMMITTEE

DUTIES

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

STAFF

Tom Dalziel, (TD), Interim Program Manager
Elisa Wilfong, (EW), Watershed Management Planning Specialist
Jamison Crosby, (JC), Watershed Management Planning Specialist
Michelle McCauley, (MM), Administrative Analyst
Kristen Hardeman, (KH), Clerk - Senior 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
Lynne Scarpa, City of Richmond
Phil Hoffmeister, City of Antioch

BASMAA DEVELOPMENT COMMITTEE

PROGRAM REPRESENTATIVES

Tom Dalziel, Program Staff
David Swartz, Contra Costa County
Frank Kennedy, Town of Moraga and City of Oakley

BASMAA PUBLIC INFORMATION / PARTICIPATION COMMITTEE

PROGRAM REPRESENTATIVES

Michelle McCauley, Program Staff
Stephen Spedowfski, City of San Ramon
Dan Jordan, Contra Costa County

BASMAA MUNICIPAL OPERATIONS COMMITTEE

PROGRAM REPRESENTATIVES

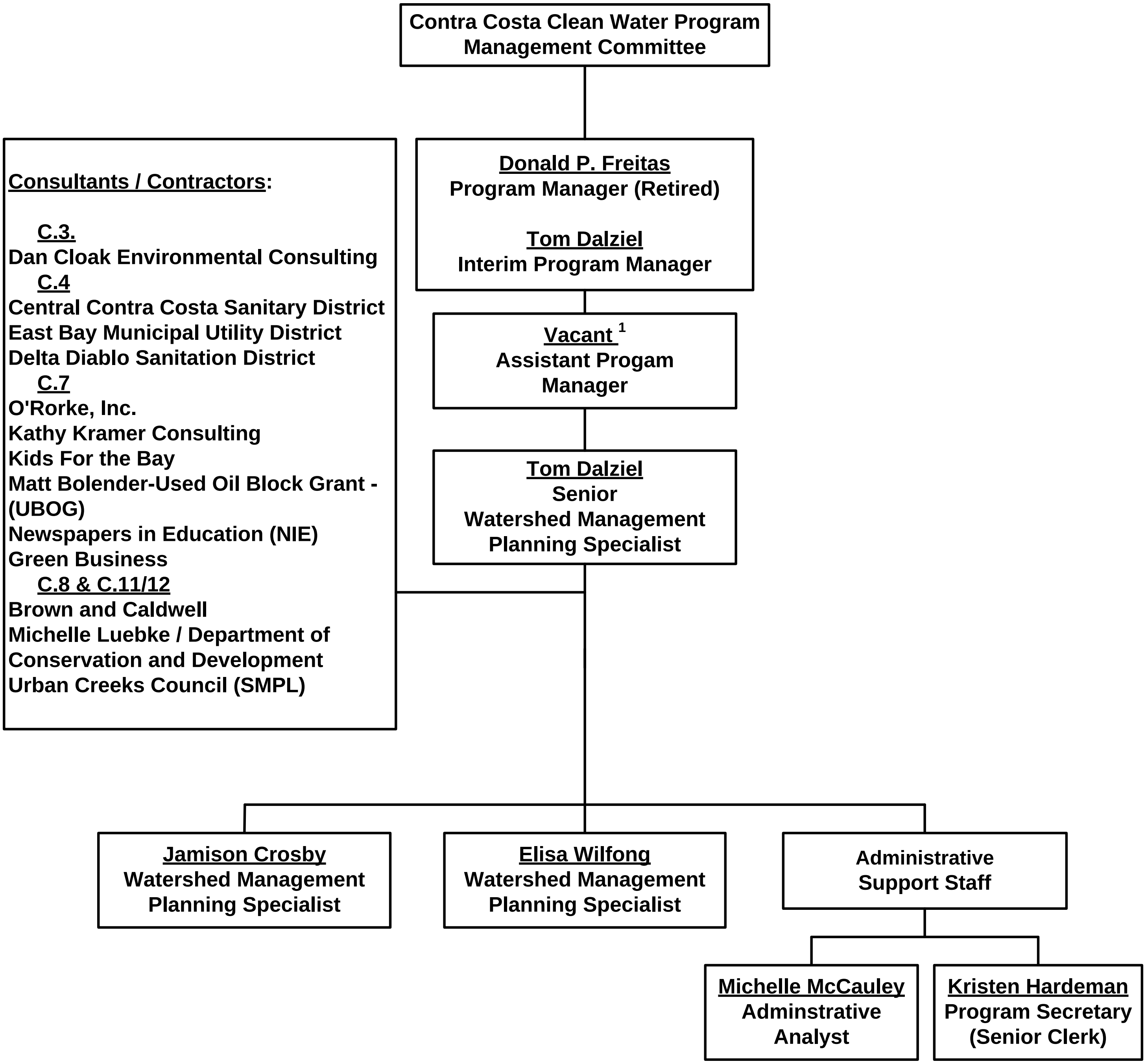
Elisa Wilfong, Program Staff
Rinta Perkins, City of Walnut Creek,
Steven Spedowfsk, City of San Ramon

BASMAA TRASH COMMITTEE

PROGRAM REPRESENTATIVES

Elisa Wilfong, Program Staff
Rinta Perkins, City of Walnut Creek,
Steven Spedowfsk, City of San Ramon

Contra Costa Clean Water Program Management



[1] Reclassification of person and position (Tom Dalziel) was approved by the Public Works Department, but denied by the County Admiinistrator.

G://GrpData/NPDES/Org Charts/CCCWP Program Management 09/10
Last Updated: September 13, 2010

ADMINISTRATIVE COMMITTEE
FY 2009/10 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL (3)	AUG (3)	SEP	OCT	NOV (3)	DEC (3)	JAN	FEB	MAR	APR	MAY	JUN	INDIV % ATT	MUNI % ATT
City of Antioch	**Phil Hoffmeister (1)**			1	1				1	1	1	1	1	88%	**88%**
	Julie Haas-Wajdowicz													0%	
City of Brentwood	**Jack Dhaliwal**				1			1	1	1	1			63%	**88%**
	Jeff Cowling			1								1		25%	
City of Concord	**Jeff Roubal**				1			1	1	1	1	1	1	88%	**100%**
	Libby Bell			1	1									25%	
County Unincorp.	**David Swartz**				1				1	1	1		1	63%	**100%**
	Rich Lierly							1				1		25%	
	Charmaine Bernard													0%	
	Dan Jordan			1										13%	
City of Pittsburg	**Jolan Longway**			1	1			1	1	1	1	1	1	100%	**100%**
	Laura Wright													0%	
City of Pleasant Hill	**Rod Wui**			1	1			1	1	1	1		1	88%	**88%**
	Steve Wallace													0%	
City of Richmond	Jenny Oorbeck													0%	**100%**
	Lynne Scarpa			1	1			1	1	1	1	1	1	100%	
PROGRAM STAFF															
	Donald Freitas			1	1			1	1						
	Tom Dalziel			1	1			1	1	1	1	1	1		
	Jamison Crosby									1	1				
	Elisa Wilfong			1	1										
	Michelle McCauley			1	1			1	1	1	1	1	1		
NON-VOTING															
Flood Control	Mitch Avalon			1	1			1		1	1		1		
	Greg Connaughton			1	1				1						
Town of Danville	Chris McCann				1			1	1				1		
City of San Ramon	Steven Spedowfski							1	1				1		

(1) Chairperson

(2) Vice-Chairperson

(3) Meeting Cancelled

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MANAGEMENT COMMITTEE
FY 2009/10 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL	AUG	SEP[3]	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	1	1		1	91%	**91%**
	Julie Haas-Wajdowicz													0%	
City of Brentwood	**Jeff Cowling**	1					1							18%	**100%**
	Jack Dhaliwal		1		1	1		1	1	1	1	1	1	82%	
City of Clayton	Kristen Burger													0%	
	Laura Hoffmeister	1	1		1	1	1	1	1	1	1	1	1	100%	**100%**
City of Concord	**Jeff Roubal**	1	1		1	1	1		1	1	1	1	1	91%	**100%**
	Libbey Bell							1						9%	
Town of Danville	**Christine McCann**	1	1		1	1	1	1	1	1		1	1	91%	**91%**
	Michael Stella													0%	
City of El Cerrito	Alexis Petru													0%	
	Melanie Mintz													0%	
	Garth Schultz	1	1		1	1	1	1	1	1		1	1	91%	**91%**
City of Hercules	Erwin Blancaflor								1					9%	**91%**
	Jeff Brown									1		1		18%	
	Jose Pacheco	1	1		1	1		1			1		1	64%	
City of Lafayette	**Donna Feehan**	1	1		1	1	1	1	1	1	1	1	1	100%	**100%**
	Ron Lefler													0%	
City of Martinez	**Alex Stroup**	1	1		1	1	1	1	1	1	1	1		91%	**100%**
	Tim Tucker							1		1			1	27%	
Town of Moraga	Frank Kennedy		1					1	1					27%	**82%**
	John Sherbert											1	1	18%	
	Jill Mercurio	1			1	1					1			36%	
City of Oakley	**Frank Kennedy**	1	1		1	1		1	1	1	1	1	1	91%	**91%**
	Jason Vogan													0%	
City of Orinda	**Cathy Terentieff**		1		1	1	1			1	1	1	1	73%	**100%**
	Paul Lang	1						1	1					27%	
City of Pinole	Nancy Voisey	1	1		1	1	1	1	1			1	1	82%	**82%**
	Dean Ellison								1					9%	
	Frank Kennedy													0%	
City of Pittsburg	Jason Burke	1												9%	**100%**
	Jolan Longway		1		1	1	1	1	1	1	1	1	1	91%	

MANAGEMENT COMMITTEE

FY 2009/10 ATTENDANCE ROSTER

City of Pleasant Hill	**Rod Wui [2]**	1	1		1	1	1	1	1	1	1	1	1	100%	**100%**
	Steve Wallace													0%	
City of Richmond	**Lynne Scarpa**	1	1		1	1	1	1	1	1	1	1	1	100%	**100%**
	Jenny Oorbeck													0%	
City of San Pablo	**Karineh Samkian**	1	1		1	1	1					1	1	64%	**100%**
	Adele Ho							1	1	1	1			36%	
City of San Ramon	**Steven Spedowfski**	1	1		1	1	1	1	1		1	1	1	91%	**91%**
	Maria Robinson													0%	
City of Walnut Creek	**Rinta Perkins**	1			1	1	1	1	1	1	1	1	1	91%	**100%**
	Scott Wikstrom													0%	
	Steve Waymire		1											9%	
Contra Costa County	**Rich Lierly**	1	1			1	1		1		1	1	1	73%	**100%**
	David Swartz		1		1			1		1				36%	
Flood Control	**Greg Connaughton**	1			1			1	1	1				45%	**88%**
	Paul Detjens											1	1	18%	
	Mitch Avalon						1	1			1			25%	
PROGRAM STAFF															
	Donald Freitas	1	1		1	1	1	1	1	1					
	Tom Dalziel	1	1		1	1	1	1	1	1	1	1	1		
	Jamison Crosby	1	1		1	1	1	1	1	1	1	1	1		
	Elisa Wilfong	1	1		1	1	1	1	1	1	1	1			
	Michelle McCauley	1	1		1	1	1	1	1	1	1	1	1		
	Kristen Hardeman				1								1		

[1] Chairperson

[2] Vice- Chairperson

[3] Meeting cancelled

MUNICIPAL OPERATIONS COMMITTEE
2009/10 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	INDIV % ATT	MUNI % ATT
City of Antioch	**Roger Clarke**							1	1			1		50%	**67%**
	Phil Hoffmeister									1				17%	
City of Brentwood	**Jeff Cowling**							1				1		33%	**83%**
	Roger Stromgren										1			17%	
	Laurie Monte								1		1	1	1	67%	
City of Concord	**Jeff Roubal**							1		1	1		1	67%	**83%**
	Libbey Bell								1					17%	
Contra Costa County	**Charmaine Bernard**							1	1	1		1	1	83%	**83%**
	Nancy Stein											1		17%	
	Tony Medina								1				1	33%	
	Alex Anaya								1					17%	
City of El Cerrito	**Garth Schultz** [(1)]							1	1	1		1	1	83%	**83%**
	Bill Driscoll							1	1	1			1	67%	
City of Hercules	**Glenn Moniz**							1	1	1	1	1	1	100%	**100%**
	Misael Gomez												1	17%	
City of Lafayette	Ron Lefler													0%	
	Donna Feehan										1			17%	
	David Terhune							1	1	1			1	67%	**83%**
City of Pinole	**Patrick Bowie**							1	1		1	1	1	83%	**100%**
	Tim Harless							1		1		1		50%	
City of Pittsburg	**Hilario Mata**							1	1				1	50%	**83%**
	Bobby Joaquin												1	17%	
	Walter Pease								1	1	1			50%	
City of San Pablo	**John Medlock**							1	1		1			50%	**66%**
	Adele Ho									1				17%	

MUNICIPAL OPERATIONS COMMITTEE
2009/10 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	INDIV % ATT	MUNI % ATT
City of San Ramon	**Steven Spedowfski**								1	1	1	1	1	83%	**83%**
	Patrick Gutierrez								1					17%	
City of Walnut Creek	**Rich Payne** (2)							1	1			1	1	67%	**100%**
	Rinta Perkins							1	1	1	1			67%	
PROGRAM STAFF															
	Elisa Wilfong							1	1	1	1	1			
	Jamison Crosby										1	1	1		
	Michelle McCauley							1	1	1	1	1	1		
NON-VOTING															
City of Clayton	Laura Hoffmeister														
Town of Danville	Chris McCann							1		1	1	1	1		
City of Martinez	Alex Stroup														
Town of Moraga	John Sherbert								1		1	1	1		
Town of Moraga	AJ Kennedy							1							
City of Oakley	AJ Kennedy								1	1	1	1			
City of Oakley	Frank Kennedy														
City of Orinda	Cathy Terrentieff									1	1	1			
City of Orinda	Paul Lang								1				1		
City of Pleasant Hill	Rod Wui								1				1		
City of Richmond	Lynne Scarpa								1		1	1	1		

(1) Chairperson

(2) Vice-Chairperson

(3) Meeting Cancelled

NEW DEVELOPMENT COMMITTEE
2009/2010 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL	AUG	SEP (3)	OCT (3)	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
City of Antioch	**Phil Hoffmeister**		1				1	1		1	1	1	
	Julie Haas-wajdowicz												
City of Clayton	**Laura Hoffmeister**						1	1		1		1	1
City of Concord	Jeff Rogers												
	Libbey Bell (2)	1	1			1	1	1	1	1	1	1	
	Mario Camorangan												
Town of Danville	**Chris McCann**		1			1	1	1	1	1		1	1
City of El Cerritto	Yvette Ortiz					1							
	Saied Aminian	1	1				1	1		1	1	1	1
City of Hercules	**Jeff Brown**						1		1	1		1	1
	Glenn Moniz	1	1					1					
City of Lafayette	**Christine Sinnette**	1					1	1	1	1	1	1	1
City of Martinez	**Khalil Yowakim**	1				1	1	1	1	1		1	1
	Tim Tucker												
Town of Moraga	Frank Kennedy						1					1	1
	John Sherbert	1	1			1		1	1	1	1		
City of Oakley	**Frank Kennedy**	1	1			1	1	1	1	1	1	1	1
City of Orinda	**Cathleen Terentieff**	1	1			1	1	1	1	1	1	1	1
City of Pinole	**Frank Kennedy**												
	Nancy Voisey	1	1				1	1	1	1			1
Contra Costa County	**David Swartz** (1)		1				1		1		1	1	1
	Monish Sen									1			
	Rich Lierly							1					
	Dan Jordan	1				1							
PROGRAM STAFF													
	Tom Dalziel	1	1			1	1	1	1	1	1	1	1
	Elisa Wilfong								1	1	1		
	Michelle McCauley	1	1			1		1					

NEW DEVELOPMENT COMMITTEE
2009/2010 ATTENDANCE ROSTER

NON-VOTING													
City of Pittsburg	**Jolan Longway**					1	1		1	1	1	1	1
City of Pleasant Hill	**Rod Wui**												
City of Richmond	Jay Ghandi												
	Lynne Scarpa		1				1		1	1	1		1
City of San Pablo	Karineh Samkian												
City of San Ramon	**Chris Low**	1	1			1	1		1	1	1	1	1
	Steven Spedowfski												
City of Walnut Creek	Carlton Thompson						1		1	1			1
	Scott Wikstrom												
	Diana Walker												

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

MONITORING COMMITTEE
2009/10 ATTENDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL	AUG[3]	SEP[3]	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	80%	**80%**
	Julie Haas-Wajdowicz													0%	
City of Concord	Libbey Bell								1					10%	
	Jeff Roubal	1			1	1	1	1		1	1		1	80%	**90%**
Contra Costa County	Charmaine Bernard													0%	
	Nancy Stein [2]	1			1	1	1	1	1	1	1	1	1	100%	**100%**
City of Richmond	**Lynne Scarpa [1]**	1			1	1	1		1	1	1	1		80%	**80%**
	Jenny Oorbeck													0%	
City of Walnut Creek	Michael Hawthorne										1			10%	
	Rinta Perkins	1			1	1	1	1	1	1		1	1	90%	**100%**
PROGRAM STAFF															
	Elisa Wilfong														
	Jamison Crosby	1			1	1	1	1	1	1	1	1	1		
	Michelle Luebke							1			1				
	Michelle McCauley	1			1	1	1		1	1	1	1			
NON-VOTING															
City of Pittsburg	Alfedo Hurtado				1				1	1	1		1		
	Jolan Longway	1						1							
City of San Pablo	Karineh Samkian	1				1	1								

(1) Chairperson

(2) Vice-Chairperson

(3) Meeting Cancelled

PUBLIC INFORMATION / PARTICIPATION COMMITTEE
2009/10 ATTEDANCE ROSTER

MUNICIPALITY	REPRESENTATIVE	JUL (3)	AUG (3)	SEP (3)	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	INDIV % ATT	MUNI % ATT
City of Antioch	**Julie Haas-Wajdowicz**				1	1	1	1	1	1	1	1	1	100%	**100%**
	Phil Hoffmeister													0%	
City of Brentwood	**Laurie Monte**				1	1	1		1	1				56%	**67%**
	Jeff Cowling										1			11%	
Flood Control District	**CeCe Sellgren**									1	1	1		33%	**100%**
	Greg Connaughton				1	1	1	1	1	1				67%	
City of Pittsburg	**Laura Wright** (2)				1	1	1	1	1	1		1	1	89%	**89%**
	Jason Burke													0%	
City of San Pablo	**Karineh Samkian**				1	1	1							33%	**33%**
	Adele Ho													0%	
City of San Ramon	**Steven Spedowfski** (1)				1	1	1	1	1		1	1		78%	**78%**
	Robin Bartlett													0%	
Contra Costa County	**Dan Jordan**				1	1	1	1	1			1	1	78%	**89%**
	David Swartz										1			11%	
PROGRAM STAFF															
	Donald P. Freitas				1	1	1	1	1	1					
	Tom Dalziel						1	1	1			1	1		
	Michelle McCauley				1		1	1	1	1	1	1			
NON-VOTING															
City of Richmond	Jenny Orbach														
	Lynne Scarpa							1			1	1			
City of El Cerrito	**Garth Schultz**								1						
City of Pinole	**Nancy Voisey**								1						

(1) Chairperson

(2) Vice-Chairperson

(3) Meeting Cancelled

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TOPLINE REPORT

For
O'Rorke, Inc.
By
Nichols Research, Inc.

May 2010

Nichols Research, Inc., 39141 Civic Center Drive, Suite 425, Fremont, CA 94538
www.nicholsresearch.com

Table of Contents

Purpose

The purpose of this study was to provide The Contra Costa Clean Water Program with information about attitudes, perceptions and behaviors of Contra Costa County Residents that would aid with continuing development and implementation of its outreach efforts and current campaign awareness. A benchmark study was conducted in 2009 with the same purpose and year-to-year comparisons, where appropriate, are included.

Content

More specifically, the survey provides information about the following topics:

1. Overall awareness and understanding of specific campaigns, including advertisements, slogans and messaging.
2. Perceptions and level of concern of the impact/pollution level of litter on local Contra Costa County water bodies.
3. Level of awareness and understanding of litter and protection of the County water bodies.
4. Understanding and knowledge of the CCCWP and its website.
5. Level of awareness and understanding of advertisements and specific slogans/messages related to litter.
6. Willingness to participate in litter prevention practices.

Methodology

O'Rorke retained the services of Nichols Research, the largest woman-owned marketing research and data-collection company in Northern California. All interviews were completed by trained and experienced interviewers within the Nichols Research phone center and monitored by an on-site supervisor during the entire course of the study.

Four hundred 6-8 minute interviews were conducted between mid April and mid May of 2010 to residents of Contra Costa County who are 18 years or older.

Random sampling was used so the completed interviews represent a population sample of the entire county with cross tabulations prepared for the four distinct areas of Contra Costa County: East, West, North/Central, Lamorinda/South, and the unincorporated area.

A reliability criterion of .01 and .05, or 99 and 95 percent was utilized for this project. The level of reliability indicates significant findings that are both one percent and five percent chance, or less that the statistical differences reported in the study are due to measurement error.

Quotas were established to ensure the most representative sample of the county as possible. The sample was stratified by area of the county and demographic variables, such as gender and age. The sample demographics were reflective of the population of Contra Costa County. A complete listing of demographics can be found in the appendix.

Social and Economic Changes Occurring Between 2009 and 2010

Top of mind awareness, perceptions and opinions can be affected by external factors such as political, social and economic issues. Environmental concerns can sometimes be overshadowed by other events that are viewed as more pressing. Some of the top changes that occurred between the Spring of 2009 and Spring of 2010 include:

- The economy declined all through 2009 and news of slow recovery only began to emerge in early 2010. People who are worried about their jobs and mortgage payments tend not to be as concerned about the environment.

- Increased usage of social sites like Facebook and LinkedIn. Adults aged 35-50 increased their usage of Facebook and Twitter emerged as a strong new digital tool.

- TIVO, DVRs and Netflix became more and more popular among TV viewers, partially because commercials can be skipped. Avid TV watchers are often likely to use a method to watch multiple TV shows in a shorter amount of time.

- Smart Phones have become even more of a source for advertising and information, particularly when the iPhone 3G was introduced in the summer of 2009 with thousands of new applications.

- YouTube increased its audience and continues to attract more creators and viewers.

- Newspaper readership continued to decline at an alarming rate because of an exodus to the web, including blogs and homepage news offerings such as 'Yahoo News'. Almost every major metropolitan newspaper was fighting for their life in 2009, and a few lost the battle and closed their doors.

- The effects of the BP oil spill in The Gulf had not yet been determined when this survey was conducted.

Principal Findings

Litter and Pollution

- Fewer respondents say they think litter impacts/pollutes local water bodies than in 2009, but when those who say maybe and don't know are included, there is only a slight change from one year to the next.

- Almost the same number of people are very or somewhat concerned about litter polluting water as were in 2009, with a small number more who are not at all concerned than in 2009.

- Renters, females and African Americans are the most concerned about litter polluting water.

- The population with the lowest incomes remains consistent with 2009 by all indicating they are very concerned about litter polluting water. This makes sense because the areas of the county with high concentrations of low-income residents also have the most problems with litter.

<u>Awareness of Reports/Advertising/Information About Litter</u>

- Fewer residents than in 2009 have heard or seen anything relating to how litter travels and builds up; the difference is extremely small though and may be attributed to changes in the type of media being viewed and listened to.

- Older citizens, over the age of 65, are more aware of reports/advertising/information about Litter, which may be a result of that age group continuing to utilize more traditional means of media like newspapers, radio and TV.

- There was a significant increase from 2009 in awareness from residents who saw stenciled storm drains and billboards with a message, but a decrease in those who saw advertising on the TV or heard it on the radio. Oddly, awareness via the Internet also decreased.

- Of those who had seen information, the majority said the message stated the threat of litter getting into the water system and the importance of not littering.

<u>Program Awareness</u>

- Awareness of the Contra Costa Clean Water Program remained flat from 2009 to 2010, but the regions of the County where there is awareness changed from year to year. In 2009 there was less awareness among residents of the unincorporated and North/Central areas of the county than in 2010.

- Of the respondents aware of CCCWP, a negligible number have ever visited the website, which is consistent with 2009.

<u>Advertisements, Slogans and Messages</u>

- There is an increase in the number of people that remember the slogan “Litter Travels But it Can Stop With You”, from 2009 to 2010, but about the same number remember “Fancy…Litter”.

- Again, residents in the unincorporated area and North/Central are more likely to remember the slogan. People in the 18-29 year age group are also the most likely to remember the slogan “Litter Travels” which is different than 2009 when people 60 and above, remembered it.

- Those who remembered either of the two messages indicate the main theme is that litter gets into the water system.

Pollution Prevention

- Actions that more than half of residents say they are willing to do are: ***Not Place Trash on the Sidewalk or Streets, Not Throw Cigarettes on the Ground, Participate in Community Events to Help Cleanup trash/Cigarettes Properly, Remind Family, Friends and Colleagues That Litter Travels and Should Stop With Us and Clean Up Litter in Park or Picnics Areas***
- Residents are least willing to ***Call an 800#*** or ***Visit a Website for More Information.***

- Many more people say that ***Not Place Trash on Sidewalk or Streets*** and ***Not Throw Cigarettes on the Ground*** are actions that do not apply to them than in 2009, which caused the total number of residents who say they would be ***very*** or ***somewhat*** likely to take these two actions to decrease from 2009.

- More residents say they are not willing to ***Stop Using Plastic Bags*** than said it in 2009, which is a moot point since most cities, and the whole State of California are planning to eliminate the use of plastic bags.

- Contra Costa County residents are more willing to ***Visit a Website For More Information*** than in 2009 and more are ***very*** willing to ***Participate in Community Events to Help Clean Up Trash/Cigarettes Properly***, but those ***not*** willing to take this action remains the same as 2009.

Significant Findings of the Survey

The findings are analyzed by the differences in response to each survey question based upon the following variables:

- Region of Contra Costa County respondent resides in
- Gender
- Age
- Income
- Education
- Ethnicity
- Length of time in current home
- Home ownership

1. Litter and Pollution

When asked whether they thought litter impacts/pollutes local water bodies, **76.5% of** respondents said ***yes***, **7%** said ***no***, **8%** said ***maybe*** and **8.5%** said ***don't know***. The percentage of respondents who said ***yes*** was much higher in 2009, ***87%***, than in 2010

- Although a similar number of males and females said ***yes,*** a slightly higher percentage of men, **9%**, than women, **5%**, said ***no***.

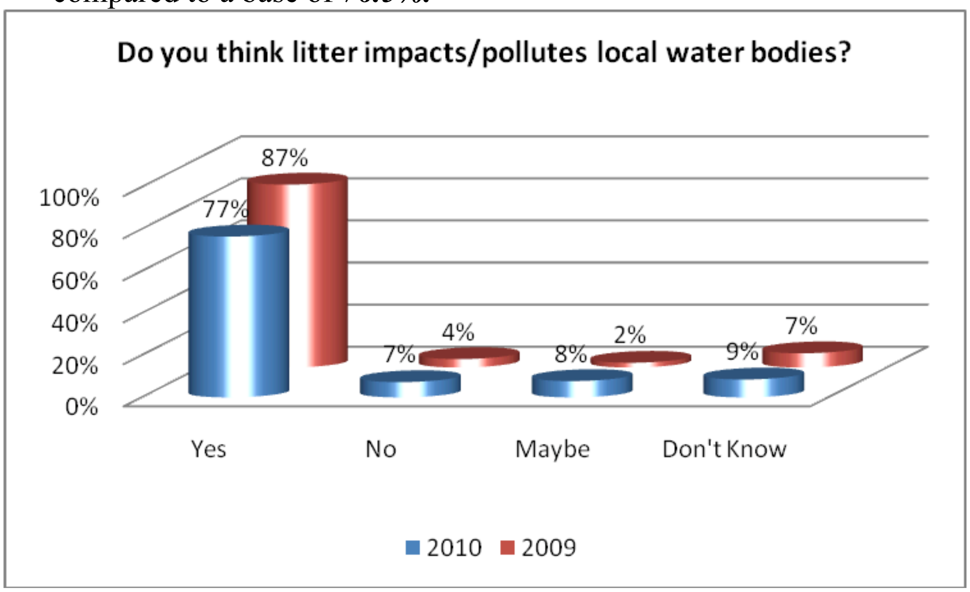
- 30-39 and 50-59 year olds said ***yes*** more often, **90/81%**, than those over 60 years old, ***62%*** and, consistent with the 2009 results, respondents older than 60 were much more likely to say ***don't know*** than younger respondents.

- No respondents with less than a high school education said ***no***; all 14 said yes, maybe or don't know. They also had the lowest percentage, ***57%***, of respondents to say ***yes***, and the highest ***maybe*** and ***don't know***.

- Residents living in the West, ***16%***, were more likely to say ***don't know*** than residents of the other areas.

- Asians and Hispanics were more likely to say ***don't know*** than Caucasians and African Americans.

- Respondents with the highest incomes, $100-$199K and those in the $15-$29K income group, said ***yes*** more frequently than those in other income groups, yet oddly, those with incomes over $200K responded more like the mid-income residents. Only ***50%*** of the lowest income respondents said ***yes***, compared to a base of ***76.5%.***



41% of residents said they would rate their concern about litter polluting water ***very*** high, **39%** said ***somewhat*** high, **15%** said a ***little*** and **5%** said ***not at all***. It is not surprising, and has been found in past studies and the 2009 results, that residents of the lower socioeconomic areas of Contra Costa County indicated greater concern about litter polluting water than residents of the more affluent areas.

- Caucasians at **37%**, and Asians at ***38%***, were less likely to say ***very*** concerned, whereas African Americans at **61%**, were more likely to say ***very,*** all of which is consistent with the 2009 findings. Asians and Caucasians were more likely to say ***somewhat,*** **40%** and **45%**, than African Americans, **32% and Hispanics, 27%**. Hispanics, at ***13%*** and Asians at ***11%*** were much more likely than others to say ***not at all***, with Caucasians and African Americans at ***2%,*** or less.

- Respondents' ages did not make as big a difference in how they answered this question as it did in 2009. The only major difference was that respondents over the age of 60 were more likely to say they are a ***little*** or ***not at all*** concerned more frequently than younger age groups, but not significantly.

- Renters and females, were most likely to say ***very*** concerned. **48%** of females but only **35%** of males said ***very***, whereas **18%** of males said a ***little*** compared to only ***11%*** of females. Also, **9%** of males said **not at all** while only **2%** of females said it. These findings are consistent with the differences found between genders and home ownership in 2009.

- **54%** of renters said ***very*** compared to ***39%*** of home owners and ***40%*** of lessees.

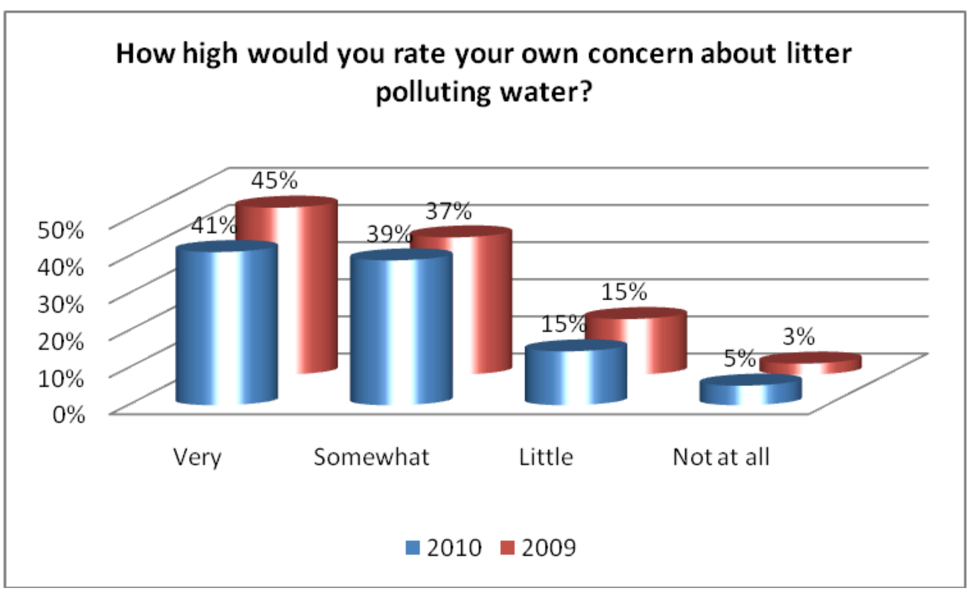
- Residents in the East area said a ***little*** much less often, **5%**, and those in the South area said ***very*** a little less often, **36%**.

- Unlike the findings in 2009, respondents with a high school degree, or less, were much more likely to have said ***not at all***, than the other education levels. In 2009, respondents with less than a high school education were much more likely than other education levels to say they were ***very*** concerned, whereas, in 2010 those same respondents are more consistent with the other education levels.

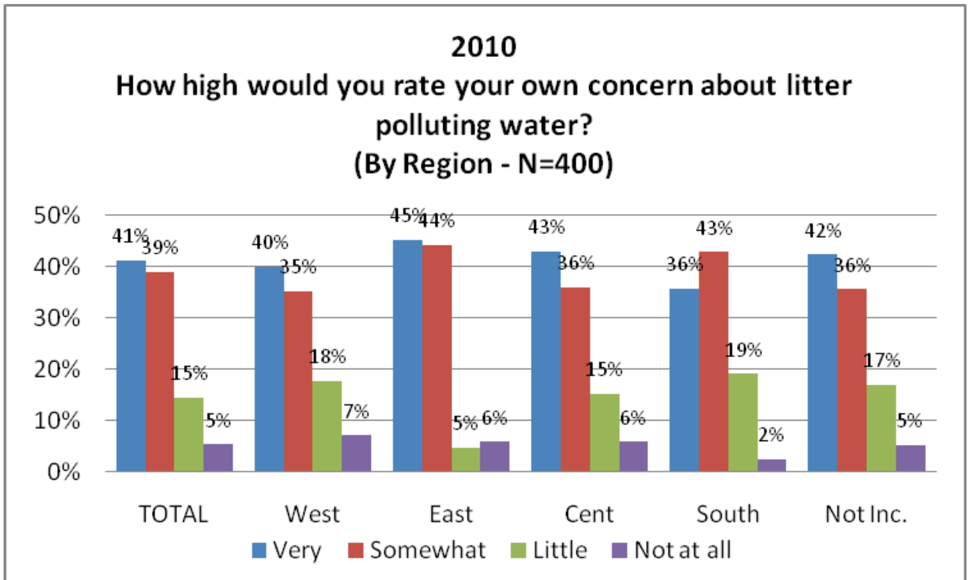
- Residents who have lived in their homes for less than one year were more likely than others to say ***very***, **53%**, and less likely to say ***a little, 7%.***

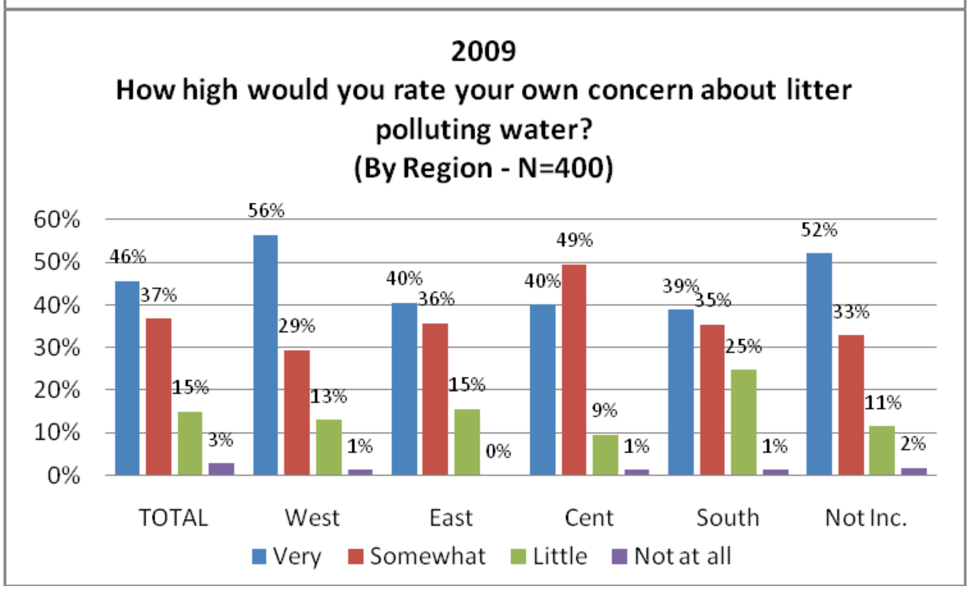
- As in 2009, **100%** of respondents with incomes under $15K rated their concern ***very*** or ***somewhat***.

<u>OVERALL</u>

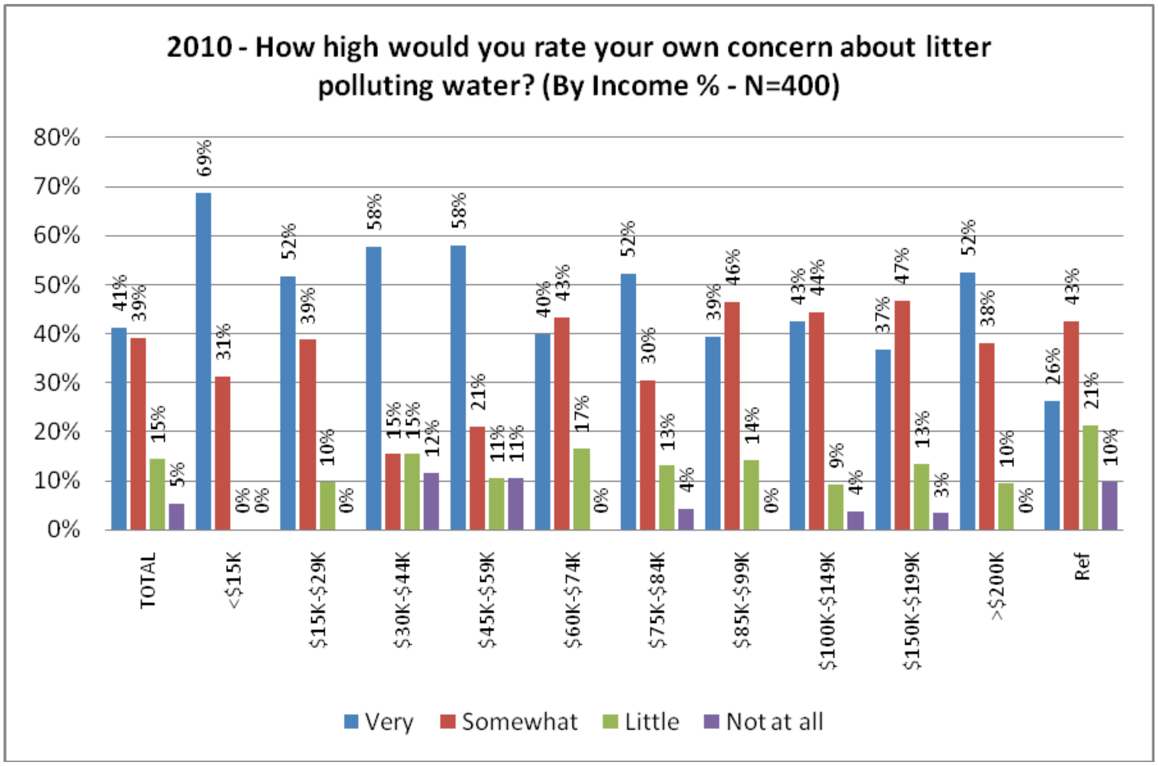


BY ***REGION***

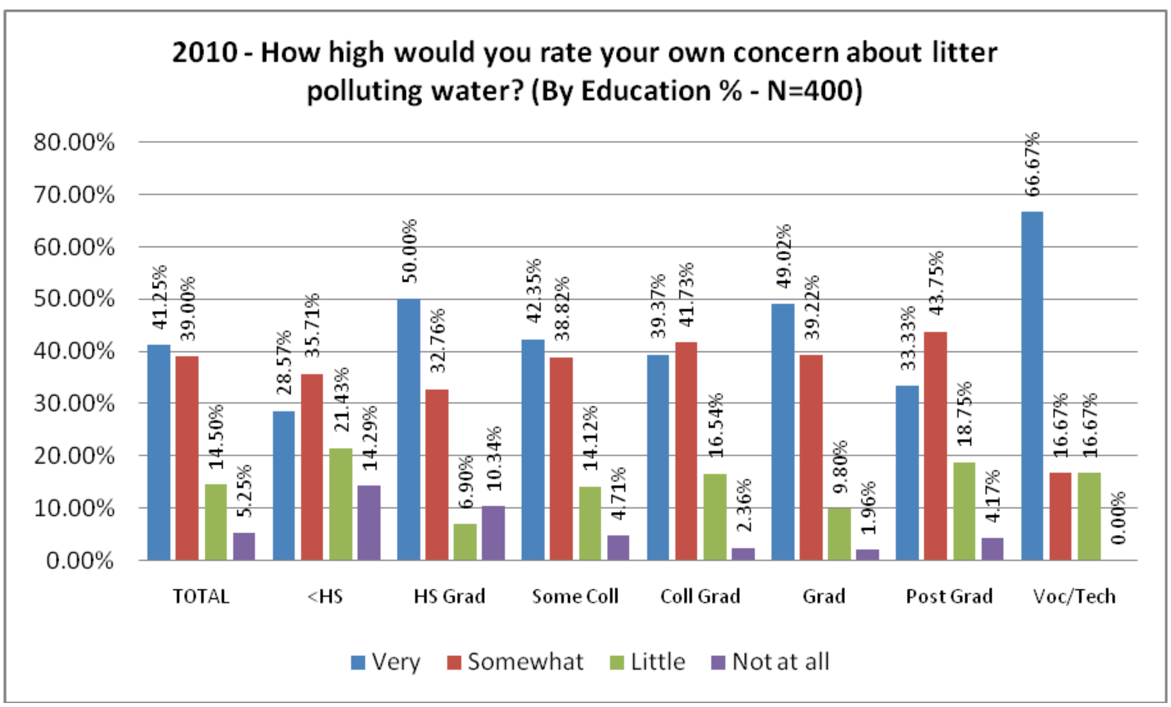

2010
How high would you rate your own concern about litter polluting water?
(By Region - N=400)
50%
40%
30%
20%
10%
0%
41% 39% 15% 5%
40% 35% 18% 7%
45% 44% 5% 6%
43% 36% 15% 6%
36% 43% 19% 2%
42% 36% 17% 5%
TOTAL
West
East
Cent
South
Not Inc.
Very
Somewhat
Little
Not at all


2009
How high would you rate your own concern about litter polluting water?
(By Region - N=400)
60%
50%
40%
30%
20%
10%
0%
46% 37% 15% 3%
56% 29% 13% 1%
40% 36% 15% 0%
40% 49% 9% 1%
39% 35% 25% 1%
52% 33% 11% 2%
TOTAL
West
East
Cent
South
Not Inc.
Very
Somewhat
Little
Not at all

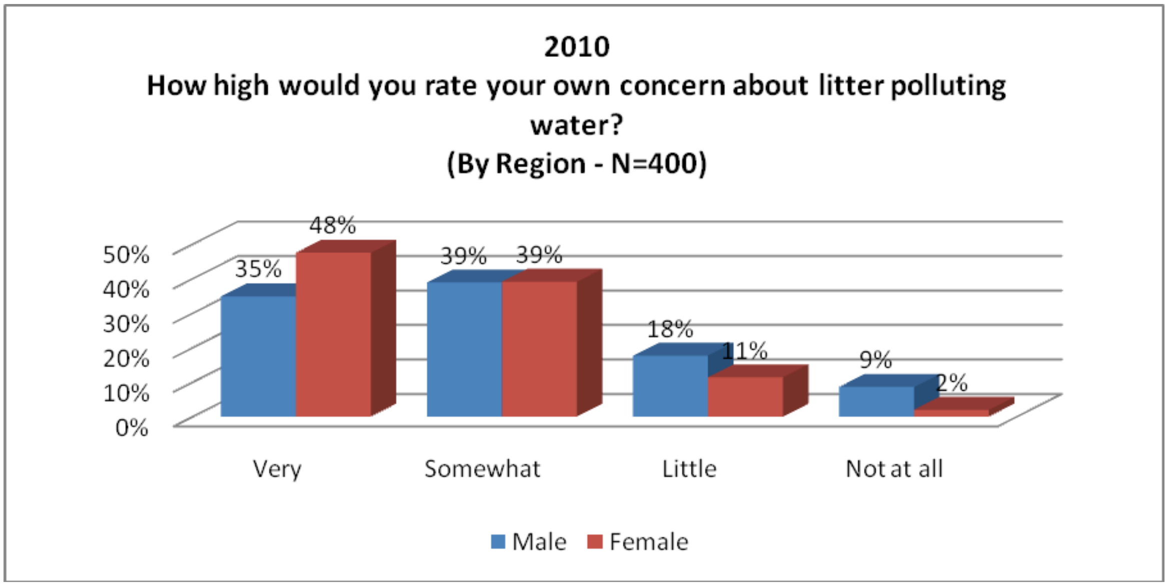
BY ***INCOME***



BY ***EDUCATION***



BY ***<u>GENDER</u>***

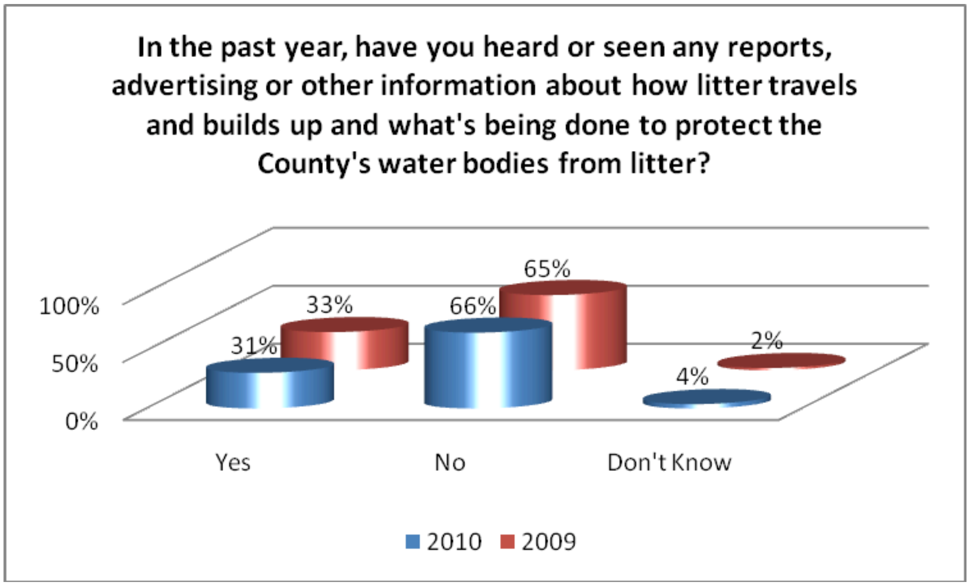


2. <u>Awareness of Reports/Advertising/Information About Litter</u>

31% of the respondents said they ***have*** heard or seen any reports, advertising or other information about how litter travels and builds up and what is being done to protect the County's water bodies from litter, **66% have not** and **4% don't know**. Compared to 2009, those who have not heard any reports remained the same, ***2%*** fewer said ***yes***, and ***2%*** more said ***don't know***.

- Respondents over the age of 65 were more likely to say ***yes*** and respondents under the age of 50 were less likely to say ***don't know***.

- Not significant, but noticeable, and the opposite of 2009, is that residents in the ***West*** region were more likely to say ***no.*** In 2009 residents of the West region were more likely to say ***yes*** than residents of the other regions. Females were still a little more likely, ***33%*** to say ***yes*** than males, ***29%***, which was similar in 2009.



Of the **123** people out of the **400** interviewed who indicated they had heard or seen information, **41%,** said they saw it on the ***television***, **31%** in a ***newspaper***, **18%** some ***other*** place, ***10%*** on ***stenciled storm drains***, ***9%*** on ***billboards***, **4%** on the ***radio***, **4%** through ***government agencies*** and **2%** on the ***internet***. The percentage of awareness decreased from 2009 for ***television***, ***newspaper, some other place***, ***radio*** and ***internet***, but increased for ***stenciled storm drains*** and ***billboards***.

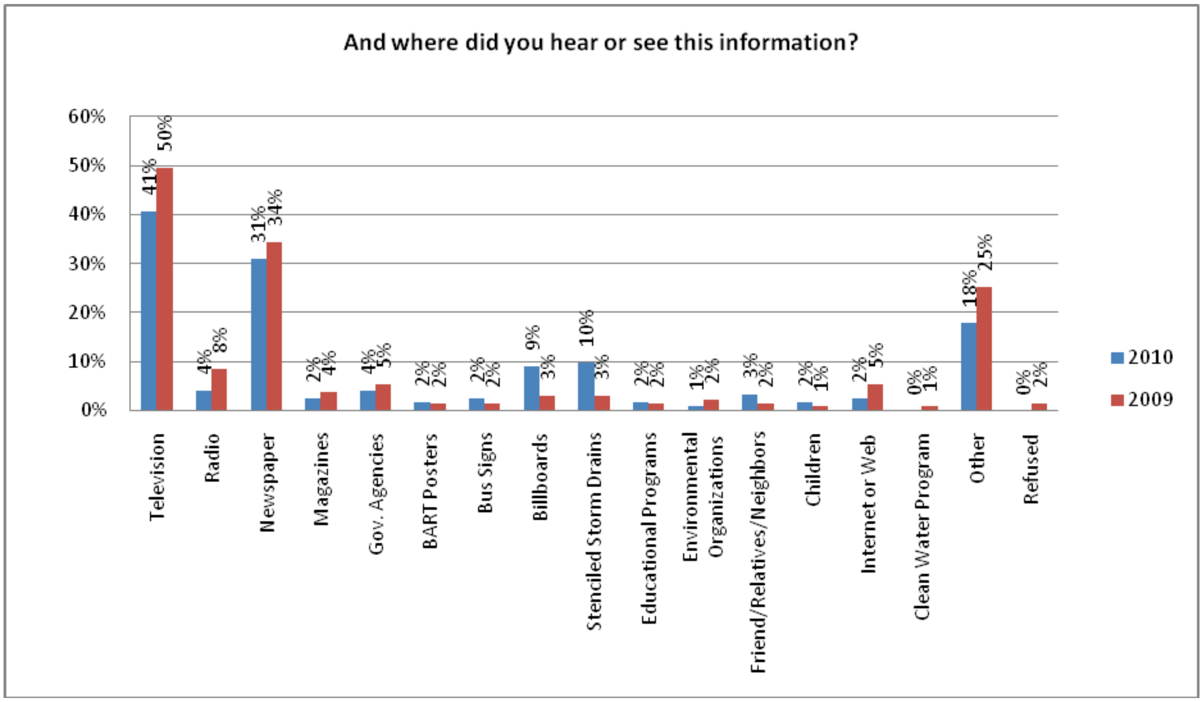
- Residents who have lived in their home for more than 10 years and respondents who are over the age of 65 were most likely to have seen information in a ***newspaper***.

- African Americans, Hispanics, renters, females, those with some college, college grads, and residents from the West and Central areas of the County were most likely to have seen information on ***TV***.

- Homeowners with incomes in the $60K-$199K range and Hispanics were most likely to say ***Billboards***.

- Homeowners, residents of the non-incorporated areas, Caucasians, Asians and residents with at least a college degree, were most likely to say ***stenciled storm drains***.

- Of the respondents who said they had heard or seen information someplace else, most indicated they received an insert in their water bill and some said they got a flyer. The listing of ‘other’ places is in the Appendix.



Those who indicated they had heard or seen information were asked what the information meant to them and their responses were recorded verbatim. The answers are very similar to those given in 2009. The entire list of responses is in the Appendix and ten of those that are representative of the answers are listed below:

1. That littering destroys the beaches and when you dump anything into the gutters it goes directly into the ocean and affects our eco-system.
2. Litter makes its way through the water ways ands up in the bay and oceans.
3. Do not litter.
4. No dumping in empty lots or pouring down storm drains.
5. All the chemicals we use go into local waterways.
6. Think twice about throwing litter out of the car on the street.
7. It is social responsibility to prevent littering.
8. Made me more aware of how bad the situation is and that everyone needs to do right.
9. The build up of litter and pollutants endangers the water supply in the county.
10. It meant that litter in water bodies is a problem that needs to be addressed before it gets worse.

3. Awareness of the Contra Costa Clean Water Program and Website

31% of the residents surveyed said ***yes***, they had heard of CCCWP, **62%** said ***no*** and **7%** ***don't know***, which is almost identical to 2009. Only ***yes*** and ***don't know*** changed by ***1%*** each. The 123 respondents, **31%**, who said ***yes***, were asked follow-up questions about CCCWP'S website.

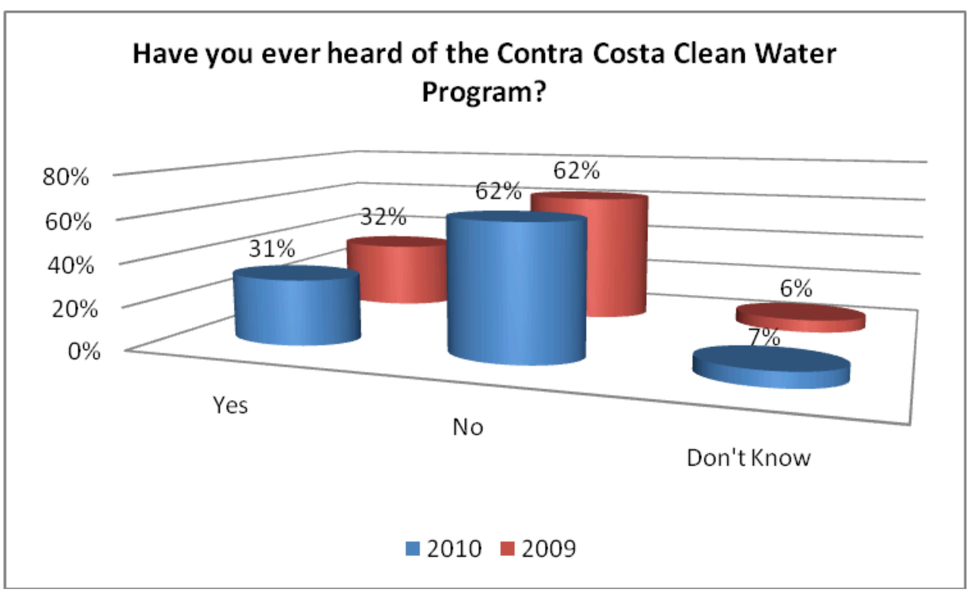
- Residents of the South and West area of the County were much more likely to say ***no***, they have not heard of the program, **70%,** and those residing in the North/Central and non-incorporated areas said ***yes*** more often, which was a change from 2009, when it was the residents of the non-incorporated area that had not heard of CCCWP.

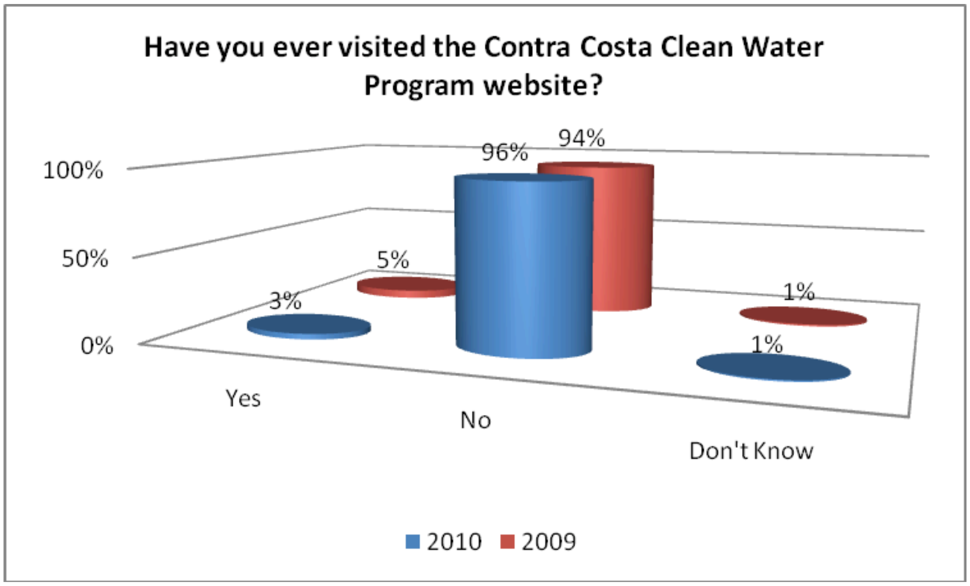
- Respondents 30-39 years old, said ***yes*** more often than respondents in all other age groups and 40-49 year olds said ***no*** more often. 60-64 year olds said ***don't know*** more often than other respondents.

- As in 2009, Hispanics at **27%** were a little less likely to say ***yes*** than respondents of other ethnicities and African Americans at ***39%*** were the most likely to say yes. ***31%*** of Caucasians and **30%** of Asians said yes.

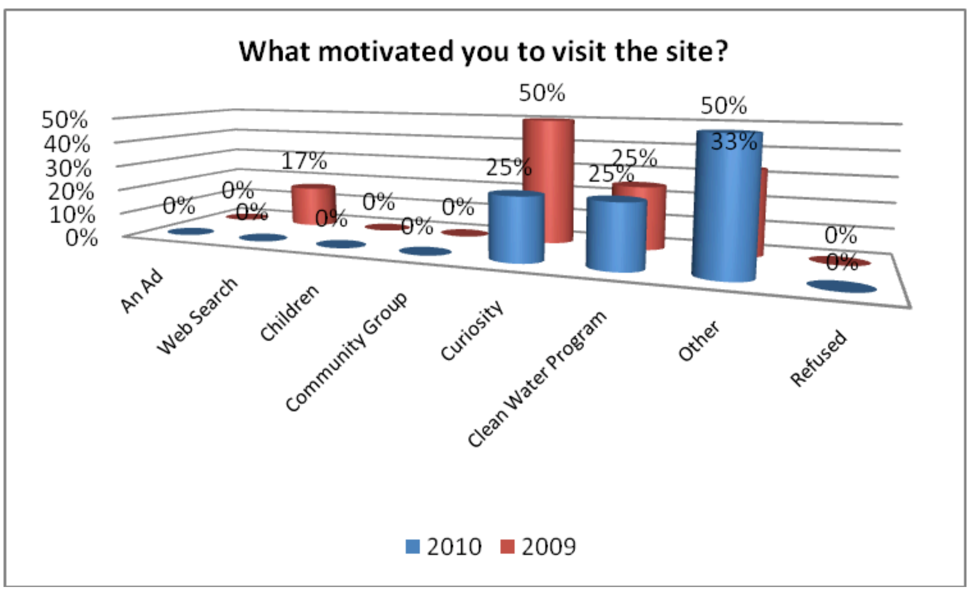
- Respondents who have lived in Contra Costa County for more than 10 years said ***don't know***, **11%,** and respondents living in their homes for 3-5 years said ***no***, *77%*, more than people who have lived in the County for other lengths of time.

- Residents with incomes $60-$74K were more likely to say ***yes***, **53%**, than those in the other income groups and respondents with incomes over $200K were the least likely to say ***yes***, **10%**.

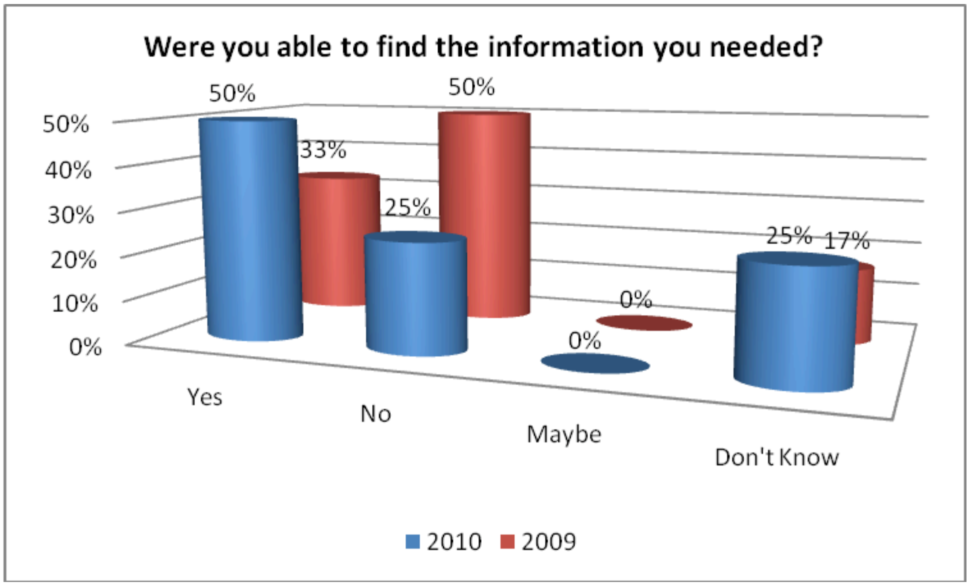




Only **4** people total, **3%** of the **123** people asked, said they have ever visited the website and **96%** said ***no***, they had not**. 2** of the **4** live in the East region of the County and **all 4** are homeowners. One person said ***don't know***.



Two respondents were able to find the information they were looking for, one was not and one said don't know.



4. CCCWP Litter Advertisements, Slogans and Messages

When asked if they had ever heard or seen advertisements about the CCCWP that mentioned the slogan "Litter Travels but it Can Stop With You", **14%** of respondents said ***yes,*** **78%** said ***no***, **6%** said ***maybe*** and **2%** said ***don't know***. More respondents said yes, maybe and don't know, ***22%*** than they did in 2009, ***16%***.

- Residents in the North/Central, **17%,** and unincorporated areas, **17%**, were more likely to have said they were aware of the advertising than those from the West, **8%.** This is a change from 2009, when the West had the highest, ***18%*** of residents, who had ever seen or heard the ad, and Non-Incorporated had the lowest, ***5%.***

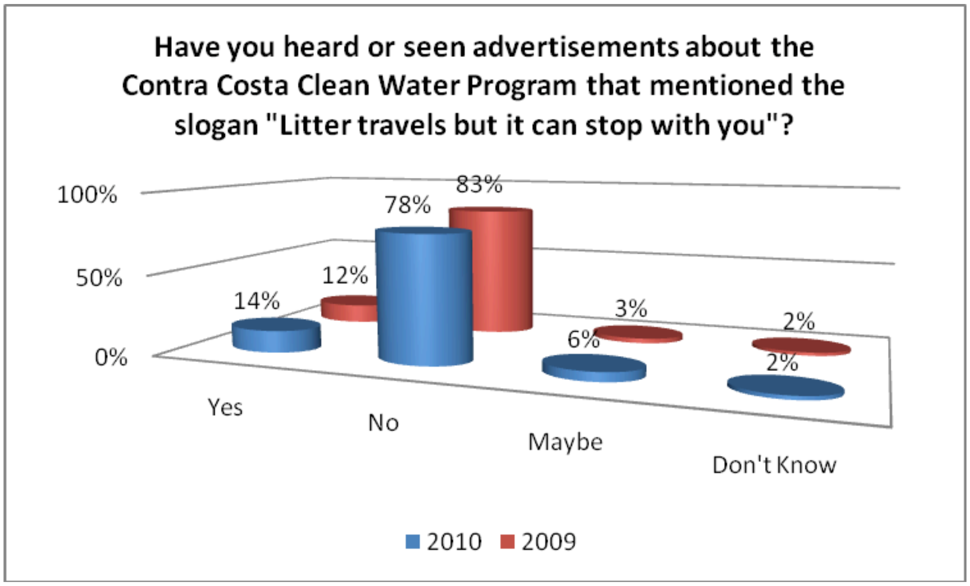
- People 18-29 years of age said ***yes, 21%,*** much more than respondents in the other age groups and respondents over age 50 were more likely to say ***don't know.***

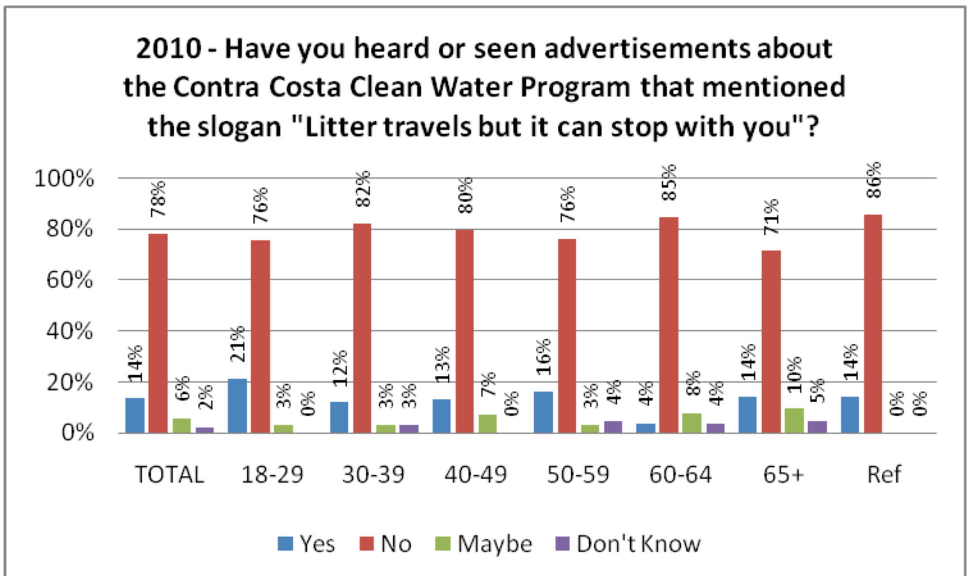
- Caucasians and Hispanics were much more likely, **17%** than African Americans, ***5%*** or Asians, **8%**, to have heard or seen advertising. This is a definite change from 2009 when African Americans were much more likely to have seen this message than the other ethnicities.

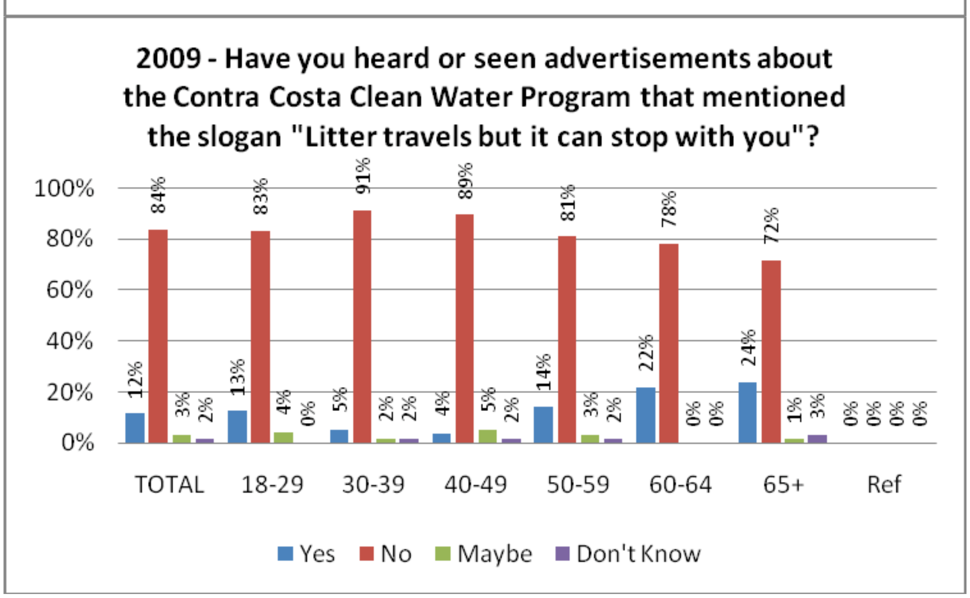
- More respondents, **30%**, with incomes between $75-$84K said yes, they had seen or heard advertising.

- Renters were much more likely to say ***maybe***, ***16%***, than homeowners, ***4%*** and males were slightly more likely, ***16%*** than females, ***12%***.

- Residents who lived in the County for more than 10 years said ***no*** less frequently**.**


Have you heard or seen advertisements about the Contra Costa Clean Water Program that mentioned the slogan "Litter travels but it can stop with you"?
100%
50%
0%
14%
12%
78%
83%
6%
3%
2%
2%
Yes
No
Maybe
Don't Know
2010
2009


2010 - Have you heard or seen advertisements about the Contra Costa Clean Water Program that mentioned the slogan "Litter travels but it can stop with you"?
100%
80%
60%
40%
20%
0%
14% 78% 6% 2%
21% 76% 3% 0%
12% 82% 3% 3%
13% 80% 7% 0%
16% 76% 3% 4%
4% 85% 8% 4%
14% 71% 10% 5%
14% 86% 0% 0%
TOTAL
18-29
30-39
40-49
50-59
60-64
65+
Ref
Yes
No
Maybe
Don't Know

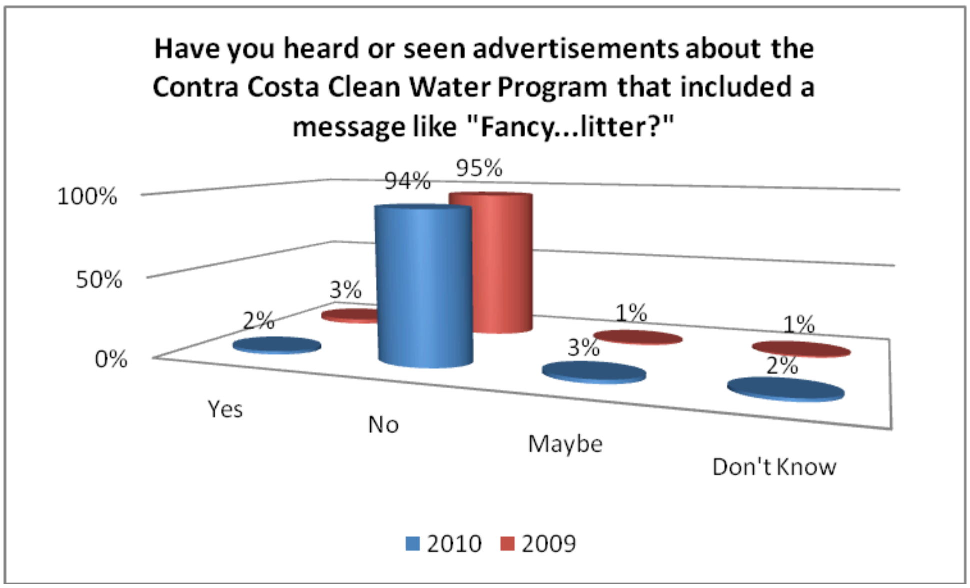

2009 - Have you heard or seen advertisements about the Contra Costa Clean Water Program that mentioned the slogan "Litter travels but it can stop with you"?
100%
80%
60%
40%
20%
0%
12% 84% 3% 2%
13% 83% 4% 0%
5% 91% 2% 2%
4% 89% 5% 2%
14% 81% 3% 2%
22% 78% 0% 0%
24% 72% 1% 3%
0% 0% 0% 0%
TOTAL
18-29
30-39
40-49
50-59
60-64
65+
Ref
Yes
No
Maybe
Don't Know

Only **2%** of respondents (8 people), said they had heard or seen advertisements about the CCCWP that included a message like "Fancy…Litter", **94%** said ***no,*** and 2% each said ***maybe*** or ***don't know***.

- Six of the eight respondents that said yes are 40-59 years old.

- Respondents with some college said ***yes*** more often and all eight of the respondents who said ***yes*** own their home.

- Most of the respondents, **5 of 8**, who said ***yes*** have lived in their home for 10 or more years and **none** who have lived in their home for less than 1 year said ***yes***.



As in 2009, the respondents who indicated that they had heard or seen either of the two advertisements were asked what the ads said to them, ***what was the message the commercial was trying to get across,*** and the main answers were:

- A reminder not to litter

- Do not put litter down the drain

- Too many people litter and it gets into our water

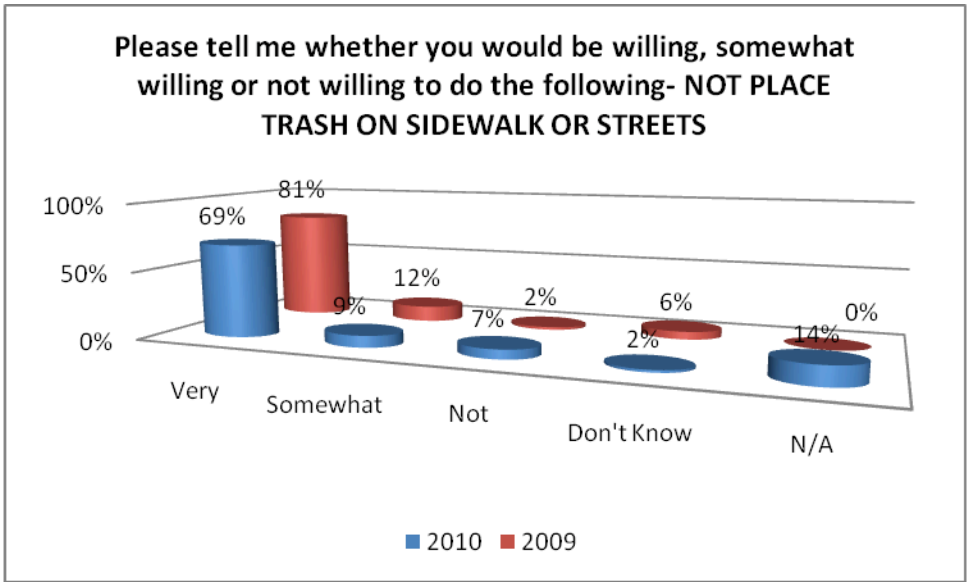
- We are not doing enough to prevent pollution

- Be careful what goes into our water system and sewage system

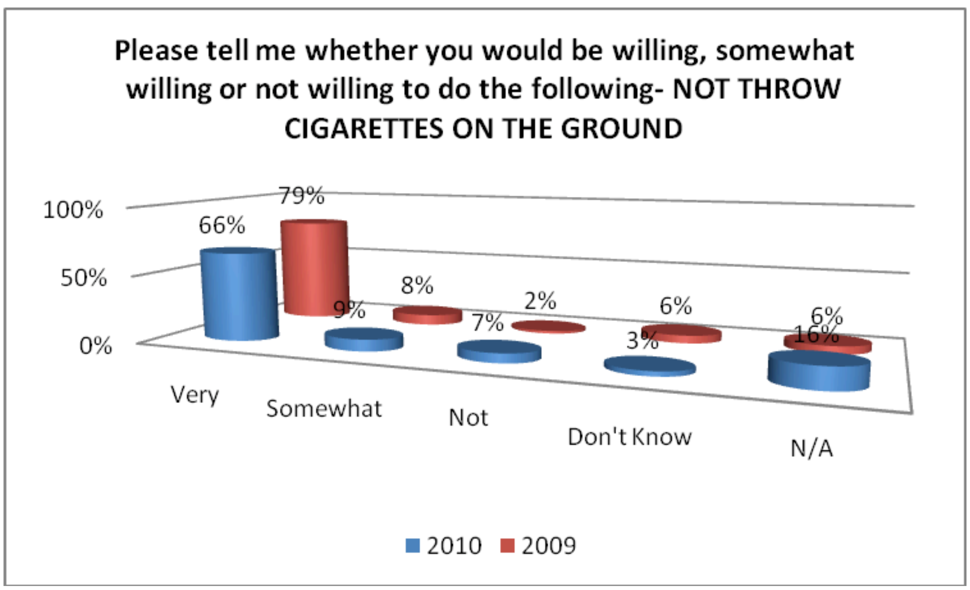
A list of all answers is included in the Appendix.

Again, only the respondents who indicated they had heard or seen any advertising, were asked to rate a series of 8 litter habits by indicating whether the ads or messages would make them rethink those habits and be very, somewhat or not willing to do certain behaviors.

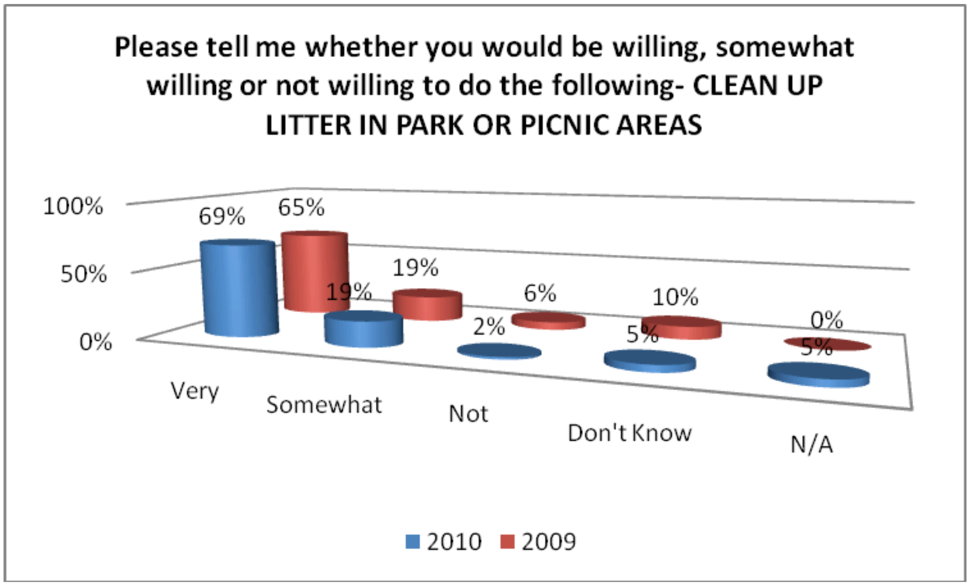
1) ***NOT PLACE TRASH ON SIDEWALKS OR STREETS***



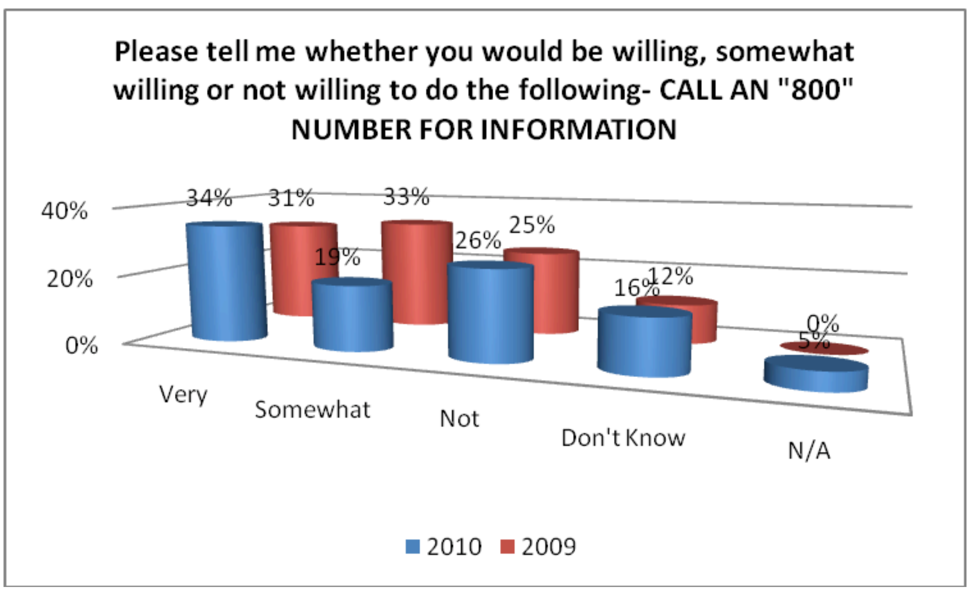
2) ***NOT THROW CIGARETTES ON THE GROUND***



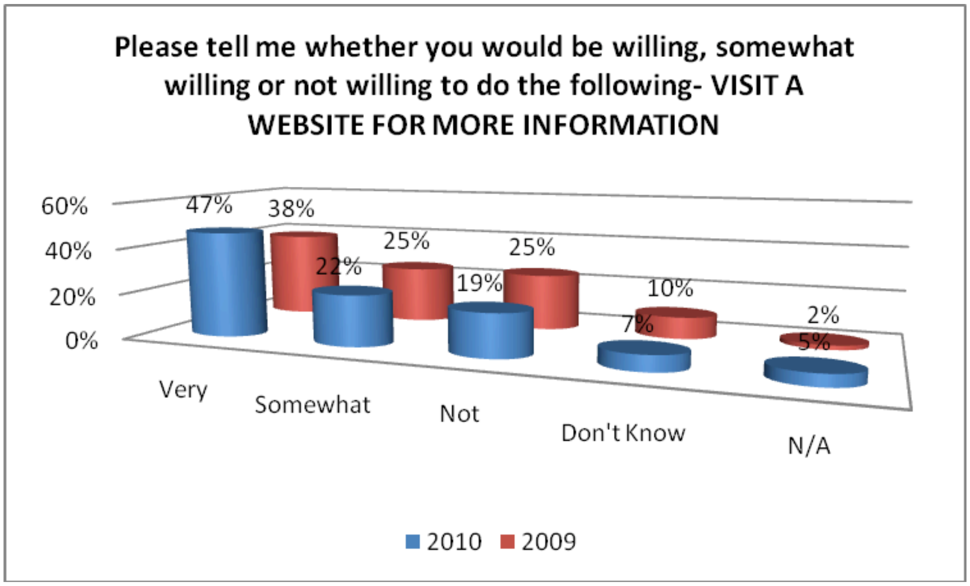
3) *CLEAN UP LITTER IN PARK OR PICNIC AREAS*



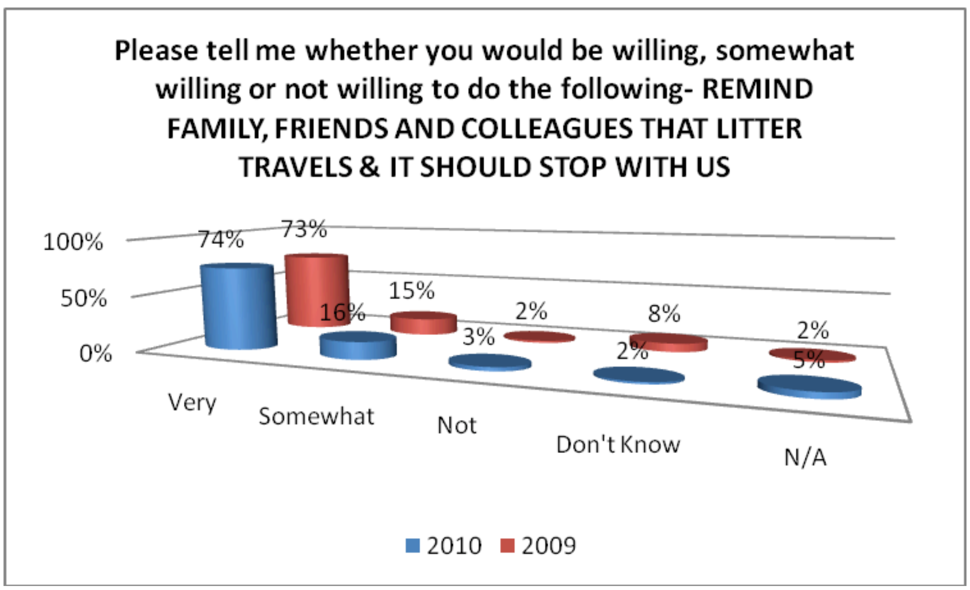
4) *CALL AN 800 NUMBER FOR INFORMATION*



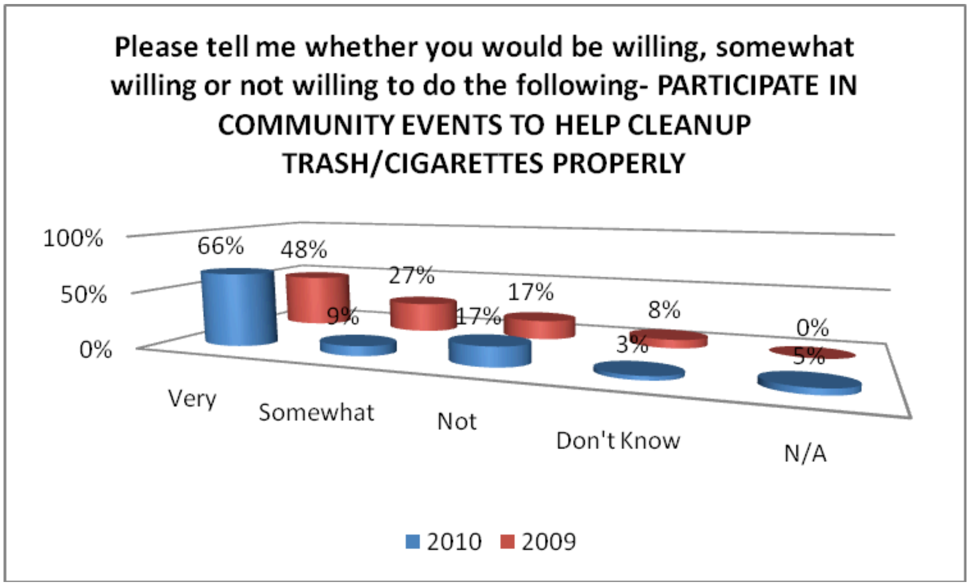
5) VISIT A WEBSITE FOR MORE INFORMATION



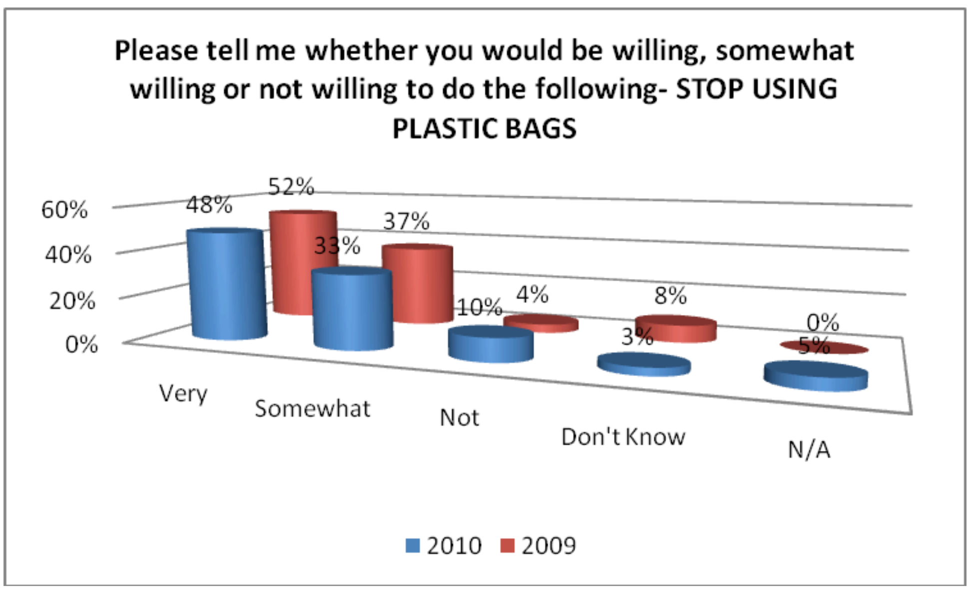
6) REMIND FAMILY, FRIENDS AND COLLEAUGES THAT LITTER TRAVELS AND IT SHOULD STOP WITH US



7) PARTICIPATE IN COMMUNITY EVENTS TO HELP CLEAN UP TRASH/CIGARETTES PROPERLY



8) STOP USING PLASTIC BAGS



Respondents said that of the eight options they would be most willing to ***not place trash on sidewalks or streets***, ***not throw cigarettes on the ground***, ***remind family, friends and colleagues that litter travels and it should stop with us*** and ***clean up litter in park or picnic areas***

The actions which respondents said they would be the least willing to do are ***call an 800 number*** or ***visit a website for information***, ***participate in community events to help clean up trash/cigarettes properly*** and ***stop using plastic bags***.

13.79% of respondents said ***not place trash on sidewalks or streets*** does ***not apply*** to them and ***15.52***% said ***not throw cigarettes on the ground*** does ***not apply*** to them, which are both significantly higher than in 2009.

Compared to 2009, respondents were much more likely to say they are ***very*** willing to ***participate in community events to help clean up trash/cigarettes properly,*** but much less likely to say they are ***somewhat willing*** and a little more likely to say they are ***very*** willing to ***visit a website for more information***. However, respondents were less likely to say they are ***very*** willing to ***not place trash on sidewalks or streets*** and ***not throw cigarettes on the ground***; this is partially due to a higher percentage of respondents saying these behaviors do not apply to them.

Asians, Hispanics, residents in the East, college grads, those who refused to state their income and females said they would be ***very*** willing to ***not place trash on sidewalks or streets*** more often than males and other ethnicities. Respondents aged 30-39, residents of the North/Central area and males said they would ***not*** be willing more often than other demographic groups. No one living in their home for more than 10 years said they would ***not*** be willing to do this, but this group also had the highest percentage of ***not-applicable*** responses.

Residents in the East and college grads would be willing to ***not*** throw ***cigarettes on the ground*** and females, 40-49 year olds and residents of the non-incorporated areas said this was not-applicable more often.

As in 2009, more of the residents in the East County would be very willing to ***clean up litter in park or picnic areas*** than those in the other regions; additionally, females and college grads also said ***very*** willing more often. All of the respondents in the non-incorporated areas said ***very*** or ***not-applicable***.

Males and college grads said they would be ***very*** willing to ***call an 800 number*** or ***visit a website for information,*** more often than females and respondents with less education. Renters, females, Asians and residents in the non-incorporated areas said they would ***not*** be willing to visit a website more often than others.

Respondents living in their homes for 1-5 years said they would ***not*** be willing to ***call an 800 number*** more often than those living in their homes 5 years or more, and as might be expected, residents 65 and older were most likely to say they are ***very*** or ***somewhat*** willing.

Respondents in the East and West areas, renters, and all of the African Americans and 30-39 year olds said they would be ***very*** willing to ***remind family, friends and colleagues that litter travels and it should stop*** more often than residents of the other areas, homeowners and other ethnicities.

No African Americans said they would ***not*** be ***very or somewhat*** willing to ***participate in community events to help clean up trash/cigarettes properly*** which is consistent with the

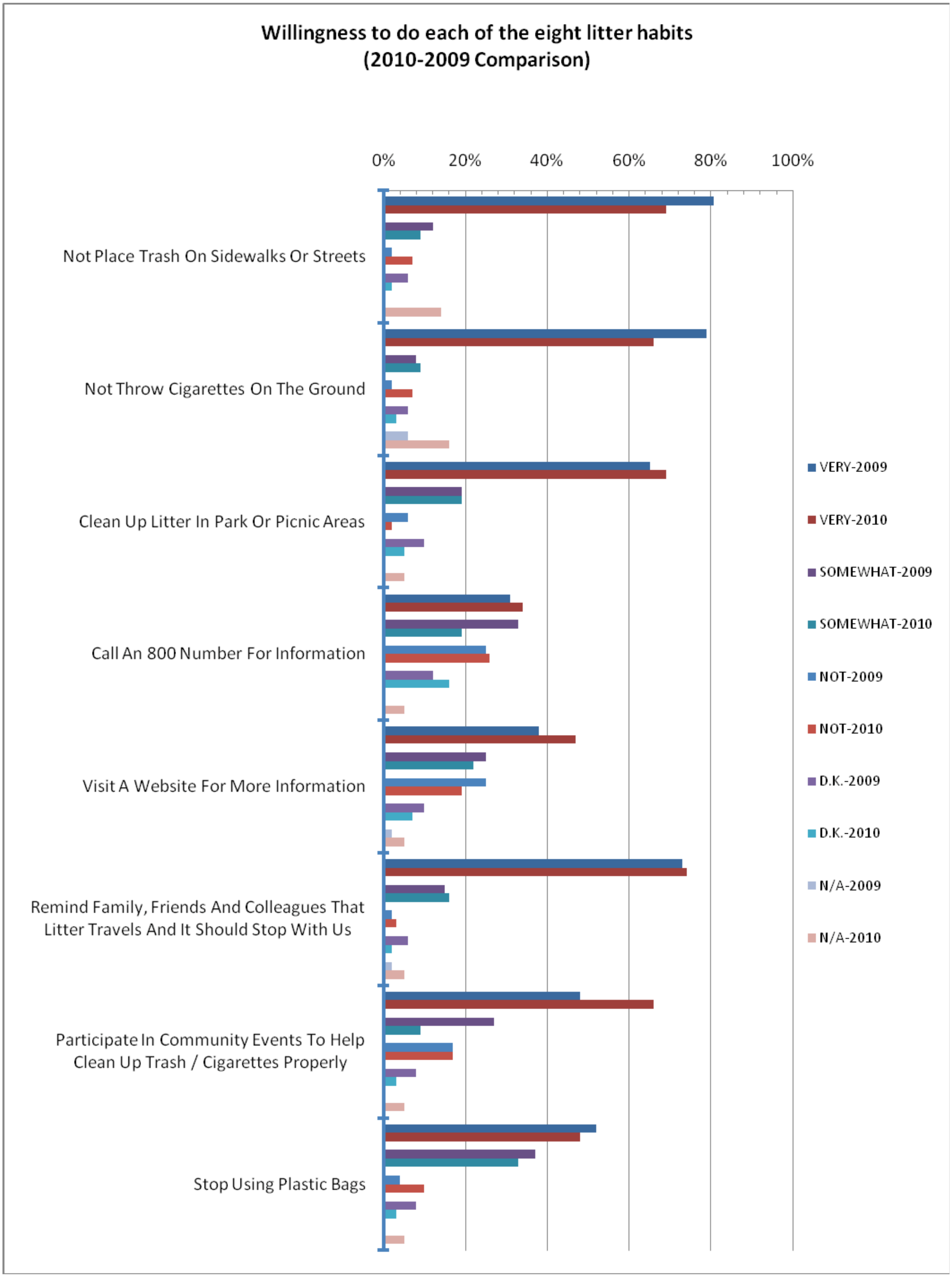
2009 study. 30-39 year olds and respondents in the East and West said ***very*** willing more often, and those in the non-incorporated areas, 50-59 year olds, Caucasians and females said ***not*** willing more often.

100% of respondents in the East, renters and those between the ages of 30-39 said they would be ***very*** or ***somewhat*** willing to ***stop using plastic bags***. Caucasians, 40-49 year olds, males and residents who refused to state their income said ***not*** willing more often than others.

Willingness to do each of the eight litter habits (numbers correspond to the habits listed above and are in percentages):

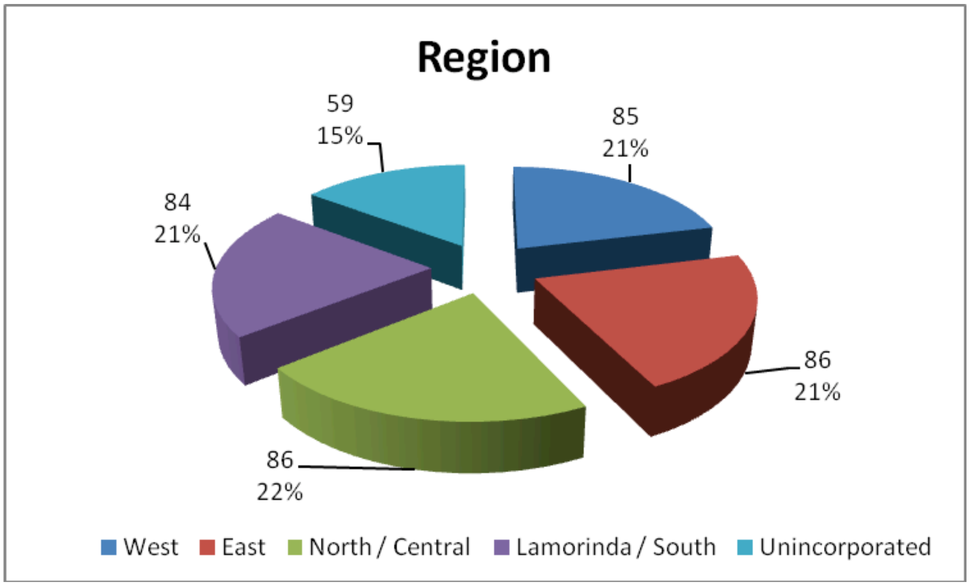
Black=2009 N=52 Red=2010 N=58	Not Place Trash On Sidewalks Or Streets	Not Throw Cigarettes On The Ground	Clean Up Litter In Park Or Picnic Areas	Call An 800 Number For Information	Visit A Website For More Information	Remind Family, Friends And Colleagues That Litter Travels And It Should Stop With Us	Participate In Community Events To Help Clean Up Trash / Cigarettes Properly	Stop Using Plastic Bags
VERY	80.77 68.97	78.85 65.52	65.37 68.97	30.77 34.48	38.46 46.55	73.08 74.14	48.08 65.52	51.92 48.28
SOMEWHAT	11.54 8.62	7.69 8.62	19.23 18.97	32.69 18.97	25.00 22.41	15.38 15.52	26.92 8.62	36.54 32.76
NOT	1.92 6.90	1.92 6.90	5.77 1.72	25.00 25.86	25.00 18.97	1.92 3.45	17.31 17.24	3.85 10.34
D.K.	5.77 1.72	5.77 3.45	9.62 5.17	11.54 15.52	9.62 6.90	5.77 1.72	7.69 3.45	7.69 3.45
N/A	0.00 13.79	5.77 15.51	0.00 5.17	0.00 5.17	1.92 5.17	1.92 5.17	0.00 5.17	0.00 5.17

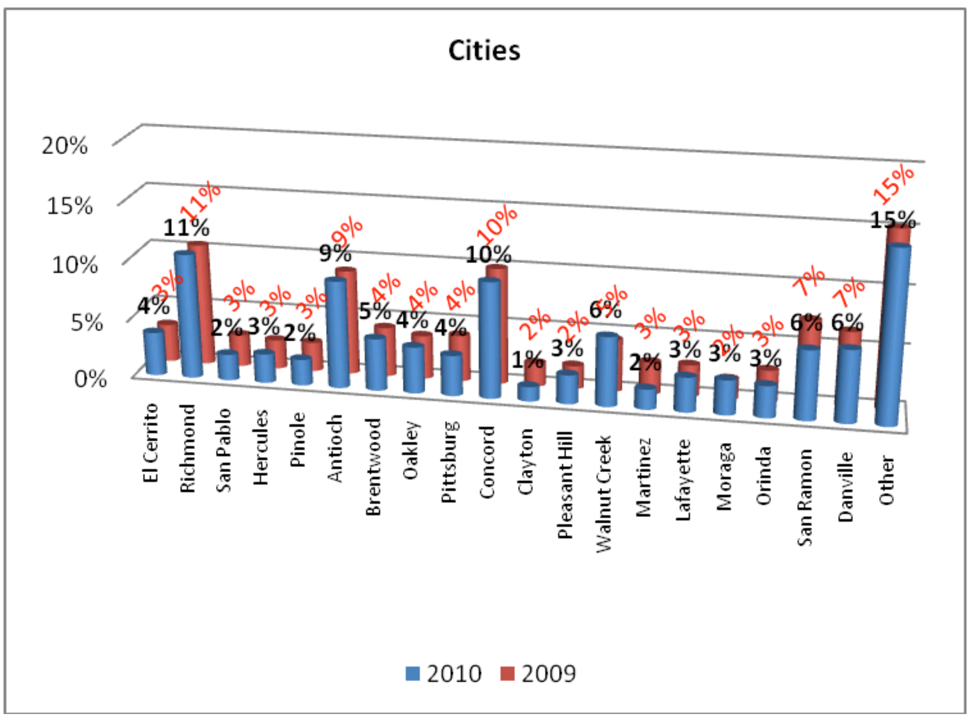
Numbers that are highlighted show a significant difference between 2009 and 2010.

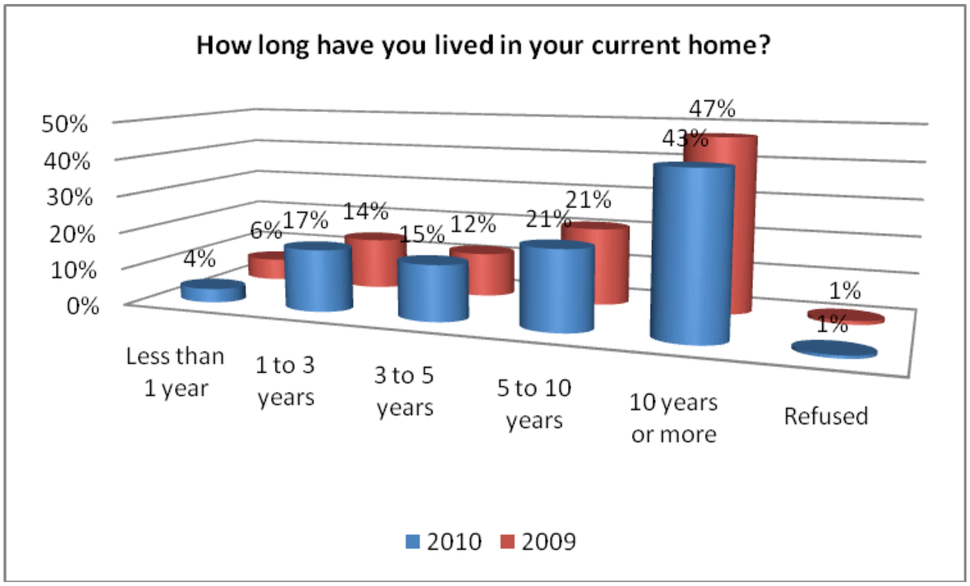

Willingness to do each of the eight litter habits
(2010-2009 Comparison)
0%
20%
40%
60%
80%
100%
Not Place Trash On Sidewalks Or Streets
Not Throw Cigarettes On The Ground
Clean Up Litter In Park Or Picnic Areas
Call An 800 Number For Information
Visit A Website For More Information
Remind Family, Friends And Colleagues That Litter Travels And It Should Stop With Us
Participate In Community Events To Help Clean Up Trash / Cigarettes Properly
Stop Using Plastic Bags
VERY-2009
VERY-2010
SOMEWHAT-2009
SOMEWHAT-2010
NOT-2009
NOT-2010
D.K.-2009
D.K.-2010
N/A-2009
N/A-2010

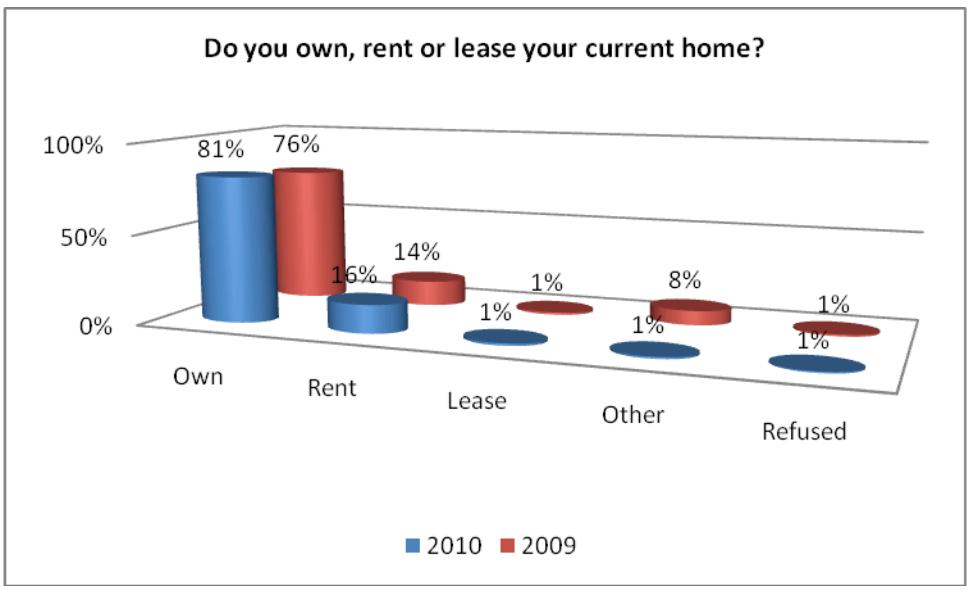
Appendix A

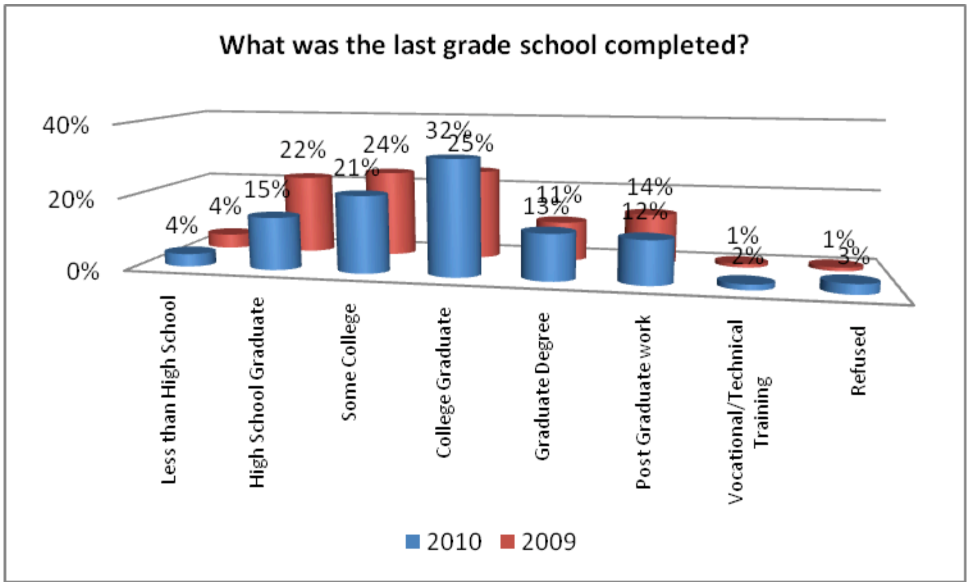
DEMOGRAPHICS

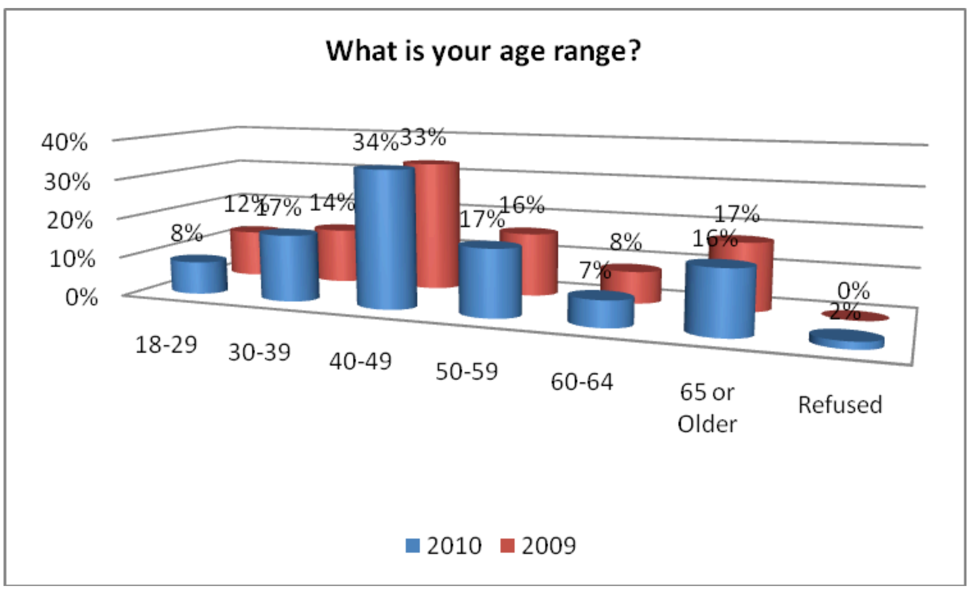


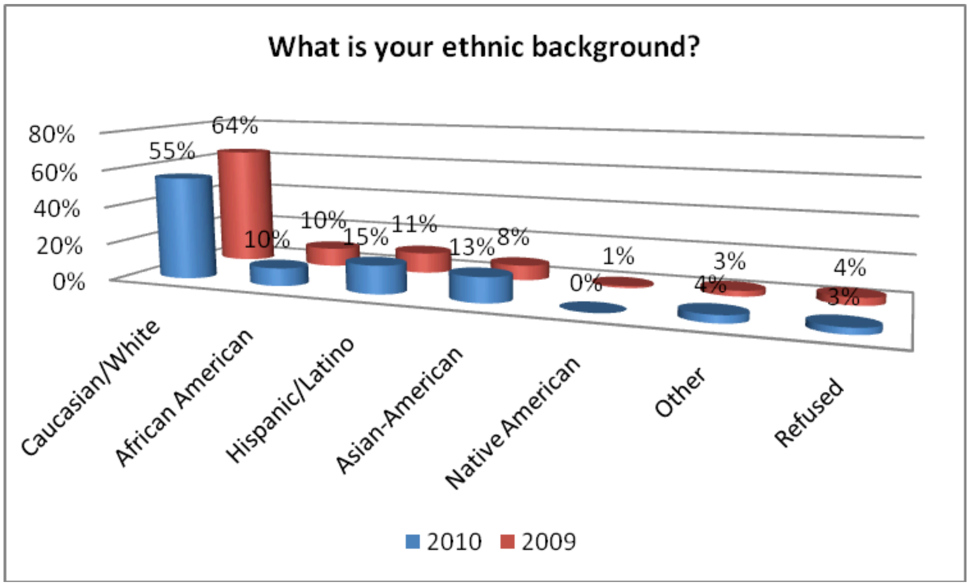


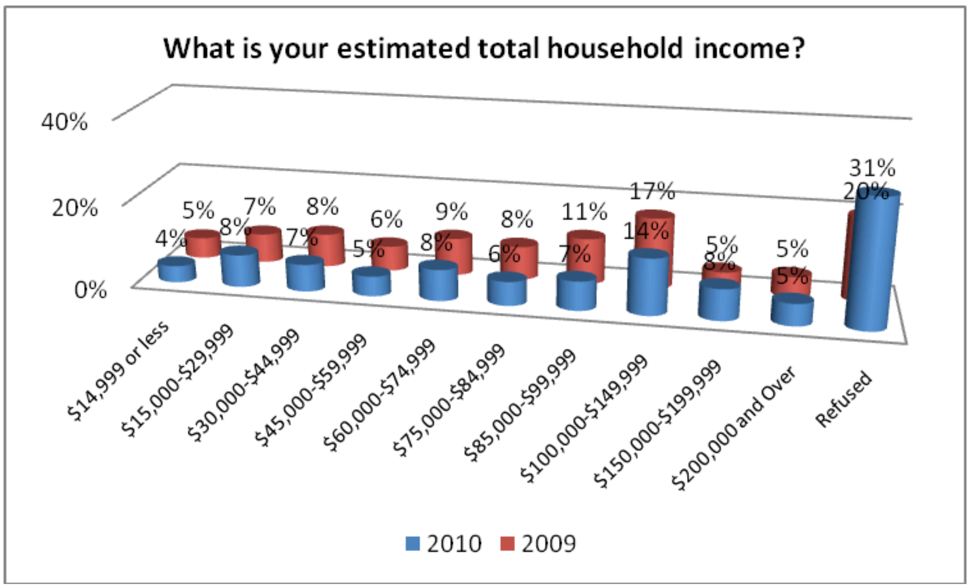

How long have you lived in your current home?
50%
40%
30%
20%
10%
0%
4%
6%
17%
14%
15%
12%
21%
21%
43%
47%
1%
1%
Less than 1 year
1 to 3 years
3 to 5 years
5 to 10 years
10 years or more
Refused
2010
2009

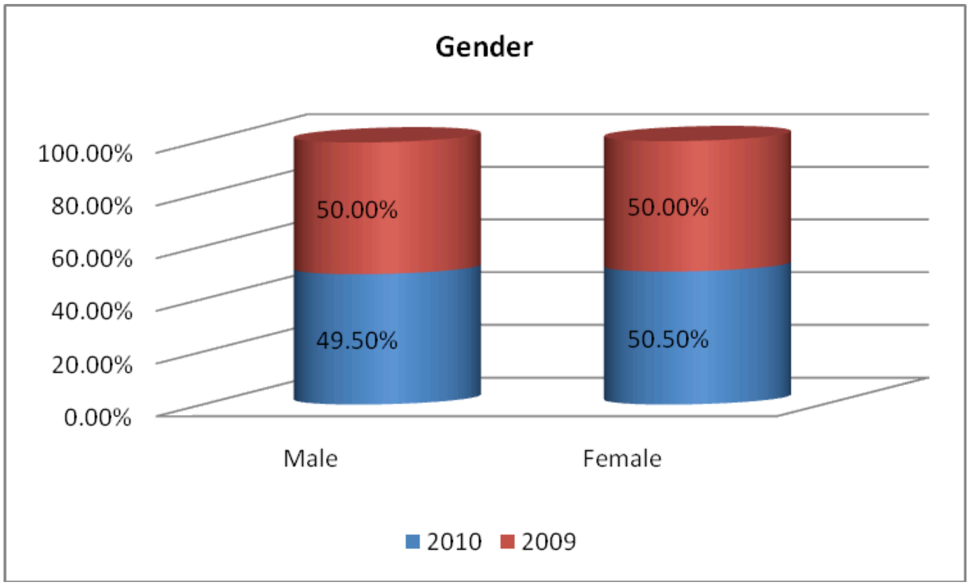

Do you own, rent or lease your current home?
100%
50%
0%
81%
76%
16%
14%
1%
1%
1%
8%
1%
1%
Own
Rent
Lease
Other
Refused
2010
2009


What was the last grade school completed?
40%
20%
0%
4%
4%
15%
22%
21%
24%
32%
25%
13%
11%
14%
12%
1%
2%
1%
3%
Less than High School
High School Graduate
Some College
College Graduate
Graduate Degree
Post Graduate work
Vocational/Technical Training
Refused
2010
2009


What is your age range?
40%
30%
20%
10%
0%
8%
12%
17%
14%
34%
33%
17%
16%
7%
8%
16%
17%
2%
0%
18-29
30-39
40-49
50-59
60-64
65 or Older
Refused
2010
2009


What is your ethnic background?
80%
60%
40%
20%
0%
55%
64%
10%
10%
15%
11%
13%
8%
0%
1%
4%
3%
3%
4%
Caucasian/White
African American
Hispanic/Latino
Asian-American
Native American
Other
Refused
2010
2009


What is your estimated total household income?
40%
20%
0%
4%
5%
8%
7%
7%
8%
5%
6%
8%
9%
6%
8%
7%
11%
14%
17%
5%
5%
5%
31%
20%
$14,999 or less
$15,000-$29,999
$30,000-$44,999
$45,000-$59,999
$60,000-$74,999
$75,000-$84,999
$85,000-$99,999
$100,000-$149,999
$150,000-$199,999
$200,000 and Over
Refused
2010
2009


Gender
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
50.00%
49.50%
50.00%
50.50%
Male
Female
2010
2009

Appendix B
Questionnaire

INTRODUCTION:

Hello, my name is __________________ and I'm calling on behalf of Nichols Research. We're conducting a survey concerning what you've seen or heard about an important environmental issue. This is not a sales call and your answers are used in general statistics. It should only take about 6-8 minutes of your time. (IF NEEDED) **This is a study about environmental issues of importance to the residents of Contra Costa County.**

S1. Are you at least 18 years of age?

YES	1 (CONTINUE)
NO	2 (ASK TO SPEAK TO H/H >18 YRS)
REFUSED	3 (TERMINATE)

S2. Are you a resident of Contra Costa County?

YES	1 (CONTINUE)
NO	2 (TERMINATE)
REFUSED	3 (TERMINATE)

S3. What city do you live in or near?

		Number	Percentage
WEST			
	EL CERRITO	15	3.75%
	RICHMOND	43	10.75%
	SAN PABLO	9	2.25%
	HERCULES	10	2.50%
	PINOLE	9	2.25%
EAST			
	ANTIOCH	37	9.25%
	BRENTWOOD	18	4.50%
	OAKLEY	16	4.00%
	PITTSBURG	14	3.50%
CENTRAL			
	CONCORD	40	10.00%
	CLAYTON	5	1.25%
	PLEASANT HILL	10	2.50%
	WALNUT CREEK	24	6.00%
	MARTINEZ	7	1.75%
SOUTH			
	LAFAYETTE	12	3.00%
	MORAGA	12	3.00%
	ORINDA	11	2.75%
	SAN RAMON	24	6.00%
	DANVILLE	25	6.25%
Other		59	14.75%

QUESTIONNAIRE:

Q1 . Do you think litter impacts/pollutes local water bodies?

	Number	Percentage
YES	306	76.50%
NO	29	7.25%
MAYBE	31	7.75%
DON'T KNOW	34	8.50%

Q2 . How high would you rate your concern about litter polluting water?

	Number	Percentage
VERY	165	41.25%
SOMEWHAT	156	39.00%
LITTLE	58	14.50%
NO AT ALL	21	5.25%

Q3. In the past year, have you heard or seen any reports, advertising, or other information about how litter travels and builds up and what's being done to protect the County's water bodies from litter?

	Number	Percentage
YES (CONTINUE)	123	30.75%
NO (SKIP TO Q6)	262	65.50%
DON'T KNOW (SKIP TO Q6)	15	3.75%

Q4. [IF YES TO Q3] And where did you hear or see this information? Please list all that apply. (TRACK ALL RESPONSES)

	Number	Percentage
TELEVISION	50	40.65%
RADIO	5	4.07%
NEWSPAPER	38	30.89%
MAGAZINES	3	2.44%
GOVERNMENT AGENCIES	5	4.07%
BART POSTERS	2	1.63%
BUS SIGNS	3	2.44%
BILLBOARDS	11	8.94%
STENCILED STORM DRAINS	12	9.76%
EDUCATIONAL PROGRAMS	2	1.63%
ENVIRONMENTAL ORGANIZATIONS	1	0.81%
FRIENDS/RELATIVES/NEIGHBORS	4	3.25%
CHILDREN	2	1.63%
INTERNET OR WEB	3	2.44%
CLEAN WATER PROGRAM	0	0.00%
OTHER (Specify)	22	17.89%
REFUSED	0	0.00%

Q5. [IF YES TO Q3] What did this information mean or say to you?

Q6. Have you ever heard of the Contra Costa Clean Water Program?

	Number	Percentage
YES (CONTINUE)	123	30.75%
NO (SKIP TO Q12)	249	62.25%
DON'T KNOW (SKIP TO Q12)	28	7.00%

Q7. [IF YES TO Q6] Have you ever visited the Contra Costa Clean Water Program website?

	Number	Percentage
YES	4	3.25%
NO	118	95.93%
DON'T KNOW	1	0.81%

Q8. [IF YES TO Q7] What motivated you to visit the site?

	Number	Percentage
AN AD	0	0.00%
WEB SEARCH	0	0.00%
CHILDREN	0	0.00%
COMMUNITY GROUP	0	0.00%
CURIOUSITY	1	25.00%
CLEAN WATER PROGRAM	1	25.00%
OTHER (Specify)	2	50.00%
REFUSED	0	0.00%

Q9. [IF YES TO Q7] What information were you looking for?

Q10. [IF YES TO Q7] Were you able to find the information you needed?

	Number	Percentage
YES	2	50.00%
NO	1	25.00%
MAYBE	0	0%
DON'T KNOW	1	25.00%

Q11. [IF YES TO Q10] What do you recall that information to be?

____

____

Q12. Have you ever heard or seen advertisements about the Contra Costa Clean Water Program that mentioned the slogan "Litter travels but it can stop with you"?

	Number	Percentage
YES	55	13.75%
NO	313	78.25%
MAYBE	23	5.75%
DON'T KNOW	9	2.25%

Q13. Have you ever heard or seen advertisements about the Contra Costa Clean Water Program that included a message like "Fancy…litter?"

	Number	Percentage
YES	8	2.00%
NO	374	93.50%
MAYBE	10	2.50%
DON'T KNOW	8	2.00%

Q14. [IF YES TO Q12 or Q13] What did the ads say to you? What was the message the commercial was trying to get across. (VERBATIM)

____

____

Q15. [IF YES TO Q12 or Q13] Did the ads or messages make you rethink your litter habits or the litter habits of those around you? Please tell me whether you would be very willing, somewhat willing or not willing to do the following:

		Very	Somewhat	Not	Don't Know	N/A
NOT PLACE TRASH ON SIDEWALKS OR STREETS		40	5	4	1	8
	Percent	68.97%	8.62%	6.90%	1.72%	13.79%
NOT THROW CIGARETTES ON THE GROUND		38	5	4	2	9
	Percent	65.52%	8.62%	6.90%	3.45%	15.52%
CLEAN UP LITTER IN PARK OR PICNIC AREAS		40	11	1	3	3
	Percent	68.97%	18.97%	1.72%	5.17%	5.17%
CALL AN "800" NUMBER FOR INFORMATION		20	11	15	9	3
	Percent	34.48%	18.97%	25.86%	15.52%	5.17%
VISIT A WEBSITE FOR MORE INFORMATION		27	13	11	4	3
	Percent	46.55%	22.41%	18.97%	6.90%	5.17%
REMIND FAMILY, FRIENDS AND COLLEAGUES THAT LITTER TRAVELS & IT SHOULD STOP WITH US		43	9	2	1	3
	Percent	74.14%	15.52%	3.45%	1.72%	5.17%
PARTICIPATE IN COMMUNITY EVENTS TO HELP CLEANUP TRASH/CIGARETTES PROPERLY		38	5	10	2	3
	Percent	65.52%	8.62%	17.24%	3.45%	5.17%
STOP USING PLASTIC BAGS		28	19	6	2	3
	Percent	48.28%	32.76%	10.34%	3.45%	5.17%

Q16. How do you feel litter issues should be handled?

DEMOGRAPHICS:

Now in order to classify your responses along with others, I need to ask a few questions about you.

D1. What is your zip code? __________

Zip	Number	Percentage
92530	1	0.25%
94164	1	0.25%
94505	10	2.50%
94506	11	2.75%
94507	9	2.25%
94509	26	6.50%
94513	18	4.50%
94517	5	1.25%
94518	8	2.00%
94519	4	1.00%
94520	15	3.75%
94521	13	3.25%
94523	9	2.25%
94525	3	0.75%
94526	14	3.50%
94528	2	0.50%
94530	14	3.50%
94531	13	3.25%
94547	10	2.50%
94549	13	3.25%
94553	8	2.00%
94556	13	3.25%
94561	17	4.25%
94563	10	2.50%
94564	6	1.50%
94565	29	7.25%

94572	3	0.75%
94582	10	2.50%
94583	13	3.25%
94586	1	0.25%
94587	1	0.25%
94595	7	1.75%
94596	4	1.00%
94597	4	1.00%
94598	9	2.25%
94605	1	0.25%
94801	10	2.50%
94803	12	3.00%
94804	18	4.50%
94805	10	2.50%
94806	12	3.00%
94807	2	0.50%
94808	1	0.25%

D2. Do you own, rent or lease your current home?

	Number	Percentage
OWN	325	81.25%
RENT	63	15.75%
LEASE	5	1.25%
OTHER	4	1.00%
REFUSED	3	0.75%

D3. How long have you lived in your current home?

	Number	Percentage
LESS THAN 1 YEAR	15	3.75%
1 TO 3 YEARS	67	16.75%
3 TO 5 YEARS	60	15.00%
5 TO 10 YEARS	85	21.25%
10 YEARS OR MORE	170	42.50%
REFUSED	3	0.75%

D4. What was the last grade school completed?

	Number	Percentage
LESS THAN HIGH SCHOOL	14	3.50%
HIGH SCHOOL GRADUATE	58	14.50%
SOME COLLEGE	85	21.25%
COLLEGE GRADUATE	127	31.75%
GRADUATE DEGREE	51	12.75%
POST GRADUATE WORK	48	12.00%
VOCATIONAL/TECHNICAL TRAINING	6	1.50%
REFUSED	11	2.75%

D5. What is your age range?

	Number	Percentage
AGE 18 TO 29	33	8.25%
AGE 30 TO 39	67	16.75%
AGE 40 TO 49	137	34.25%
AGE 50 TO 59	67	16.75%
AGE 60 TO 64	26	6.50%
AGE 65 OR OLDER	63	15.75%
REFUSED	7	1.75%

D6. What is your ethnic background?

	Number	Percentage
CAUCASIAN/WHITE	220	55.00%
AFRICAN-AMERICAN	38	9.50%
HISPANIC/LATINO	60	15.00%
ASIAN-AMERICAN	53	13.25%
NATIVE AMERICAN	0	0.00%
OTHER (Specify)	16	4.00%
REFUSED	13	3.25%

D7. What is your estimate total household income?

	Number	Percentage
$14,999 OR LESS	16	4.00%
$15,000 TO $29,999	31	7.75%
$30,000 TO $44,999	26	6.50%
$45,000 TO $59,999	19	4.75%
$60,000 TO $74,999	30	7.50%
$75,000 TO $84,999	23	5.75%
$85,000 TO $99,999	28	7.00%
$100,000 TO $149,999	54	13.50%
$150,000 TO $199,999	30	7.50%
$200,000 AND OVER	21	5.25%
REFUSED	122	30.50%

That's all the questions I have. Thank you for your time, we appreciate your participation in this important research study.

INTERVIEWER: AFTER INTERVIEW COMPLETION, PLEASE FILL OUT THE FOLLOWING.

RECORD GENDER:

	Number	Percentage
MALE	198	49.50%
FEMALE	202	50.50%

RECORD LANGUAGE OF INTERVIEW:

	Number	Percentage
ENGLISH	398	99.50%
SPANISH	2	0.50%

DATE OF INTERVIEW: ____________________

Appendix C
VERBATIMS

S3: Other

Alamo
Crocket
Pacheco
Rodeo
Knightensen
Discovery
Bay
El Sobrante
Discovery
Bay
Bay Point
Rodeo
Discovery
Bay
Discovery
Bay
Alamo
Bay Point
Bay Point
El Sobrante
El Sobrante
Rodeo
Discovery
Bay
Bay Point
El Sobrante
El Sobrante
Crocket
Crocket
El Sobrante
Discovery
Bay
Discovery
Bay
Discovery
Bay
El Sobrante
El Sobrante
El Sobrante
El Sobrante
Discovery
Bay
Bay Point

Bay Point
Bay Point
Alamo
El Sobrante
El Sobrante
El Sobrante
Lafayette
Lafayette
Alamo
Discovery Bay
Discovery Bay
Alamo
Alamo
Alamo
Crocket
Bay Point
Bay Point
Bay Point
Bay Point
Bay Point
Bay Point
Alamo
Alamo
Alamo
Bay Point

Q4. Other

Water bill insert
Newsletter from water department
Water bill inserts, pamphlets
Science fair at son's school
Banners, flyers
Flyers'
Pamphlets
Water Bill Insert
Shoreline Recreation Area
At work
Girl scout activities
Water bill
Brochure
Girl scouts event
Water bill insert
Pest Control Business
Sign at a car wash
Moraga Pamphlet
Co-workers
Mailings
East Bay MUD Flyers
Water bill insert

Q5. What did this information mean or say to you?

Stop people from littering. No dumping in empty lots or pouring down storm drains.

We should cooperate and slow down pollution

Not to pollute by throwing garbage out or pouring chemicals in the storm drains

Recycle. Be careful about what you put in the trash.

To warn people how illegal dumping can harm humans and animals

Don't waste water

It's sad to me

Don't litter

What is put into our storm drains goes through waterways and into the bay without treatment

Litter was building up in drains, clean up was expensive, situation getting worse.

Be careful about what goes down storm drains

Don't remember

Don't litter

How somebody's garbage goes into the ocean and it's more damage than you think

That we have to be real careful where we dump our stuff

It just talked about the importance of not littering

To pick up trash. Try to help the hatcheries and fish

Be careful with our litter

Nothing much. Good message for other people

To help not pollute and don't waste water

A cartoon fish. "Don't litter in the ocean because I live there."

Think twice about throwing out litter from the car on the street

Don't put trash in water system. Put it in the proper place

We need to learn how to get rid of our waste/junk/trash

Don't litter because water is precious

Reinforced what I already know

We need to do something to save our water supply

All the chemicals we use go into local waterways

Storm drains leads to water waste

Be careful about what you do with your garbage/litter

It is social responsibility to prevent littering

It meant that litter should be cut down

Need to be more careful about pollution caused by littering/dumping

We need to stop littering

Reinforced my thinking/concerns about plastic/Styrofoam litter being thrown in local creeks, etc.

Don't be a litter bug

Water supply is subject to pollution by litter. It's very important to dispose of litter properly

I never litter

How car chemicals run into storm drains and into the bay

Litter is going into water supplier

Don't throw things out of the car or down the storm drains

Not much

Nothing

Don't know

To raise a concern to the community not to pollute

Means we have to take care of mother earth

That everyday’s moving around stuff gets litter into the water and where it's not supposed to be

Someone is trying to help the problem

People need to change their attitude more

Don't Corrupt/pollute our water

Nothing specific. Just that they were worried about water pollution in the area

To be careful to not litter

Someone is trying to clean up the water

It says not to litter. It's a danger to our species

Keep the world clean

Made me more aware of how bad the situation is and that everyone needs to do right

More litter we have, the quicker the Earth is going to end

If we continue to pollute water then the water we use will be like garbage

Don't trash California

Someone is working on it

Be more careful about litter

It's everybody's business to take care of your garbage and not to litter

Someone is trying to do something about this problem

Highlights how people's litter impacts water quality and ends up in the bay

It gives info on how to clean up water pollutants

Talked about properly disposing medication and the harm it could do if not followed

I was disgusted that people aren't concerned, dump garbage anywhere

In the course of my work we learn extensively about issues/problems involving litter impacting the water supply

That litter is a threat to the water system

Storm drains lead directly to the bay/delta and any litter in drains goes there

Everything is deteriorating

Made me go out and get water filter

We should put more effort in cleaning up the water bodies

How pollution filters through the water system into creeks, etc.

Litter travels with you

Litter makes its way through water ways and ends up in the bay and oceans

Do not drop anything in the drain storms

Grease clogs drain and should be made aware

We should all be concerned about polluting water

Inform the public that litter can affect the water table

The build up of litter and pollutants endangers the water supply in county

Do not remember

Do not remember

It raises awareness and what you should and should not do to the water system

The water has a problem. The water is no good. You should use a water filter in your house

These programs made me mad. Will increase weed and pest control costs

Can not remember

Trash gets into water

That litter gets in our water not only by use putting it in the water

Do not remember

At my children's school, they talked about that everything flows/drains into the ocean

To keep the water clean

It was posted on a construction site I working at and said that we have to install a filter to filter water before it went into the storm drain system

My son was at an environmental program at Point Benita, and so they talked about it there, that all trash ends up in the ocean. My daughter has done environmental clean-up with the girls scouts and at the storm drains it said "Do not dump right into the Bay."

It was quite a problem because it impacts people , your whole environment. The board of supervisors in the county should make it ordinances saying "you can't litter."

That it is good for society to recognize that storm drains go straight into the ocean

Don't remember

It was about preventing pouring things into the sewer, but I had no idea it was for the Contra Costa County

That stuff can get into the water table from leaching

People need to clean up after themselves otherwise they are drinking polluted water

That litter can be bad for the water and even animals in the water. In our gathering, we talked about that subject of course. Especially with children to learn to take care of air and water, and recycling, using trash in a useful way when throwing food away.

That we have a serious issue enough to take another look into my old ways practicing in respect to recycling, pollution

How we can keep our water clean and how we can help

We talked at work. If it drains, it goes down the ocean

It meant that litter in water bodies is a problem that needs to be addressed before it gets worse

That littering destroys the beaches and when you dump anything into the gutters it goes directly into the ocean and affects our eco-system.

Says clean water program is protecting the water shed

That this is an issue that can't be ignored

This problem needs to be dealt with

Don't remember

That our county is trying to keep water as clean as they can and they need help to do that

Do not put dog feces into the storm drain. There was a picture of a fish right on the sidewalk

Do not litter

That we should stop littering. Pollution comes from run-offs

Too much litter
Washing chemicals down drains and throwing animal waste in plastic bags and down storm drains is an issue

We aren't doing enough to prevent pollution
Be careful what goes into our water system & sewage system. For example, flushing prescriptions & nail polish are bad

A reminder not to litter

Don't recall

Do not put litter down the drain

Litter is getting worst

Too many people litter and it gets into our water

Q8. Other

Work related
Co-worker

Q10. What do you recall that information to be?

Include PPM of different pollutants. This is not an alarmist website, but could be alarmist website if information is in tech terms that tend to alarm residents. Website should include comparative toxicity figures in layman's terms, for example, as toxic as a baby aspirin.

I don't remember

Q13. What did the ads say to you? What was the message the commercial was trying to get across?

At an individual level, we can help stop litter/pollution

Be aware of what's going on

Not to litter

That even though I am littering in the streets, it's going to end up in the oceans so watch out

People have the power to stop water pollution

We need to be concerned about litter and the effect it has on us\

Litter gets into storm drains and into the water bodies

If you see something on the ground, pick it up

Be careful how you dispose of litter

Put the litter in the waste can

Keep garbage/chemicals out of storm drains since they drain into local waters and the bay

It's our responsibility

You must not litter

Do not litter

Do not litter

Not to litter and throw your stuff away

We have the power to stop littering

Just to be careful with your everyday stuff. Stop and think what you're doing - don't litter

All of us should try to participate in picking up garbage and give donations to help keep streets clean

We need to not litter because it goes into our water

Everyone should take the responsibility to clean up their own litter. Dispose of it properly

We need to start picking up our litter to save the environment

Self responsibility

Made me aware that this problem is up to us to stop

Don't trash

That the only way to stop this problem is for us to stop throwing garbage around

Take responsibility for preventing litter from entering storm drains

Be real careful what you do with your litter

When you dispose of garbage where it should be put. Helps stop water/environment pollution.

I am more conscious about litter

People can stop litter from entering our water system

If you do your part, every little bit helps to stop pollution problems

Litter goes wherever we go

Litter travels the waterways and that can stop if we don't litter

Do not litter. Pick up any that you see

Stop littering

It made him more concerned about the issue and knows only we can stop this

Be more aware of taking care of putting garbage in the correct containers and picking it up

Stop throwing out your car or in your drains. You're polluting water

Bus message had a dog with a lot of dirt around him

On a bus, I saw a sign of dog licking an item with slogan "fancy litter"

Litter is a big issue that's effecting our water

I was tied to an effort to recycle I thought, but apparently it wasn't. We let people think run-off water goes through a treatment plant or something.

I don't remember

It reminded me of being a girl scout. I am an adult girl scout, so I learned to take care of trash, and that's what I am teaching my children

That litter gets into the water system

Don't litter

If each person stops littering then it will stop pollution. It only takes one person

We the people are also responsible for stopping water pollution and not just organizations

That we can all do something to stop water pollution

People need to realize they have the power to fix or add to the problem

Not to litter because one little paper can go/travel down to the ocean

I don't remember

Litter moves down stream

Don't litter

Control your litter

Everybody should stop littering

Do not litter. Recycle

D6. Other

Did not specify

Fiji

East Indian

Filipino

African/Asian American
Caucasian/Asian
American

East Indian

East Indian

East Indian

Sri Lankan

East Indian

East Indian

Middle Eastern

Afghani

Arabic

Brazilian

BAY AREA STORMWATER MANAGEMENT AGENCIES ASSOCIATON

Media Relations Program

March – June 2010

Final Report Submitted by

O'Rorke Inc.

Overview

O'Rorke Inc. was hired by the Bay Area Stormwater Management Agencies' Association to conduct three media pitches to satisfy media relations work as outlined in the MRP.

O'Rorke participated in meetings with the PIP committee to determine the pitch topics and then developed strategies for each working closely with project manager, Sharon Gosselin.

The three pitch topics were:

- pesticides
- car washing
- litter, relating specifically to plastic bags

Coverage

In all, the three pitches resulted in thirty-eight media placements: six in print; eleven on the radio; and twenty-one online (this included radio station and newspaper websites).

What follows is a brief synopsis of each pitch strategy and the coverage results. Attached are individual media reports for each pitch.

Pesticides

Working with the media relations campaign project manager, O'Rorke strategized a pitch on pyrethroid pesticides. Using materials developed for Our Water Our World, O'Rorke wrote a release about pyrethroids emerging as a new force in the market and detailed information about how one chemical will be banned only to have a new one take its place.

The pitch resulted in six placements. The Alameda Sun ran the story with the headline, "Exercise Caution When Choosing Pesticides." Another coverage highlight included Geoff Brosseau's interview on KMKY (Radio Disney), a station that has good reach among women because mothers listen to the station with their children.

Car Washing
To promote using professional car washes or simply washing on grass or gravel instead of paved surfaces, O'Rorke fcused on a public-affairs driven pitch with prepared PSA copy as the cornerstone.

This was very effective. PSAs aired on five stations, including the high profile KCBS and KOIT. Additionally, translating the PSAs allowed O'Rorke to secure placement with KIQI, a Spanish language station. Numerous stations included the PSA copy on their websites and Sharon Gosselin was interviewed on the subject by KEAR.

Overall, this pitch resulted in fourteen placements.

Litter/Plastic Bags
Because litter is such a major issues facing stormwater programs, this was an important topic to cover. Again working with the project manager and PIP committee, O'Rorke developed a press release focusing on plastic bags as a major source of littler and promoting reusable bags as a better choice. The release also featured several tips to help peopled remember to use their reusables.

For this pitch, O'Rorke used a two-pronged strategy. The first part consisted of doing "DJ drops" at five key radio stations. A DJ drop is when a press release ad leave behind is brought to a station's morning show along with some food and refreshments for the morning show crew. In this case, we brought food, the press release and a few reusable chico-style bags to each station. The results were fantastic: two of the five stations covered the story that day. A third included some mention on air and requested copy to use online.

Coverage highlights included a two-minute discussion of plastic bags by Sarah & Vinnie of the immensely popular Radio Alice (KLLC) and a "Fog Files" segment on KFOG.

The second piece of the pitch consisted of sending the release out to other stations not covered by the drops and also to print. For print, O'Rorke also include a courtesy photo of a plastic bag on a storm drain. The second round of pitching resulted in several print and online placements. At this writing, two additional placements are still pending with Asian Week and Diablo magazine.

Overall, at this time, the litter pitch resulted in eighteen placements.

Media Coverage: Pesticides

Print

- Alameda Sun. "Exercise Caution When Choosing Pesticides." 4/29/2010.
- Danville Weekly. "Danville asks residents to think twice before buying pest control products." 5/18/2010.

Online

- Alameda Sun. "Exercise Caution When Choosing Pesticides." 4/29/2010.
- Danville Weekly. "Danville asks residents to think twice before buying pest control products." 5/18/2010.

Radio

- KEAR-AM. Interview w/ Geoff Brosseau completed Monday 5/10 at 8:15 a.m. The two five-minute segments aired Monday 5/10 at 11:04 a.m. and 4:04 p.m., and Tuesday 5/11 at 11:04 a.m. and 4:04 p.m.
- KMKY-AM (Radio Disney). Interview w/ Geoff Brosseau completed Wednesday 5/19 at 11 a.m. Scheduled to air first weekend in June.

Media Coverage –Car Washing

Online--PSAs

- KISS-FM (98.1)
- KMEL-FM (106.1)
- WILD 94.9
- KKSF-FM (103.7)
- STAR 101.3
- GREEN 960
- 910 KNEW
- KCBS-AM 740 – Online beginning 7/10, one (1) week prior to radio air date

Radio—PSAs and interview

- KMKY-AM (1310)
- KIQI-AM (1010)
- KCBS-AM (740) – 7/20-7/21; one (1) or two (2) times, Mon-Fri.
- KSQQ-FM 96.1 – Currently on air; 7/1 through next week
- KOIT-FM 96.5 – Running since 6/25; will continue to air for one (1) additional week from today 7/2
- KEAR-AM – Interview w/ Sharon Gosselin completed Thursday 7/15 at 10:00 a.m. The three five-minute segments will air Monday 7/19, Tuesday 7/20 and Wednesday 7/21

Media Coverage: Litter/Plastic Bags

Online

- KISS-FM (98.1)
- KMEL-FM (106.1)
- WILD 94.9
- KKSF-FM (103.7)
- STAR 101.3
- GREEN 960
- 910 KNEW
- PleasantonWeekly.com. "Grab Bag." Week of 7/12/10.
- TriValleyViews.com. "Grab Bag." Week of 7/12/10.
- San Ramon Express.com. "Grab Bag." Week of 7/12/10.
- DanvilleExpress.com. "Grab Bag." Week of 7/12/10.

Radio

- KLLC-FM (ALICE 97.3) – DJ Drop; on-air mention
- KFOG-FM (105.3) – DJ Drop; on-air mention
- KMEL-FM (106.1)

Print

- Lamorinda Weekly
- Orinda News (September)
- Rossmoor News
- Tri-City Voice

Pending

- AsianWeek
- Diablo Magazine

DRAFT

FOR IMMEDIATE RELEASE CONTACT: Geoff Brosseau
(650) 365-8620

PRESS RELEASE

SPRING INTO ACTION
Bay Area Stormwater Agencies Ask Consumers to Exercise Caution When Choosing Pesticides

April 20, 2010—Spring has sprung. With Spring comes new life and new opportunities to make better decisions for your yard and garden and for the environment.

With all the new growth, pests are not far behind. As gardeners figure out how to keep pests from bugging them too much, the Bay Area Stormwater Management Agencies Association (BASMAA) is asking consumers to make careful choices when purchasing pest control products.

After the highly publicized voluntary recalls of diazinon and chlorpyrifos (Dursban) as home and garden pesticides, consumers could easily think that most products on store shelves are safer. But this is not the case. In the wake of the recalls a new class of pesticides has come into prominence: pyrethroids.

"We have a situation where some highly toxic chemicals were taken off the market only to be replaced by newer—and just as toxic—chemicals," says James Scanlin, chair of BASMAA. "It's a vicious cycle that can leave consumers very confused and has a negative impact on the environment."

Pyrethroids are a class of pesticide designed to kill a wide variety of pests, such as lawn grubs and ants. But pyrethroids are also highly toxic to beneficial insects like ladybugs, earthworms, and lacewings, which help to keep problem pests in-check. Once beneficial bugs are eliminated, pests are free to multiply without the natural checks and balances that beneficial insects provide. According to a 2010 report prepared for the San Francisco Estuary Project, pyrethroid pesticides "remain the highest priority….because they have been linked to widespread toxicity in California surface waters."

"Pyrethroids came into wider use after bans on chlorpyrifos and diazinon took effect," explains Mr. Scanlin "They are found in easily over 900 products." Yard and garden pesticides are a particular problem when it comes to stormwater pollution. Once they wash off from rain and watering, pesticides flow into storm drains, polluting local creeks and the Bay, harming fish and other aquatic life.

BASMAA, a consortium of stormwater programs in the San Francisco Bay region, wants to help residents make less-toxic choices while maintaining beautiful yards and gardens.

BASMAA offers these tips when dealing with garden pests:

- Try less-toxic methods before making a purchase. Go to OurWaterOurWorld.org for tips and information. Sometimes biological controls (like bringing beneficial bugs into your yard and garden) can do the trick without any chemicals.

- Read labels. The word "pyrethroid" will not appear on a label, but look out for the following active ingredients: permethrin, bifenthrin, cyfluthrin, cypermethrin, deltamethrin, lambdacyhalothrin, and tralomethrin. A quick tip: active ingredient names ending in "-thrin" are usually in the pyrethroid class. The exception to this is pyrethrin which is produced naturally from the chrysanthemum flower – though can still be toxic to aquatic life. To download a free pocket guide that gives examples of products without pyrethroids, go to OurWaterOurWorld.org

- When shopping, seek out the least toxic products. Look for shelf signs with the Our Water, Our World name and logo, which call out the best choices in each category. Participating stores include Orchard Supply Hardware, Sloat Garden Centers, Ace Hardware Stores, Home Depot, and many other local nurseries and garden centers. To find a store near you, go to OurWaterOurWorld.org.

Final BASMAA Carwash PSA's Spring 2010

A: Love washing your own car? Keep doing it – but wash it on the lawn or on gravel or go to a car wash. Here's why: When you wash your own car in your driveway or street, you're also washing off pollutants like copper from brake pads and other chemicals. In many places, this runoff goes right to the storm drain untreated and from there it pollutes our waters. At the car wash, runoff water is collected and treated. Check out baywise.org for more information. (:30)

B: Be green this summer. Instead of washing your car on the driveway, wash it on a lawn or gravel. Here's why: when you wash your car in your driveway or street, copper from brake pads and other chemicals wash off, too – right into the nearest storm drain and into the Bay – untreated. For more pollution prevention tips, check out baywise.org. (:20)

C: Love washing your own car? Keep doing it – but don't do it in your paved driveway or street, where water runs off into the storm drain. Try washing your car on a grassy area or gravel instead. Why? To limit runoff. When you wash your car, you're also washing off pollutants like copper from brake pads and other chemicals. From there, they go right to the Bay. See baywise.org for more information. (:30)

D: Be green! Wash your car on a lawn or gravel. Here's why: when you wash your car in your driveway, copper from brake pads and other chemicals wash off, too – into the nearest storm drain and the Bay – untreated. For more tips, check out baywise.org. (:10)

Draft

PAPER OR PLASTIC? NO THANKS, I'VE GOT MY OWN
Bay Area Stormwater Management Agencies in reusable bag push to reduce water pollution

June XX, 2010—With a plastic bag ban in the offing for California this year, the Bay Area Stormwater Management Agencies Association (BASMAA), wants residents to start taking action now to break the plastic bag habit.

"Noting 'bring bag' at the top of your shopping list is an easy addition," said James Scanlin of BASMAA, a consortium of municipal stormwater pollution prevention programs from around the region. "By the end of 2010, California may have a plastic bag ban in place, so we are prepping residents to start using reusable bags now."

By now, seeing a plastic bag perched on a tree branch or hugging the pavement near a storm drain is a normal sight. Often these bags find their way into storm drains, local waterways, and eventually the ocean. Plastic debris like this represents nearly 90 percent of floating marine debris, according to the California Coastal Commission.

"Plastic bags are a huge environmental issue," says Scanlin of BASMAA. "Plastic never breaks down. It's little bits of litter, including plastics, that have added up to the immense island of garbage floating in the Pacific." According to the Earth Resource Foundation, over 100,000 marine animals die from plastic entanglement each year because they mistake plastic bags for food.

An analysis by the California State Assembly shows that Californians use 19 million plastic bags per year. From their very production (which entails use of petroleum), to the litter they create, to the havoc they have wreaked on the world's oceans, plastic bags are a major environmental issue.

BASMAA is asking Bay Area residents to make a renewed push toward using reusable bags. There are incentives for consumers, too: While many supermarkets have long offered five-cent bag credits, big box retailers like Target are now doing the same.

BASMAA offers these tips to residents to ensure they have reusables at the ready:

- Keep a rolled up or Chico-style bag in your purse to have handy for quick shopping trips.

- Leave reusable bags by the front door near keys, cell phones and other must-have items.

- Place some in the trunk or on the front passenger seat of your car so they're easily available when running errands.

- Just say no! If buying a small item, just refuse a plastic bag from the store clerk.

Contra Costa Monitoring and Assessment Program

Summary of Benthic Macroinvertebrate Bioassessment Results (2009)

Prepared for:

Contra Costa Clean Water Program
255 Glacier Drive
Martinez, CA 94553

Prepared by:

Armand Ruby Consulting
in association with
Brown and Caldwell

June 17, 2010

Preface and Acknowledgements

Many volunteers have assisted in collecting the bioassessment data described in this report. In 2009, participating groups included: Earth Team, Friends of Five Creeks, Friends of Orinda Creeks, Friends of the Creeks, Friends of Alhambra Creek Watershed, Friends of Marsh Creek Watershed, Friends of Mt. Diablo Creek Watershed, Friends of Pinole Creek Watershed, students from Los Medanos College, and the San Pablo Watershed Neighbors Education and Restoration Society. 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 Watershed 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.

Volunteers calculate stream discharge in Wilkie Creek

Title page photo: A group of volunteers after a sunny day in Rodeo Creek

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 took over primary responsibility for the collection of bioassessment data in 2007.

BMIs are composed primarily of insect larvae, mollusks, and worms. They 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.

In 2009 the Contra Costa Volunteer Creek Monitoring Program conducted bioassessments at 35 creek sampling stations, within 14 of the 29 major watersheds in Contra Costa County. The spring 2009 field data collection effort involved 64 volunteers and approximately 708 volunteer hours, county-wide. BMI samples and associated habitat quality data were collected using the 2007 California Surface Water Ambient Monitoring Program (SWAMP) protocols. To provide a measurement of Aquatic Life Use condition at these stations, a preliminary Benthic Index of Biotic Integrity (B-IBI) score was calculated from the BMI identification results for each station, using a method developed previously for creeks in Contra Costa County. Ranges of B-IBI scores were then assigned to poor, marginal, fair, good, and very good categories.

Results from 2009 indicate that 71% of creek stations sampled in Contra Costa County scored in the very good, good, or fair categories. Stations in Pine and San Ramon Creeks (Walnut Creek Watershed), Wildcat Creek, and Marsh Creek scored the highest of all stations sampled (B-IBI scores equal to or above 40). The lowest IBI scores (18 or lower) were calculated for stations in the lower reaches of Marsh, Mt. Diablo, Cerrito, Pine, and Rheem Creeks. Generally, lower scores were obtained from samples in lower reaches of the respective watersheds, where higher-density urban land uses typically predominate.

For 2009 data, physical habitat quality ("PHAB") scores (based on a semi-quantitative scoring system) were positively, though weakly, correlated with B-IBI scores. Physical habitat condition is typically related to the degree of development of the watershed.

Watershed-wide average B-IBI scores were calculated from the 2009 data to allow for broad inter-watershed comparisons. Among the 14 monitored watersheds there is a wide range in average scores, from San Ramon, Wildcat, and Alhambra Creeks, ranked first, second, and third, respectively, with average B-IBI scores in the "good" category, to Rheem and Cerrito Creek watersheds, ranked in the "marginal" category. Most watersheds had average scores in the "fair" category. Because all sites cannot be monitored every year, in any given year the mix of sites selected for monitoring strongly influences watershed-wide average scores.

Annual variability in average IBI scores is attributable to a number of factors, including site selection, antecedent (preceding) rainfall, and other climatological conditions.

New Zealand mudsnails (*Potamopyrgus antipodarum*) were present in a sample collected from the Baxter Creek site (BAX030).

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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. CCMAP is the principal monitoring vehicle for the Contra Costa Clean Water Program (CCCWP)[1], serving to fulfill monitoring requirements in the Joint Municipal NPDES Permits (Permits) issued 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. This report summarizes the methods and results of bioassessment data collection in 2009 under the CCMAP.

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 reach 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 CCMAP in subsequent years. To assess the condition of aquatic life uses, a watershed-based sampling design is employed, where creeks within particular watersheds are typically monitored for (at least) two consecutive years before monitoring resources are moved to other watersheds.

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.

Left: Two Friends of Orinda Creeks volunteers perform a titration for Alkalinity in upper San Pablo Creek

[1] The Contra Costa Clean Water Program is comprised of Contra Costa County, all nineteen of its 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

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. Beginning in 2007, all CCMAP bioassessment sample collection and field observations were performed by the Volunteer Creek Monitoring Program. The spring 2009 field data collection effort involved 64 volunteers and approximately 708 volunteer hours, county-wide.

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.

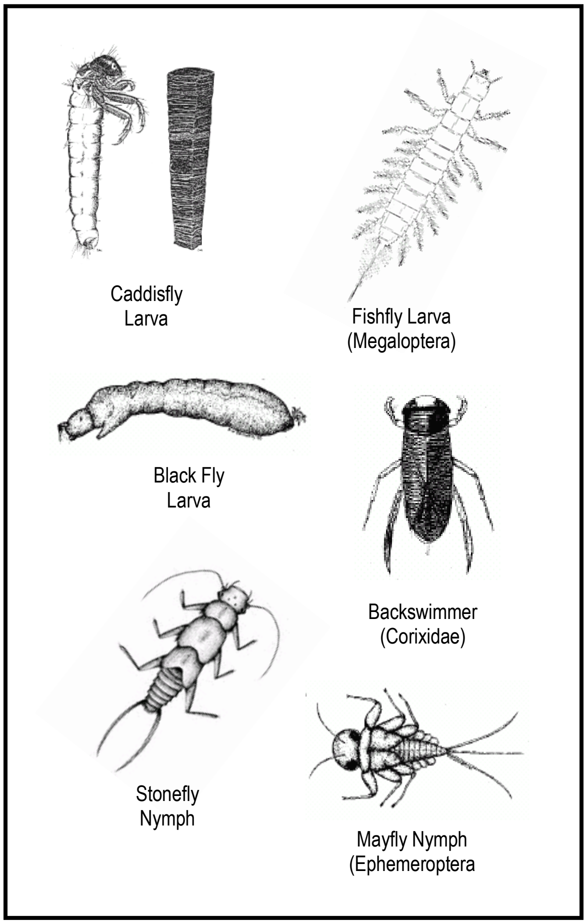


Figure 1. Examples of benthic macroinvertebrates (BMIs) used by the Contra Costa Clean Water Program as indicators of aquatic life use condition.

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.

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 2009 are shaded.

The locations of creek stations sampled during 2009 are presented graphically in Figure 2. Specific information on the locations of the 2009 CCMAP sampling stations is presented in Table 3.

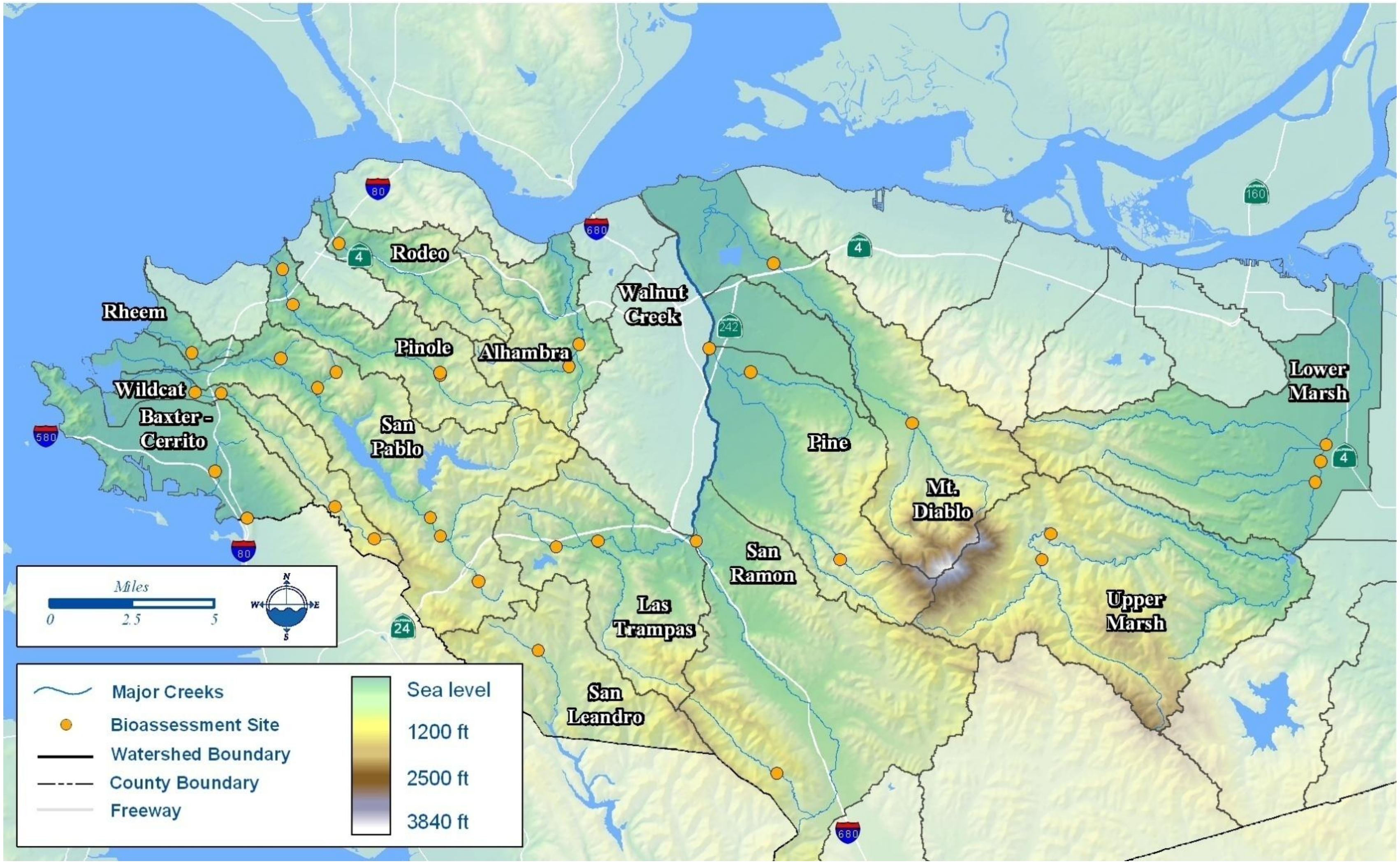


Figure 2. Benthic Macroinvertebrate (BMI) bioassessment stations sampled under the Contra Costa Monitoring and Assessment Program (CCMAP) in 2009.

Table 3. Benthic Macroinvertebrate (BMI) bioassessment stations sampled in 2009.

Code	Waterbody	Location	Latitude	Longitude
Alhambra Creek Watershed				
ALH130	Alhambra Creek	Alhambra Cr. below Arroyo del Hambre	37.97423	-122.12595
ALH150	Arroyo del Hambre	Arroyo del Hambre above Castle Creek Court	37.96720	-122.13048
Baxter Creek Watershed				
BAX030	Baxter Creek	Booker T. Anderson Park	37.91898	-122.3261
Cerrito Creek Watershed				
CER010	Cerrito Creek	Pacific East Mall	37.89807	-122.306957
Marsh Creek Watershed				
MSH045	Lower Marsh Creek	Marsh Cr Trail off Sand Creek Rd – Pinn Bros	37.93796	-121.70740
MSH052	Lower Marsh Creek	Between Dainty and Balfour	37.93090	-121.71048
MSH061	Lower Marsh Creek	Creekside Park	37.92159	-121.71306
MSH130	Upper Marsh Creek	County Detention Center	37.89722	-121.86031
MSH140	Upper Marsh Creek	210 Tumbleweed Court	37.87817	-121.86908
Mt. Diablo Creek Watershed				
MTD020	Mt. Diablo Creek	Diablo Creek Golf Course (hole 16)	38.01861	-122.02602
MTD060	Mt. Diablo Creek	Clayton Library	37.94405	-121.93749
Pinole Creek Watershed				
PNL010	Pinole Creek	Pinole Creek at Senior Center	38.00722	-122.29030
PNL029	Pinole Creek	Pinole Library Demonstration Garden	37.92431	-122.28441
PNL100	Periera Creek	Bear Creek Road- upstream of footbridge	37.96392	-122..20161
PNL110	Pinole Creek	Bear Creek Road – upstream of natural drop	37.96249	-122.20126
Rodeo Creek Watershed				
RDO009	Rodeo Creek	Downstream of Viewpoint Blvd.	38.01989	-122.25908
Rheem Creek Watershed				
RHM030	Rheem Creek	Contra Costa Community College	37.97034	-122.33972
San Leandro Watershed				
SLE208	Moraga Creek	Miramonte HS	37.84205	-122.14434
San Pablo Creek Watershed				
SPA110	Wilkie Creek	Santa Rita Rd by De Anza School	37.96883	-122.29048
SPA130	Castro Creek	Castro Ranch Rd US of Olinda/Hillside	37.95592	-122.26992
SPA133	Castro Creek	EBRPD land near Conestoga Way; below pond outfall & U/S of confluence	37.96336	-122.25959
SPA175	San Pablo Creek	Wagner Ranch Nature Area	37.89966	-122.20531
SPA190	San Pablo Creek	EBMUD Orinda Treatment Plant	37.89163	-122.19960
SPA240	San Pablo Creek	Upstream of Camino Encinas Road	37.87250	-122.17861
Pine Creek (Walnut Creek Watershed)				
WAL200	Pine Creek	Via de Mercados	37.97669	-122.05198
WAL220	Gallindo Creek	Trailside Circle	37.96664	-122.02862
WAL290	Little Pine Creek	Mt. Diablo State Park – Northwest entrance	37.88426	-121.97717
Las Trampas Creek (Walnut Creek Watershed)				
WAL365	Lafayette Creek	Village Center	37.88780	-122.13505
WAL375	Las Trampas Creek	Leigh Creekside Park	37.89120	-122.11207
San Ramon Creek (Walnut Creek Watershed)				
WAL500	San Ramon Creek	Creekside Street	37.89147	-122.05728
WAL730	Bollinger Creek	Chen's property off Bollinger Canyon Road	37.78973	-122.01040
Wildcat Creek Watershed				
WIL060	Wildcat Creek	At Vale Road	37.96027	-122.36750
WIL070	Wildcat Creek	Alvarado Park at Buckeye Picnic Area	37.95237	-122.32105
WIL130	Wildcat Creek	¼ mile up Lone Oak Picnic Area trail	37.95319	-122.33836
WIL180	Wildcat Creek	Big Springs Picnic Area	37.88979	-122.23681

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

The 2007 SWAMP protocols were followed by CCMAP citizen monitors during the 2007-09 sampling. In accord 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, 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. See the sample field data sheet (Appendix E) for details on the observations recorded by the PHAB team. See Appendix F for completed field sheets used during actual sampling.

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

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.

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 25 cm^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 E.

As indicated in the SWAMP protocols, measurements of in-stream and riparian habitat and ambient water chemistry always accompany bioassessment samples. Physical habitat measurements were 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 habitat. A summary of physical habitat scores for all bioassessment stations monitored in the current year is provided in Appendix A.

Left: Students at Los Medanos College calculating reach gradient

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 B.

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 sample based on a nine sq. ft. sampling area).

2.5.2 Benthic Indices of Biotic Integrity

An Index of Biotic Integrity (IBI) is an index that reduces complex information about biological community structure into a simple numerical value based on measures of taxonomic richness (number of taxa); taxonomic composition (e.g., insects vs. non-insects); taxonomic diversity; feeding groups (e.g., shredders, scrapers, or predators); habits (e.g., burrowing, clinging, or climbing taxa); and tolerance to stressors. Typically, separate metrics are used from each of these categories to develop a multi-metric index (IBI) for a particular region of interest (e.g., Western U.S., California or Contra Costa County) to assess the biological condition in creeks.

Table 4. Six general steps typically used to develop an Index of Biotic Integrity (IBI)

1. Classify stream types into classes and select reference sites
2. Select potential metrics
3. Evaluate metrics to select most robust ones
4. Score metrics and combine scores into IBI
5. Assign rating categories to IBI score ranges
6. Evaluate IBI and refine

Barbour *et al*. (1999) identified six general steps involved in the development of an IBI (Table 4); each step can be modified based on the needs of the region or availability of research tools. Benthic macroinvertebrate IBIs (B-IBI) recently developed for Southern and Northern California wadeable streams and the status of the San Francisco Bay B-IBI are discussed here, along with steps used to develop a preliminary B-IBI for Contra Costa creeks.

Northern and Southern California B-IBIs

Benthic Indices of Biotic Integrity (B-IBIs) were recently developed for coastal Northern California (Oregon border to Marin County) and Southern California (Mexico Border to Monterey County) using the steps presented in Table 4 (Ode et al., 2005; Rhen and Ode, 2006). Of 71 possible metrics, eight were selected for the Northern California B-IBI and seven for the Southern California B-IBI (Table 5). Four metrics were selected in common for the Northern and Southern California B-IBIs.

Table 5. Metrics selected for development of the Southern and Northern California B-IBIs.

B-IBI Metric	Southern California	Northern California
Coleoptera Richness	x	x
EPT Richness (Ephemeroptera + Plecoptera + Trichoptera)	x	x
Predator Richness	x	
Diptera Richness		x
% Collector individuals	x	
% Noninsect Taxa		x
% Tolerant	x	x
% Intolerant Taxa	x	x
% Non-Gastropoda Scraper Individuals		x
% Predator Taxa	x	
% Shredder Taxa		x

San Francisco Bay Area B-IBI

To better understand the biological integrity of Bay Area creeks, the Bay Area Macroinvertebrate Bioassessment Information (BAMBI) network[3] has begun to develop a provisional B-IBI for San Francisco Bay Area Creeks. The Bay Area B-IBI is being developed using data collected from Contra Costa, Alameda, Santa Clara, San Mateo, Napa, Marin, Sonoma and Solano counties, and will fill a geographical data gap created by the Northern and Southern California B-IBIs. 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 for applicability in the Bay Area. As a result, a preliminary B-IBI for Contra Costa was developed. To determine which metrics are applicable, IBI development steps 1-5 were followed (see Table 4). The following paragraphs briefly describe this process.

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. There are many definitions of the term “reference condition” ranging 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, most reference condition approaches seek to identify a compromise, the “least disturbed condition” in region. In regions like the San Francisco Bay Area, it is necessary to select sites that represent the “best attainable” condition given application of best management practices 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.

The bioassessment programs in Contra Costa County have attempted to include information about minimally impacted conditions at selected “reference” stations to supplement data collected at BMI

[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.

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 6 were selected to represent reference conditions in Contra Costa County.

Table 6. 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. Ideally, reference conditions would represent each set of sampling sites with significantly different BMI assemblages due to natural conditions. 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

Selection of the most appropriate bioassessment metrics for an IBI is a critical phase in the creation of an IBI and typically undergoes the most revision in subsequent refinement of an index. Ideal metrics differ from region to region (hence the need for regional IBIs), but share common characteristics. Most critically, "core" metrics should be able to discriminate between known reference stations and stations with known impacts.

A series of techniques was used to select appropriate metrics in the development of the preliminary Contra Costa B-IBI, following United States Environmental Protection Agency recommendations (Barbour *et al*. 1999, Hughes *et al*.1998, McCormick *et al*. 2001). However, since similar techniques were used in the development of the Northern and Southern California B-IBIs, the 11 metrics selected in these indices were used as the starting point for the Contra Costa B-IBI, instead of testing all possible metrics (~71). 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 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 7 presents the scoring ranges for the five metrics included in the preliminary Contra Costa County B-IBI.

Table 7. Scoring ranges for the five metrics included in the preliminary Contra Costa County Benthic-IBI and scoring categories that define biotic condition.

IBI 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

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 scores for each site, using the scoring categories defined in Table 7, and the B-IBI score for each site is calculated by simply summing the component metric scores. The resulting B-IBI scores are then divided into scoring categories that define thresholds of biotic condition as shown at the bottom of Table 7. 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 2009, over 15,000 individual macroinvertebrate organisms were taxonomically identified from the 35 sampling stations in the 14 Contra Costa County watersheds monitored. These organisms comprised 111 distinct BMI taxa. Table 8 provides an overview of distribution by major taxonomic grouping, county-wide. A complete list of taxa identified in Contra Costa County samples in 2009 is included in Appendix D.

Table 8. Percentages of all organisms identified within various BMI groups (2009)

GROUPS OF BENTHIC MACROINVERTEBRATES IDENTIFIED	% OF ALL ORGANISMS
Aquatic Insects/Spiders/Crustaceans (Arthropoda)	86.73%
Aquatic Insects:	
True Flies (Diptera)	52.11%
Mayflies (Ephemeroptera)	14.64%
Caddisflies (Trichoptera)	1.55%
Stoneflies (Plecoptera)	1.52%
Beetles (Coleoptera)	0.78%
Dragonflies and Damselflies (Odonata)	0.56%
Acari	0.49%
Amphipoda	6.13%
Ostracoda	8.90%
Alderflies and Dobsonflies (Megaloptera)	0.05%
Segmented Worms (Annelida)	5.58%
Hirudinea	0.04%
Polychaeta	0.05%
Oligochaetes	5.48%
Coelenterata	0.01%
Snails and Clams (Mollusca)	7.53%
Flat Worms (Platyhelminthes)	0.15%
Other (Nematomorpha)	0.01%

3.1.1 Most Dominant Taxa

Over 55% of the organisms identified in 2009 belonged to one of five taxa (Table 9). Dipterans were the most common taxa identified, occupying three of the top five taxonomic frequencies.

Table 9. Five most frequently identified benthic macroinvertebrate taxa identified in samples collected in 2009**.**

TAXON	TAXONOMIC GROUP	COMMON NAME	TOLERANCE VALUE (0-10)*	% OF ALL ORGANISMS
Simulium	Diptera	Black flies	6	14.23%
Orthocladiinae	Diptera	Non-biting midges	5	13.71%
Baetis	Ephemeroptera	Baetid mayflies	5	10.95%
Ostracoda	Ostracoda	Seed shrimp	8	8.90%
Chironomini	Diptera	Non-biting midges	6	7.73%
			Total	**55.52%**

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

The 2009 taxonomic results were less dominated by Dipterans than in 2008; in 2009 the frequency of Dipteran identifications was very similar to 2007. However, as in 2008, the 2009 results were relatively low in Oligochaetes compared with 2007, when Oligochaetes were the number-one-ranked taxa identified. Chironomids have remained among the top five taxa for the past several years; however, their abundance is lower in recent years than during the 2001-06 period, when they cumulatively represented 30% 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 freshwater habitats (Epler, 2001). 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.

3.1.2 Functional Feed Groups (FFGs)

Without a relatively diverse variety of food types (e.g., fine and coarse particulate organic material, algae and other BMIs), an imbalance in BMI community structure occurs, reflecting stressed conditions. 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.

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.

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. BMI communities at sampling stations in Contra Costa County are dominated by generalist FFGs (see 2009 distribution, Figure 3). Specialized feeders, such as scrapers, shredders and predators, are typically considered to be the more sensitive types of BMIs and are generally well represented in healthy streams. Organisms from specialized FFGs are identified in Contra Costa creeks, but to a lesser degree than collector-gatherers and collector-filterers.

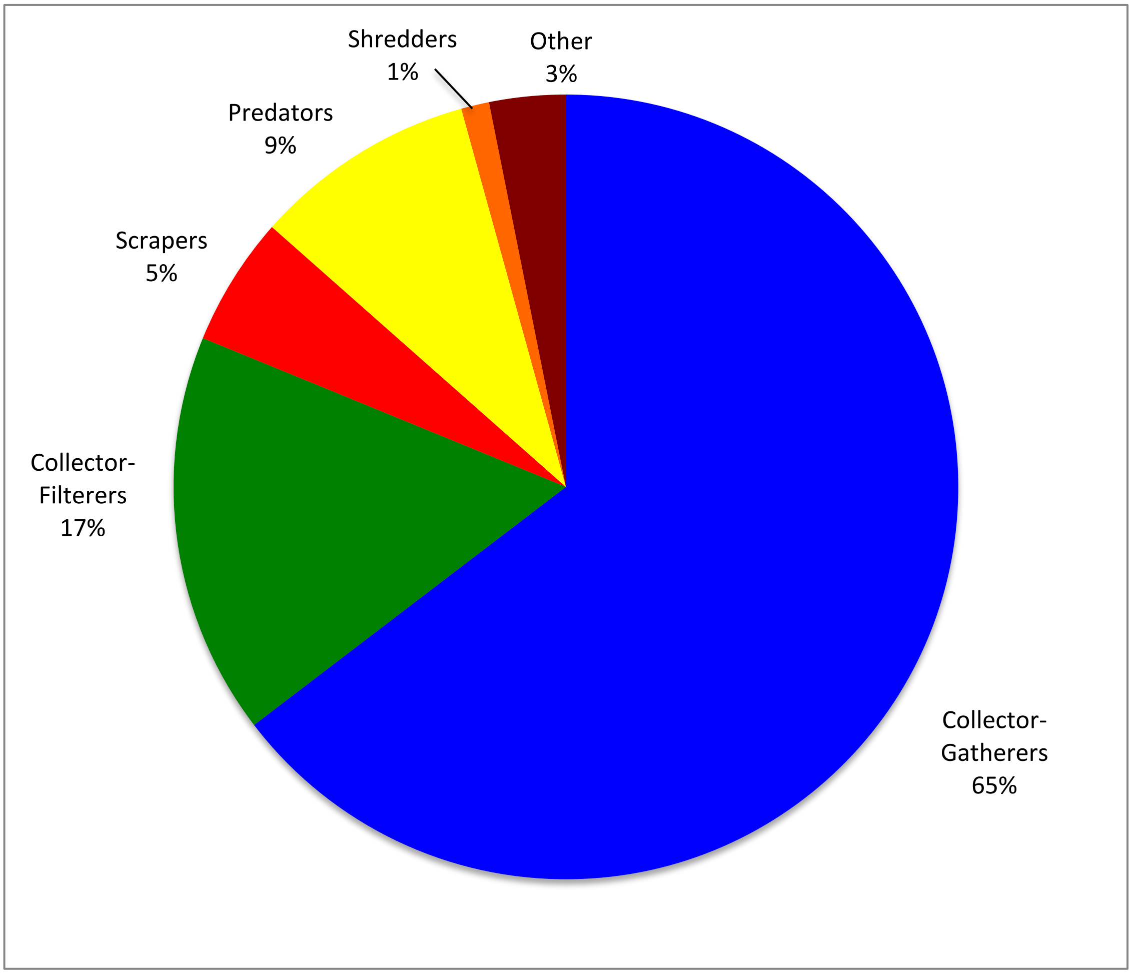


Figure 3. Percentages of organisms identified in functional feeding groups in 2009.

3.2 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 each creek sampling station and event. B-IBI scores presented in this report represent the most up-to-date evaluation of bioassessment data on a "county-wide" basis.

Results from 2009 indicate that roughly 71% of creek stations sampled in Contra Costa County scored in the very good, good or fair categories (Figure 4). Stations in Pine and San Ramon Creeks (Walnut Creek Watershed), Wildcat Creek, and Marsh Creek scored the highest of all stations sampled (B-IBI scores equal to or above 40). The lowest IBI scores (18 or lower) were calculated for stations in the lower reaches of Marsh, Mt. Diablo, Cerrito, Pine, and Rheem Creeks.

To assess the general condition of aquatic life uses on a watershed scale, average B-IBI scores were calculated for the 12 Contra Costa watersheds monitored during 2009, using the average score of all stations within the watershed boundaries (Figure 5, Table 10).

The individual metrics and scores used to calculate the B-IBI scores are presented in Appendix C.

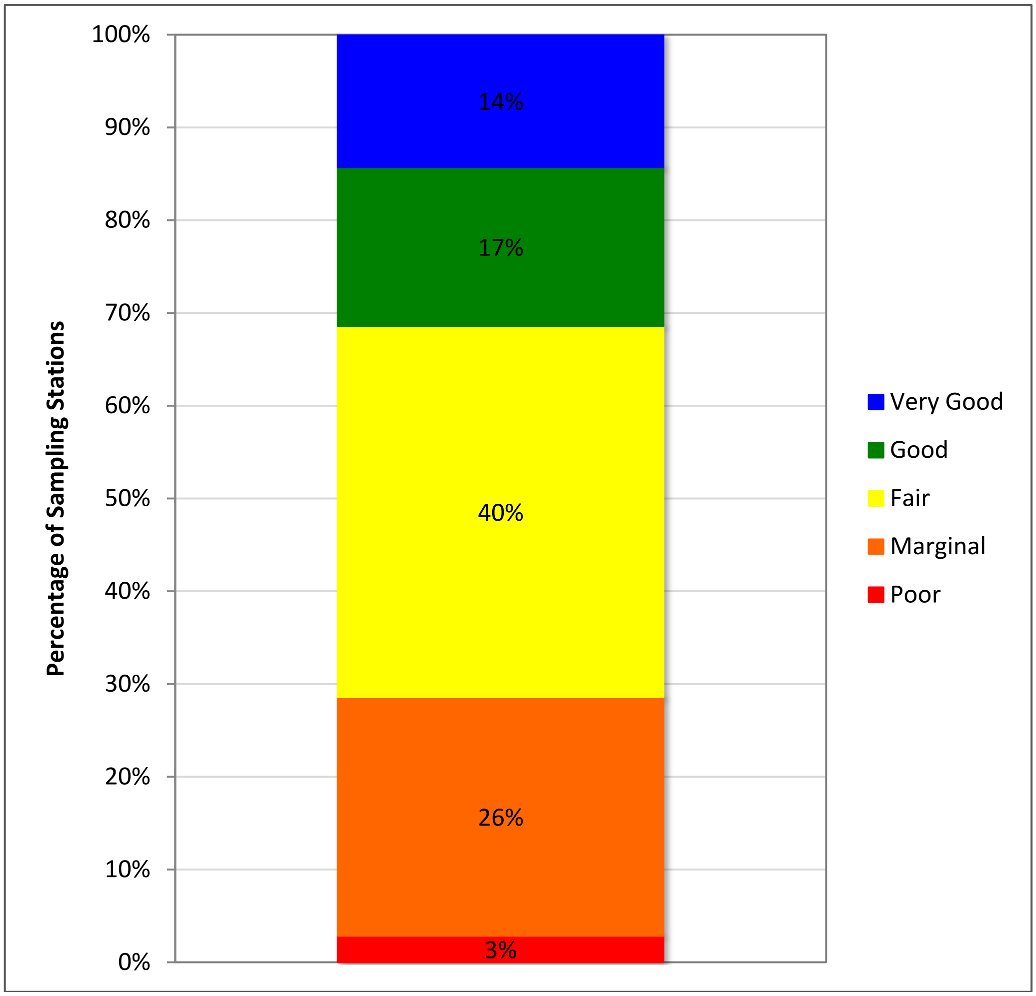


Figure 4. Percentage of Contra Costa County creek stations in each B-IBI scoring category, based on 2009 data.

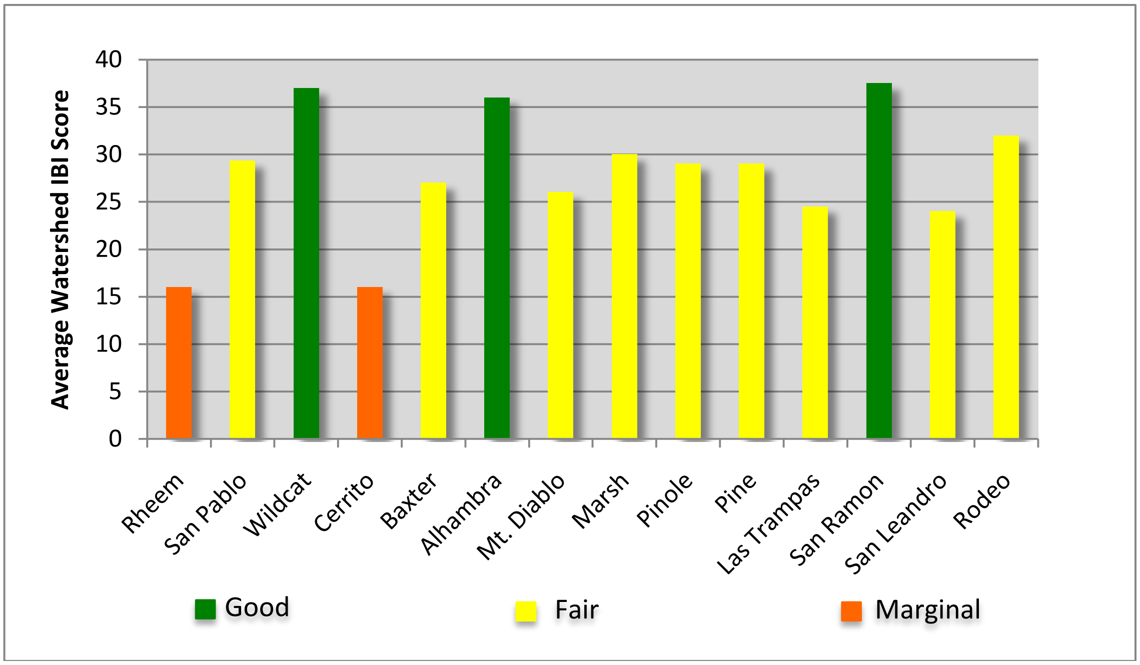


Figure 5. Average 2009 B-IBI Score by watershed

Note: the Las Trampas, Pine and San Ramon Creek sites are located within the Walnut Creek watershed.

Table 10. Average B-IBI Watershed Score and Ranking, 2009 Data

1	San Ramon	37.5
2	Wildcat	37.0
3	Alhambra	36.0
4	Rodeo	32.0
5	Marsh	30.0
6	San Pablo	29.3
7	Pinole	29.0
8	Pine	29.0
9	Baxter	27.0
10	Mt. Diablo	26.0
11	Las Trampas	24.5
12	San Leandro	24.0
13	Rheem	16.0
14	Cerrito	16.0

3.3 ANNUAL VARIABILITY IN B-IBI SCORES

BMI communities naturally vary spatially and temporally. The CCMAP standardizes the monitoring approach to attempt to minimize the variability due to the sampling regime, by collecting samples from the same stream reaches on a recurring basis, 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 IBI scores, as discussed below.

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. An analysis of annual variation in B-IBI scores from 2001-2006 (EOA, 2007) revealed that it was not possible to discern any notable or consistent temporal trends in the BMI monitoring data. A longer time frame is often needed to illustrate temporal trends, as sufficient data must be accumulated to overcome the inherent noise (innate variation) in the data.

3.3.1 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.

3.3.2 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.

3.3.3 Climate

Differences in annual climate, particularly antecedent rainfall (rainfall that occurs in the period prior to sampling), could influence annual average B-IBI statistics. In fact, the 2005-06 rainfall year was dramatically different than both 2006-07 and 2007-08 (see Table 11). The 2006 BMI samples were collected following a hydrologic year with over 27 inches of rainfall, more than three times the amount received in 2006-07, and more than twice the amount received in 2007-08. 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.

As shown in Table 11, the 2008-09 rainfall year was similar in total accumulation to the previous (2007-08) hydrologic year, but nearly twice as much as the 2006-07 year. However, rainfall was higher during the spring period that preceded the 2009 BMI sampling than during the 2008 or 2007 spring.

Table 11. 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

3.3.4 Year-to-Year Comparisons

For the three most recent years of BMI sampling (2007-09), 15 sites were sampled consecutively in all three years. The average annual results of the IBI scoring and the individual metrics used in computing the IBI scores are shown in Table 12 for the 15 sites sampled in these three years. Overall, the 2009 results tended to be similar to the 2007 results, and represented moderate improvements with respect to the 2008 results. The very dry spring experienced in 2008 may have had a detrimental effect on overall (average) results. This contrasts with the comparison of 2006 to 2007 results (Armand Ruby Consulting, 2008), in which a very wet spring in 2006 produced much lower IBI scores than the following, more normal water year in 2007. However, the individual B-IBI scores for the 13 sites sampled in 2007-09 are shown in Appendix H, with highest year highlighted for each site. This chart does not show any consistent pattern year-to-year.

Table 12. Average* Annual B-IBI Score and Metrics, 2007-09 Data

	2007	2008	2009
Total IBI	32.6	29.0	**33.1**
Beneficial Metrics:			
EPT Taxa	**3.7**	2.8	3.6
Number Diptera Taxa	7.8	7.1	**8.1**
Number Predator Taxa	**6.3**	4.7	5.7
Detrimental Metrics:			
% Collectors	**69%**	70%	71%
% Non-Insecta Taxa	35%	**29%**	33%

* Average scores for 15 sites monitored in all three years; best (highest beneficial and lowest detrimental) scores are highlighted for each metric.

3.4 POTENTIAL FACTORS AFFECTING AQUATIC LIFE USES

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). Limited data are currently available on food availability, stream hydrology and water quality, and therefore no analyses were performed on these factors. The effects of watershed-scale urbanization (via elevation) and reach-scale physical habitat quality were examined using available data in the 2007 report (EOA, 2007).

3.4.1 Urbanization

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. In previous studies, the effects of urbanization on BMIs have been evaluated using indicators such as percent impervious surfaces and percent urban area in upstream land areas. Although data were not available for these urbanization indicators, information on other indicator, elevation, was available to assess correlation between urbanization and IBI scores.

Due to historical development patterns, urbanization in Contra Costa County typically increases as elevation decreases. In the 2001-06 BMI report analysis (EOA, 2007), elevation did not correlate well with B-IBI score. Additional analysis of the relationship should be performed, to assess whether other indicators of urbanization, such as population density, are correlated with BMI measurements.

For the 2009 BMI sample results, monitoring sites were characterized as being in "lower", "middle", or "higher" reach ranges, and the minimum, mean, and maximum B-IBI scores for each group were compared (see Figure 6). The results of these comparisons support the idea that upper regions of watersheds, which are generally less developed that lower regions, tend to have higher B-IBI scores. The mean and maximum in each category consistently increased from lower to middle to upper ranges of the watersheds tested in 2008. These spatial trends are consistent with those observed in the 2007 data (ARC, 2008).

3.4.2 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).

As in 2007 and 2008, the 2009 PHAB scores were positively correlated with the B-IBI scores. The relationship was statistically significant ($p = 0.044$), but the correlation was again weak ($r^2 = 0.12$). 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.

3.4.3 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. 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 figure, section 3.5.2), perhaps indicating that the invasive colonization may be in the early stages.

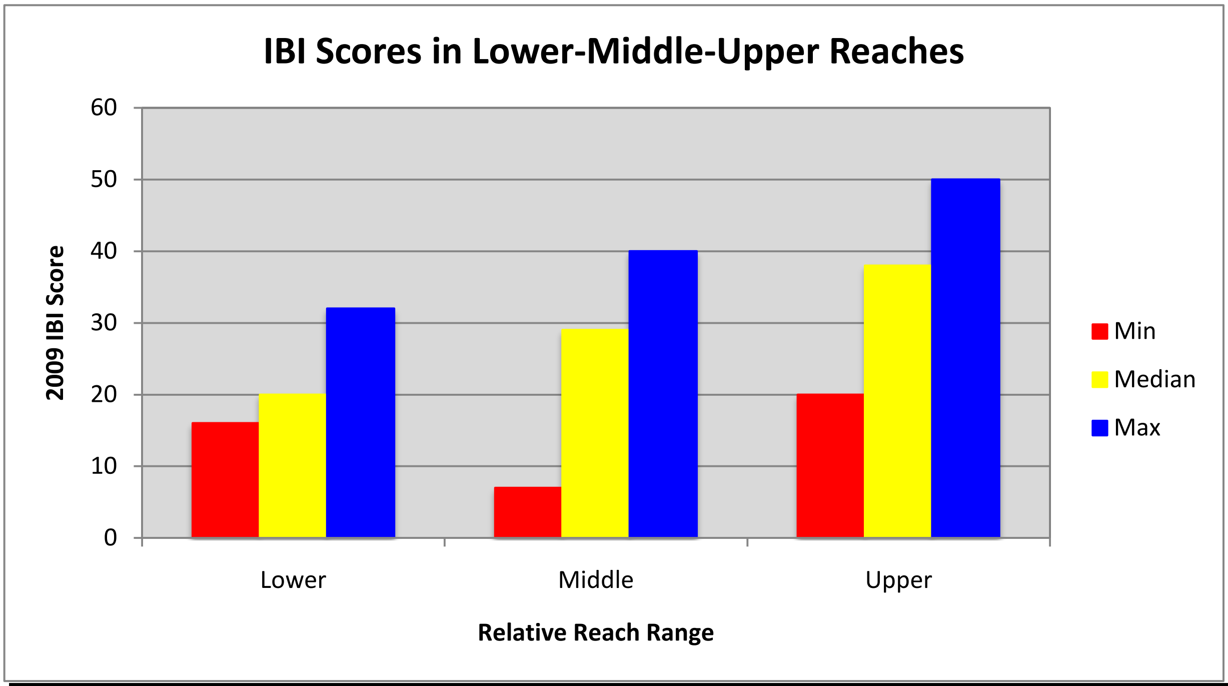


Figure 6. Comparisons of IBI Scores in Lower, Middle and Upper Creek Stations, 2009 Data

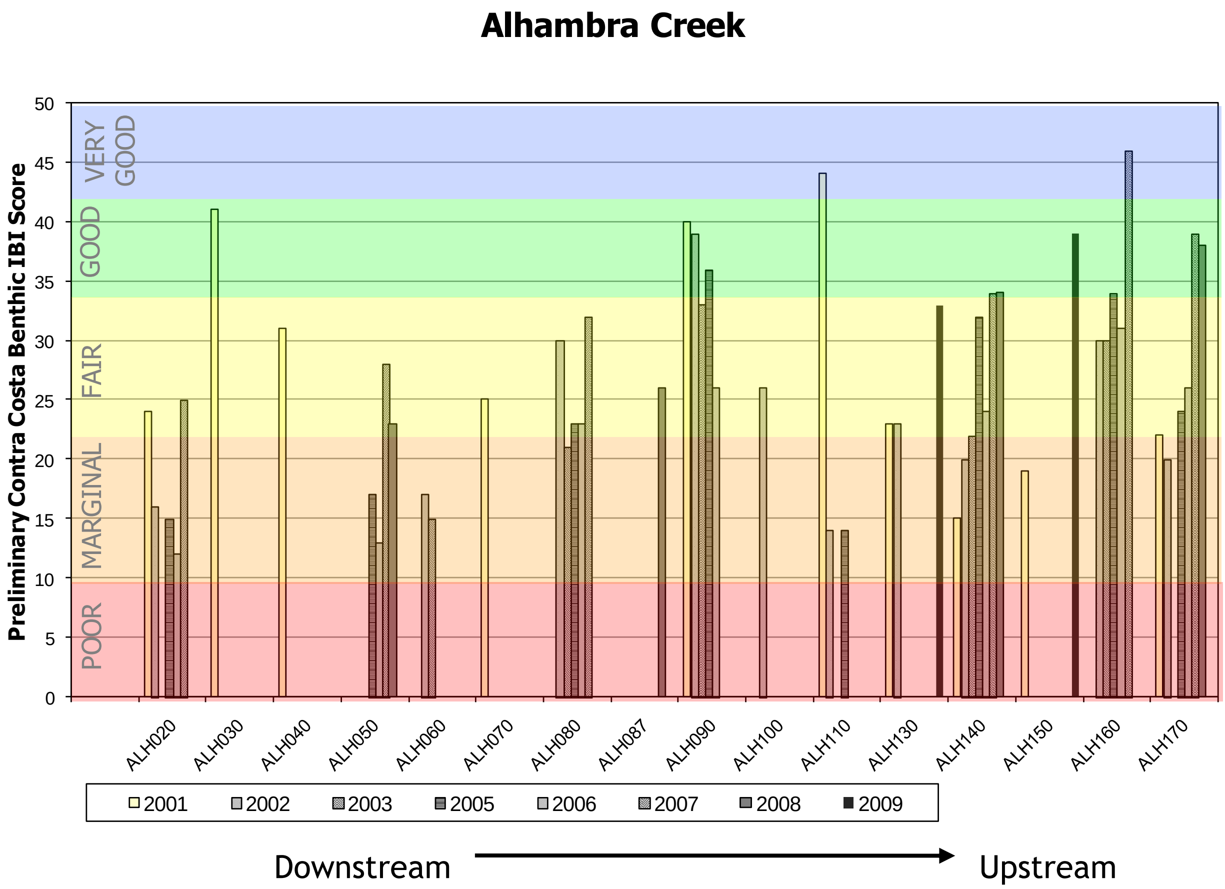
3.5 WATERSHED-SPECIFIC OBSERVATIONS

This section includes graphical presentations of all BMI monitoring results from 2001-09, 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.

Several 2009 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: MSH061, SLE208, SPA175, SPA190, WIL080, WAL200, WAL290, WAL365, and WAL375. 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.

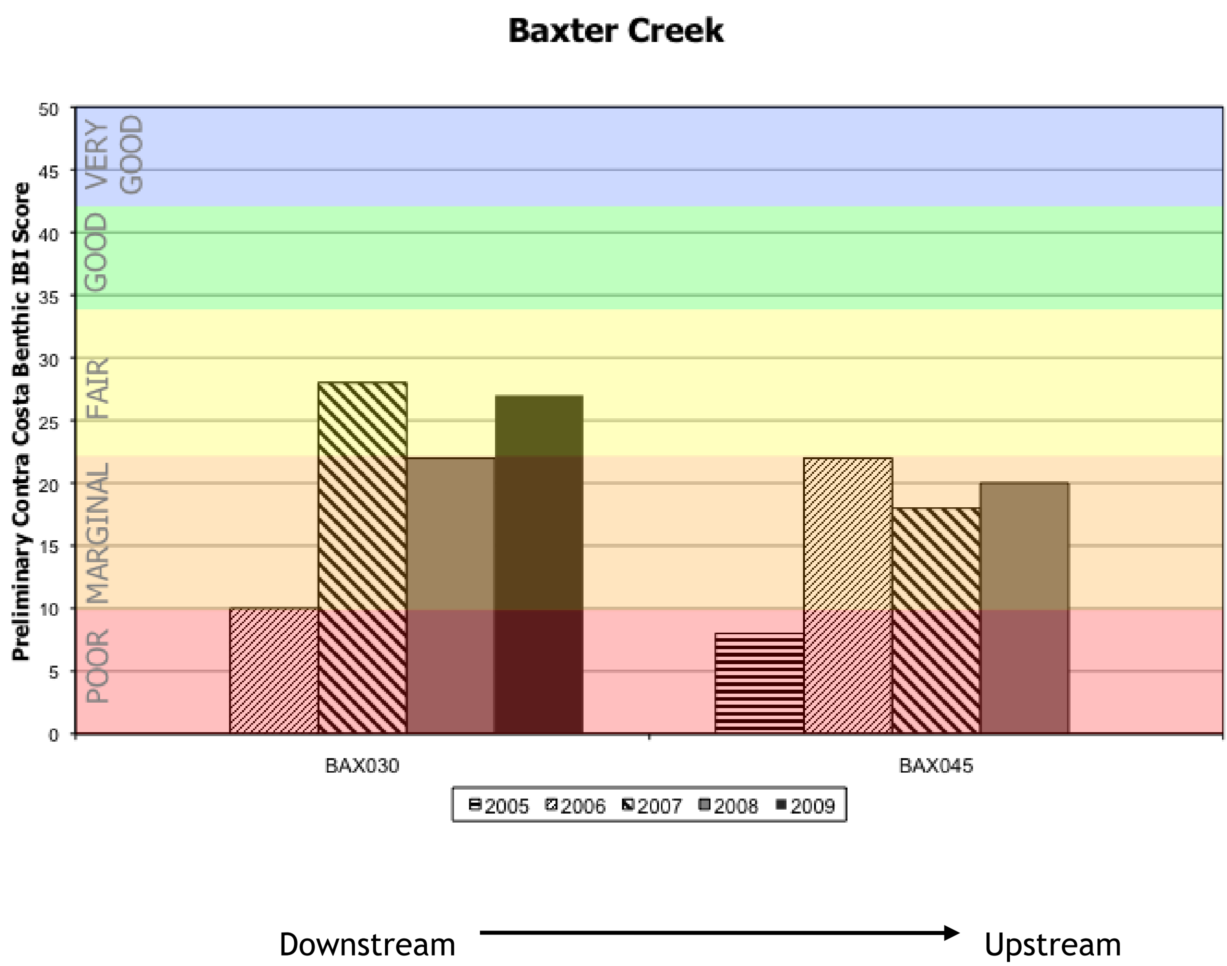
3.5.1 Alhambra Creek Watershed

Within the Alhambra Creek watershed the general condition of aquatic life uses in creeks appears to be fairly good, relative to other watersheds in Contra Costa County, as illustrated by the B-IBI scores.



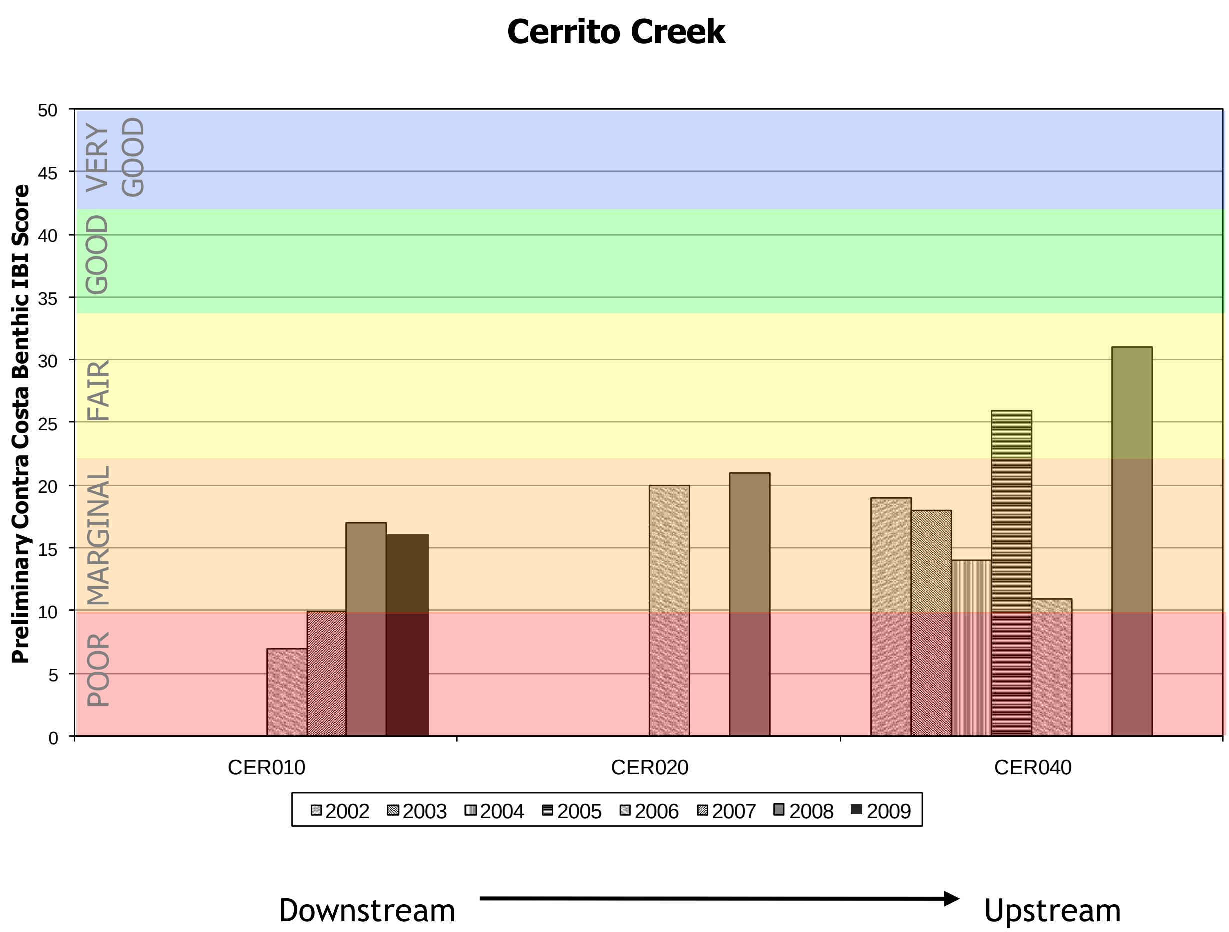
3.5.2 Baxter Creek Watershed

Baxter Creek watershed is made up of predominately urban land uses, and creek channels have been heavily altered due the historical effects of urbanization. Therefore, it is not unexpected that stations within this watershed would generally have B-IBI scores within the poor to marginal categories. These stations are dominated by short-lived, tolerant benthic macroinvertebrates that generally indicate stress on a system. In 2009, for the first time, New Zealand mudsnails (*Potamopyrgus antipodarum*) were positively identified in a sample collected from a site on Baxter Creek (BAX030).



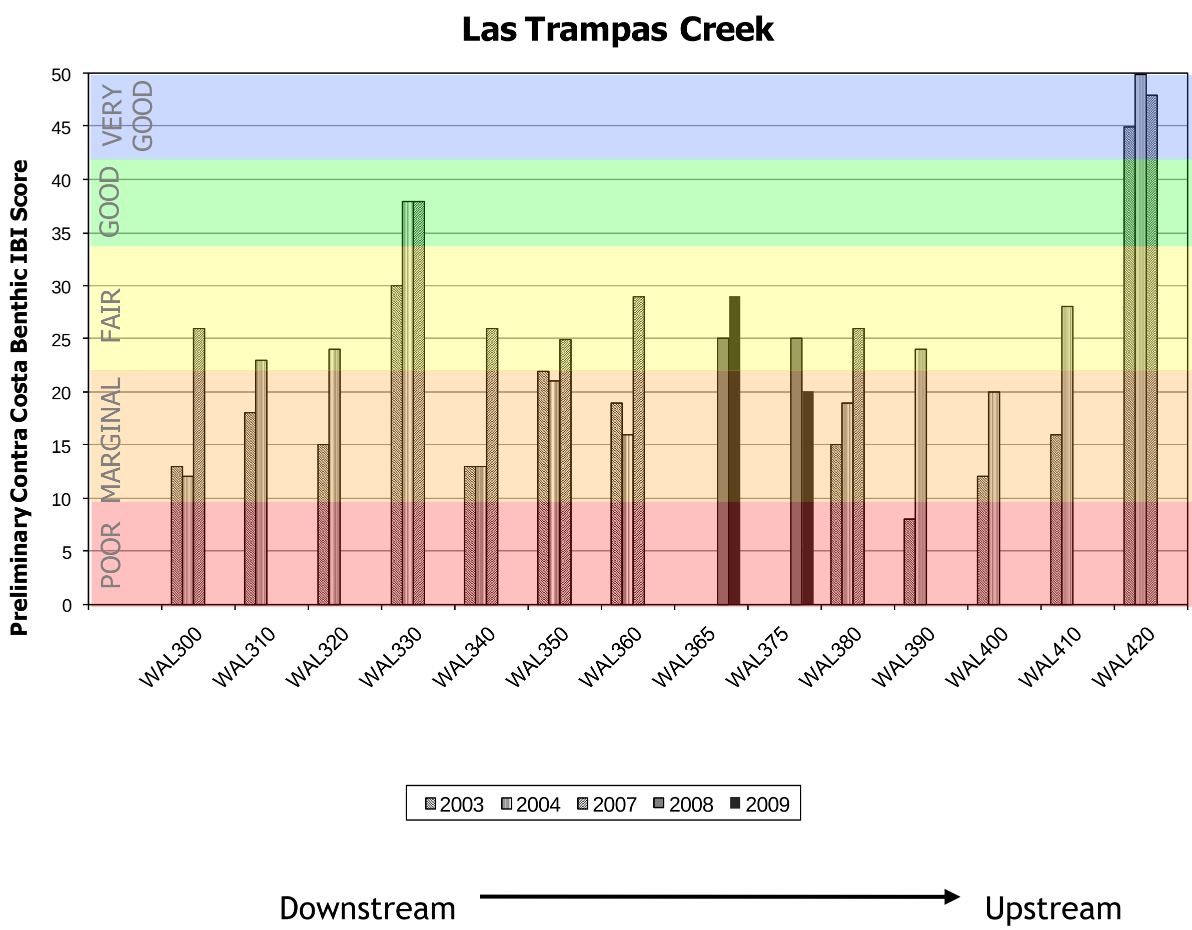
3.5.3 Cerrito Creek Watershed

Cerrito Creek watershed is also made up of predominately urban land uses, and creek channels have been heavily altered due the historical effects of urbanization. Therefore, it is not unexpected that stations within this watershed would generally have B-IBI scores within the poor to fair categories. These stations are dominated by short-lived, tolerant benthic macroinvertebrates that generally indicate stress on a system.



3.5.4 Las Trampas Creek Watershed

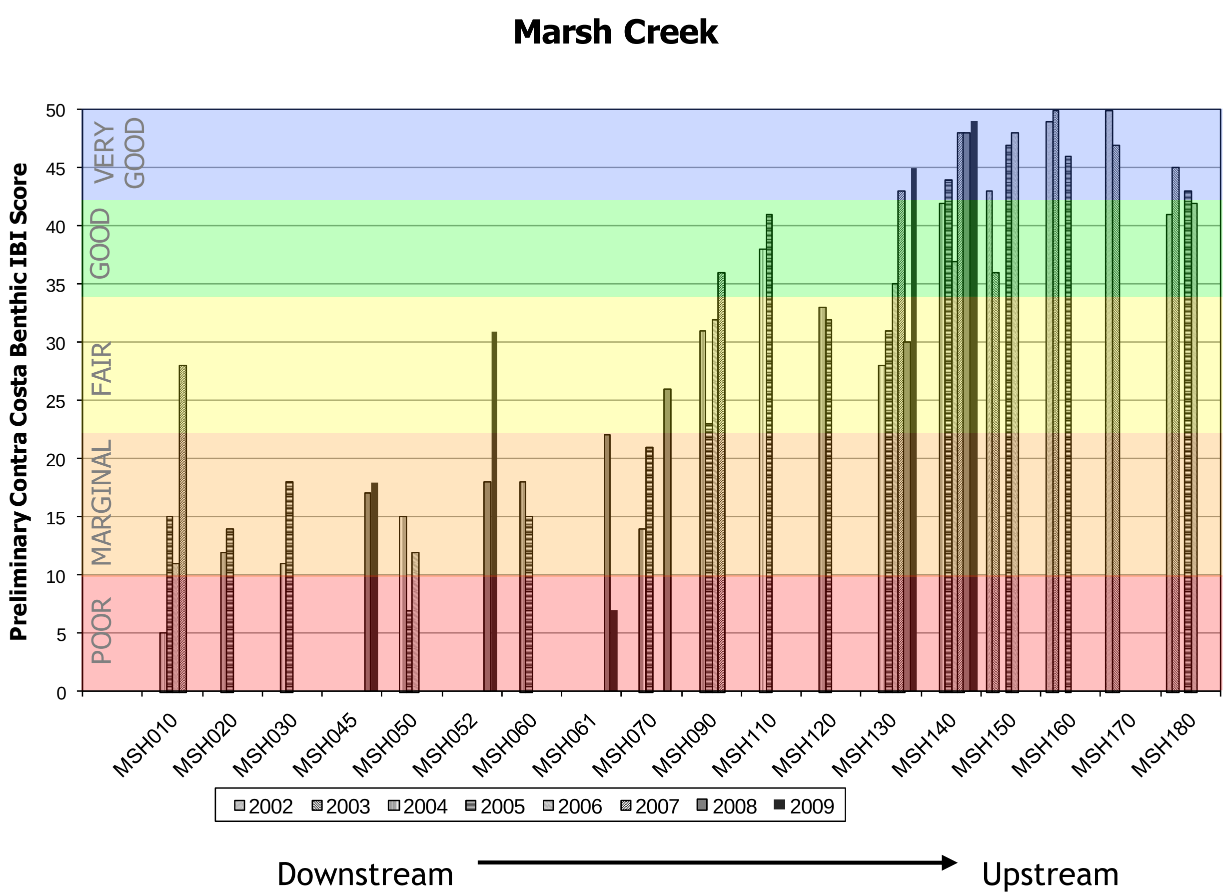
With the exception of stations WAL330 andWAL420, B-IBI scores for stations in the Las Trampas creek watershed have been fair to marginal. Stations WAL330 (Reliez Creek) and WAL420 (Las Trampas Creek) are located in the upper Walnut Creek watershed and predominately drain open space land uses and relatively large parcels of land. In contrast, other stations in the watershed are surrounded by residential and commercial development.



Note: the Las Trampas Creek sites are located within the Walnut Creek watershed.

3.5.5 Marsh Creek Watershed

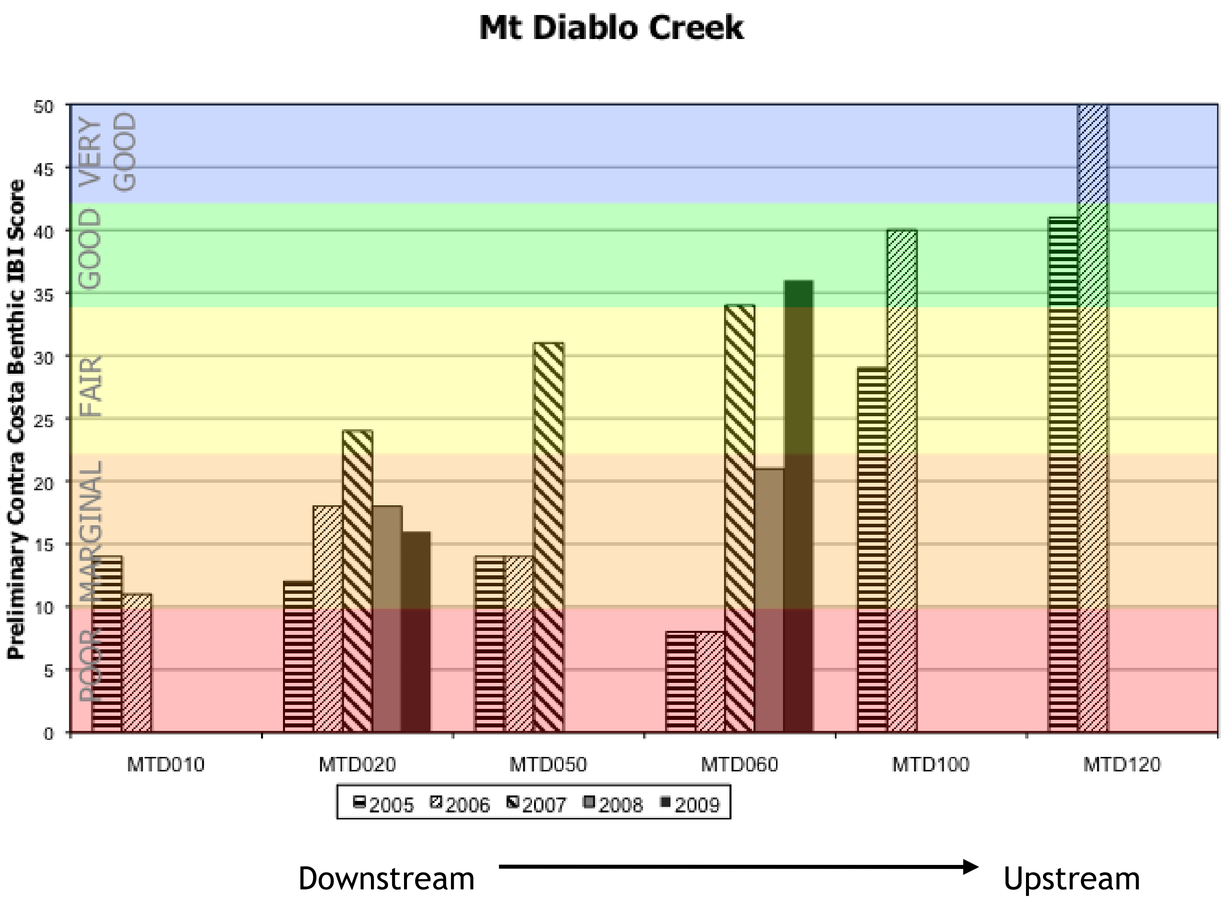
In contrast to the upper watershed, stations in the lower watershed consistently generally score in the poor to marginal categories, and are dominated by short-lived tolerant benthic macroinvertebrates that generally indicate stress on a system. The low scores at stations in the Lower March Creek watershed, 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. However, the sites in the Upper Marsh Creek watershed, above the dam (MSH090 and above), 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

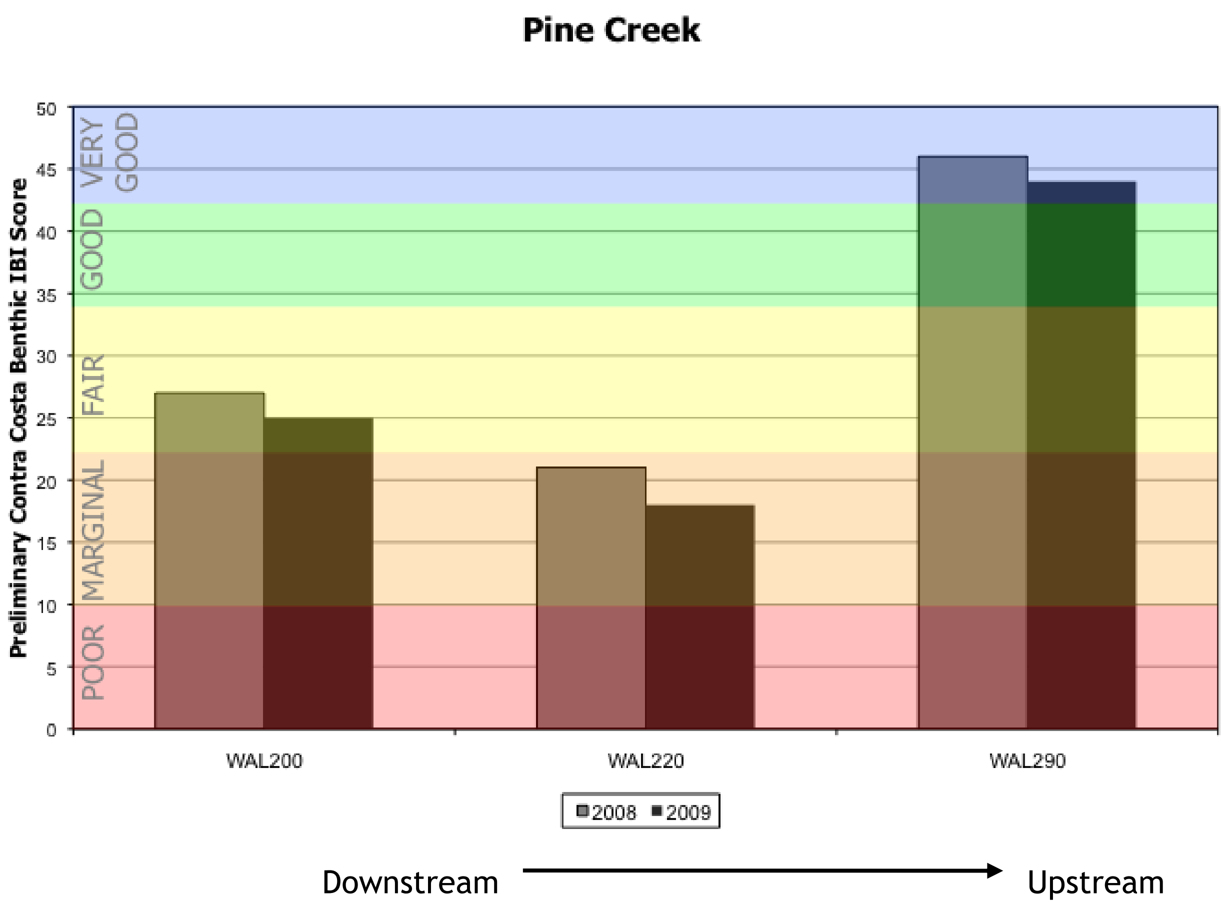
3.5.6 Mt. Diablo Creek Watershed

In this watershed there is a fairly clear progression in B-IBI scores from lower to upper watershed. Stations in the upper watershed, particularly MTD120, had B-IBI scores in the good to very good categories. Scores in the mid to lower watershed stations (below MTD100) were much lower, falling into the marginal and poor categories. These lower watershed stations were generally dominated by short-lived tolerant BMIs that generally indicate stress on a system. Lower scores at these stations could indicate that degraded physical habitat and/or water quality may be impacting benthic communities.



3.5.7 Pine Creek Watershed

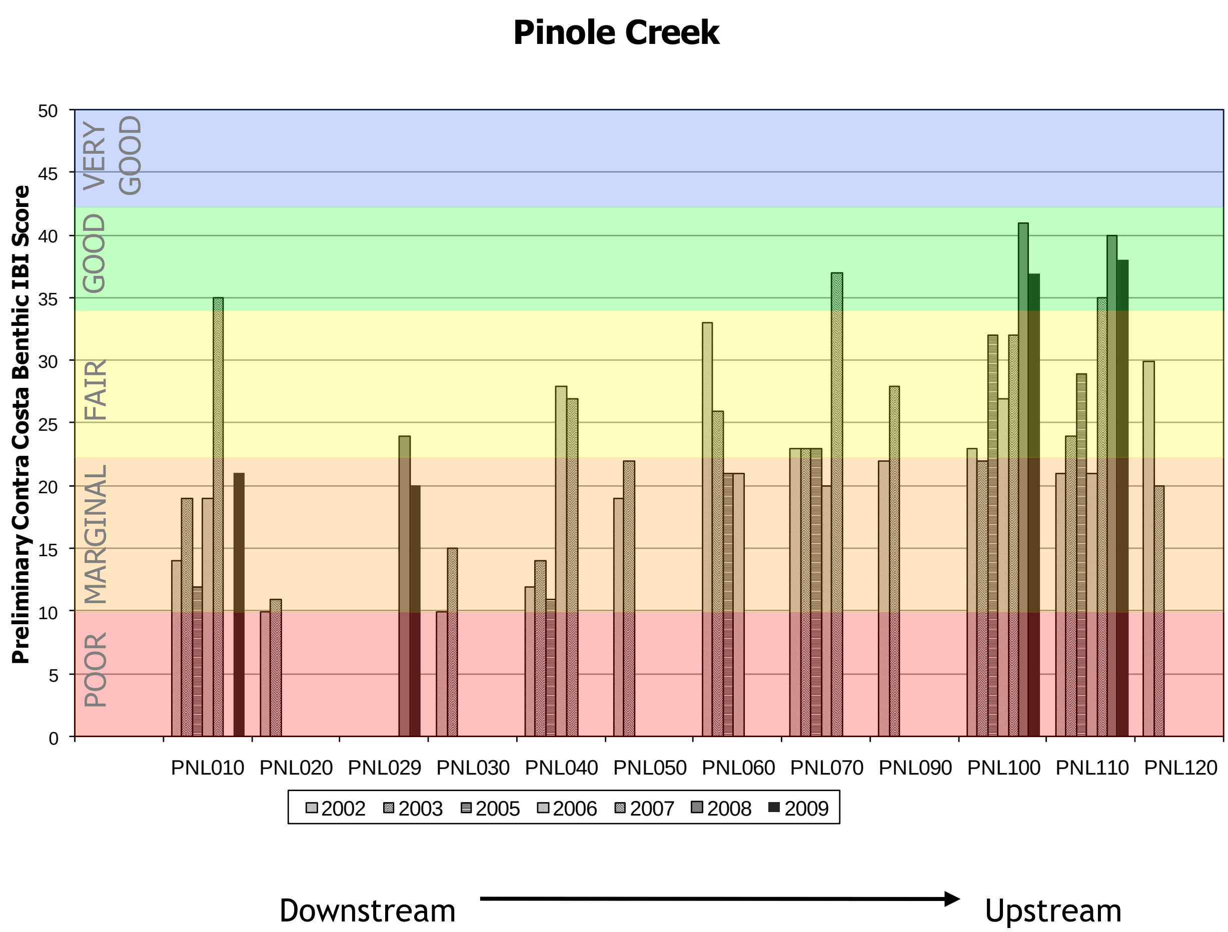
Pine Creek watershed was monitored for the first time in 2008, with marginal to very good results, trending higher at the upper watershed site, in the typical pattern. In 2009, scores dropped slightly.



Note: the Pine Creek sites are located within the Walnut Creek watershed.

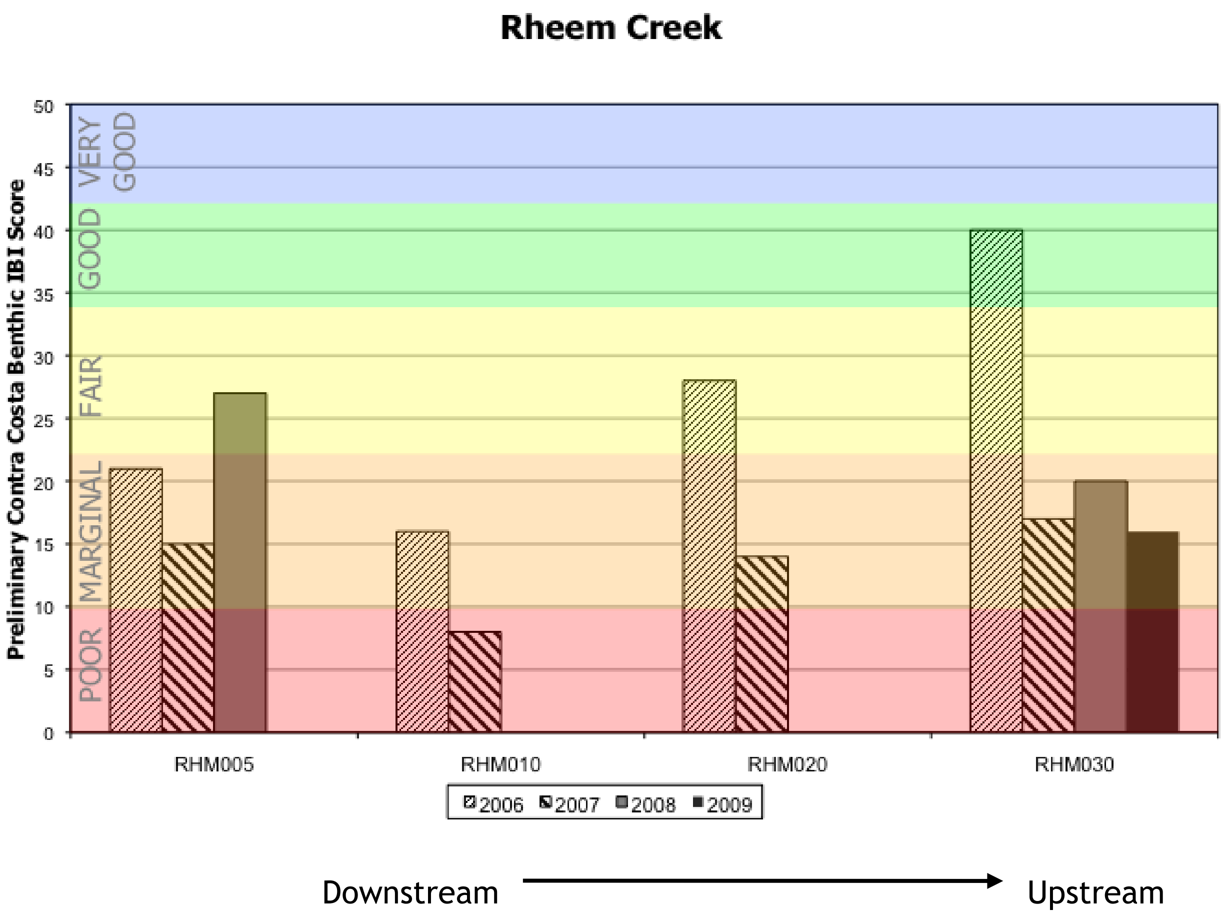
3.5.8 Pinole Creek Watershed

Aquatic life use conditions in creeks within the Pinole Creek watershed appear to be relatively good compared to other watersheds in the County. Throughout this watershed scores range from poor to good.



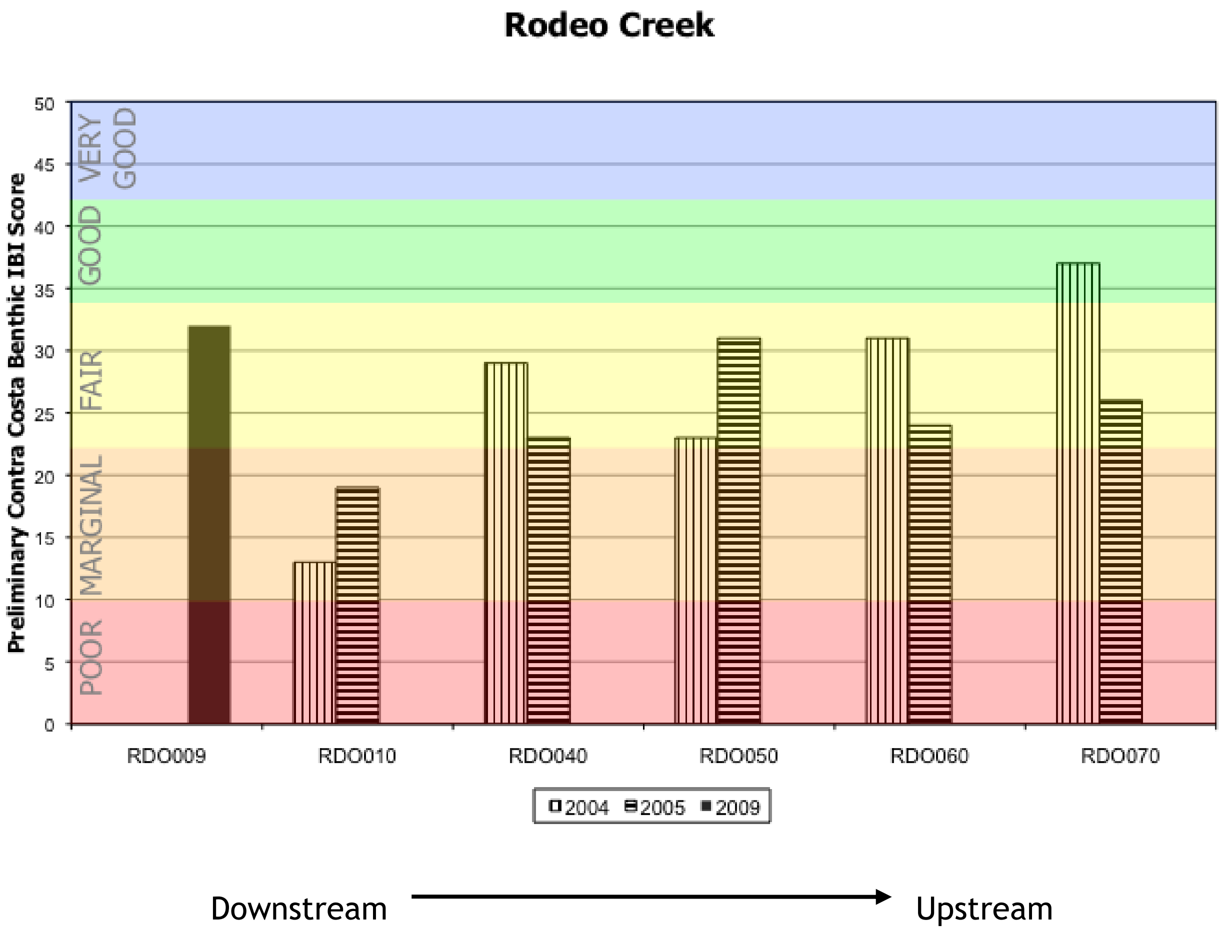
3.5.9 Rheem Creek Watershed

Results have been mixed for stations within Rheem creek. Scores were in the marginal to good B-IBI categories during the 2006 sample collection, but scores dropped into the poor to marginal categories with the 2007 sample results, followed by improvement into the marginal to fair categories for the two sites sampled in 2008. In 2009, only the furthest upstream station was sampled, showing a drop in IBI score from 2008. Stations in the lower watershed are dominated by short-lived tolerant benthic macroinvertebrates that generally indicate stress on a system. Reduced physical habitat quality at all stations in the watershed may partially explain benthic community composition. The Rheem Creek 2007B-IBI scores were consistently lower than the 2006 scores, contrary to most other Contra Costa watersheds.



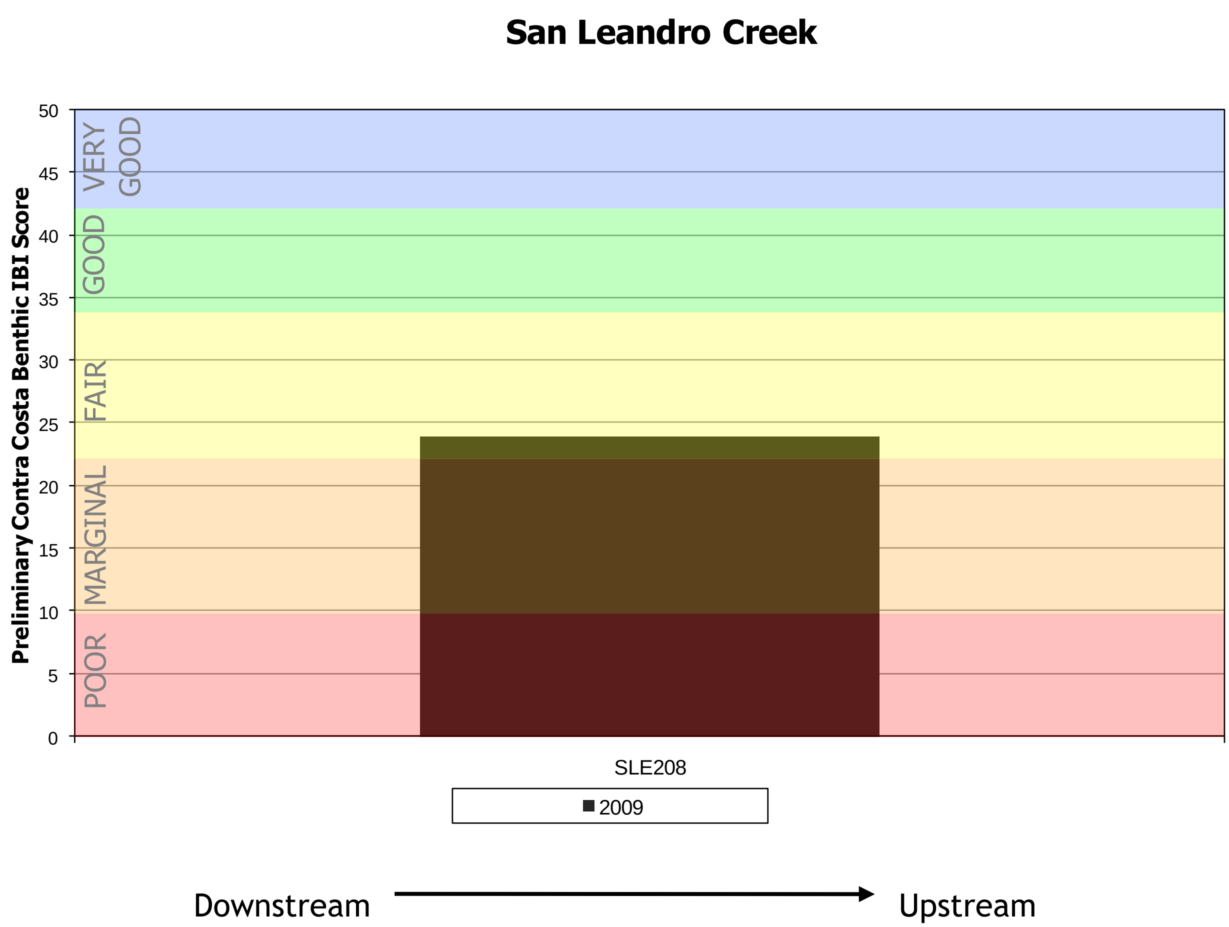
3.5.10 Rodeo Creek Watershed

The farthest-downstream portion of Rodeo Creek (site RDO009 is new in 2009, slightly downstream of site RDO010) appears improved compared to earlier measurements made nearby in 2004 and 2005. This may not indicate a trend, however, as It is possible that this variability is due to difference in hydrology or in measurement protocol.



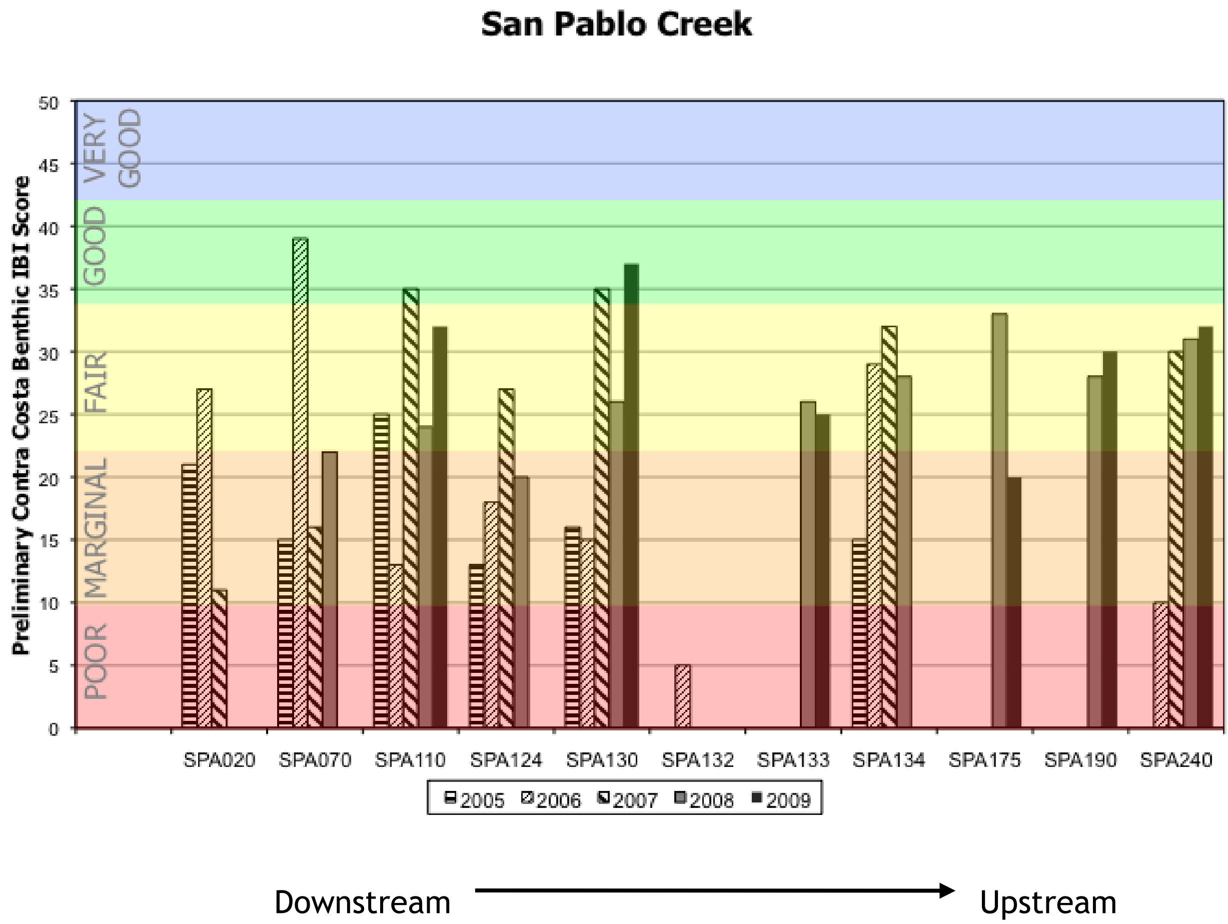
3.5.11 San Leandro Creek Watershed

A site on Moraga Creek, in the San Leandro Creek watershed, was monitored for the first time in 2009.



3.5.12 San Pablo Creek Watershed

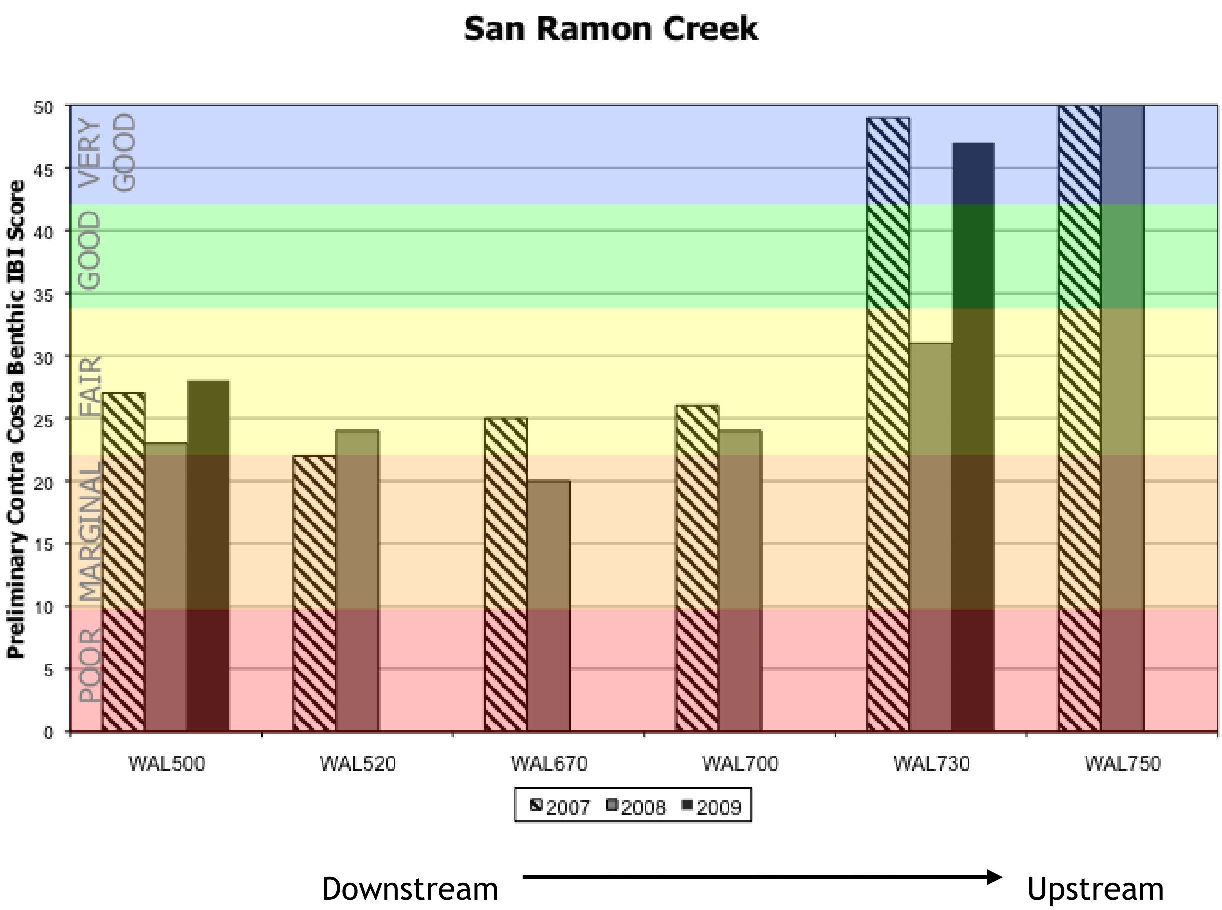
The condition of aquatic life uses in creek stations located in the San Pablo Creek watershed appears to be highly variable from site to site and year to year.



Note: San Pablo Reservoir is located between sites SPA134 and SPA175.
Note also: 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.

3.5.13 San Ramon Creek Watershed

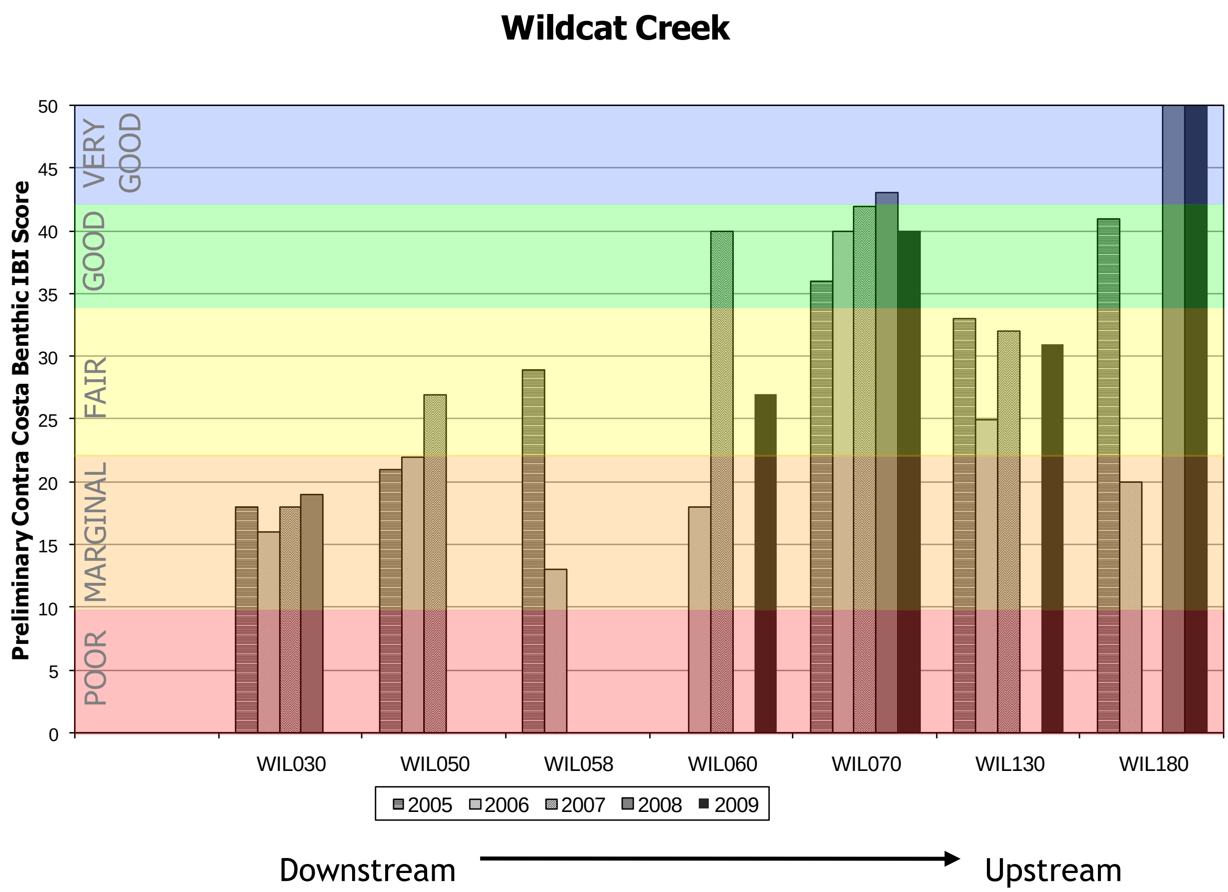
The San Ramon Creek watershed was monitored for the first time in 2007. The condition of aquatic life uses in the creek stations located in the San Ramon Creek watershed appears to be marginal to very good.



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

3.5.14 Wildcat Creek Watershed

Stations in the Wildcat Creek watershed have marginal to very good B-IBI scores.



4.0 CONCLUSIONS AND RECOMMENDATIONS

In 2009 the Contra Costa Volunteer Creek Monitoring Program conducted bioassessments at 35 creek sampling stations, within 14 of the 29 major watersheds in Contra Costa County, using the current (2007) California Surface Water Ambient Monitoring Program (SWAMP) protocols. To provide a measurement of Aquatic Life Use condition at these stations, a preliminary Benthic Index of Biotic Integrity (B-IBI) was calculated for each station, using an approach developed previously for creeks in Contra Costa County. Ranges of B-IBI scores were then assigned to poor, marginal, fair, good, and very good categories.

Results from 2009 indicate that roughly 71% of creek stations sampled in Contra Costa County scored in the very good, good, or fair categories. Stations in Pine and San Ramon Creeks (Walnut Creek Watershed), Wildcat Creek, and Marsh Creek scored the highest of all stations sampled (B-IBI scores equal to or above 40). The lowest IBI scores (18 or lower) were calculated for stations in the lower reaches of Marsh, Mt. Diablo, Cerrito, Pine, and Rheem Creeks. Generally, lower scores were obtained from samples in lower reaches of the respective watersheds, where higher-density urban land uses typically predominate.

For 2009 data, physical habitat quality ("PHAB") scores (based on a semi-quantitative scoring system) were positively, though weakly, correlated with B-IBI scores. Physical habitat condition is typically related to the degree of development of the watershed.

Watershed-wide average B-IBI scores were calculated from the 2009 data to allow for broad inter-watershed comparisons. Among the 14 monitored watersheds there is a wide range in average scores, from San Ramon, Wildcat and Alhambra Creeks, ranked first, second, and third, respectively, with average B-IBI scores in the "good" category, to Rheem and Cerrito Creek watersheds, ranked in the "marginal" category. Most watersheds had average scores in the "fair" category. Because all sites cannot be monitored every year, in any given year the mix of sites selected for monitoring strongly influences watershed-wide average scores.

Annual variability in average IBI scores is attributable to a number of factors, including monitoring site selection for that year, as well as antecedent (preceding) rainfall, and other climatological conditions.

New Zealand mudsnails (*Potamopyrgus antipodarum*) were present in a sample collected from a Baxter Creek site (BAX030).

Recommendations

The following recommendations are made for CCMAP monitoring and data analysis:

- Continue analysis of the influence of climatic factors - such as seasonal rainfall - on annual average B-IBI scores and the underlying metrics. Following completion of the 2010 BMI monitoring, include the full ten years of BMI monitoring results in an analysis of the correlation of hydrographic factors with the B-IBI scores and underlying metrics, and with annual changes in the relative species assemblages. Include consideration of: BMI sample timing (seasonally), antecedent conditions prior to sampling, and duration and intensity of major rainfall events. Derive recommendations applicable to future BMI monitoring, including for example guidance regarding the appropriate timeframe for BMI sample collection.
- Assess the effects of the types of sites selected (e.g., relative numbers of sites in low-medium-high elevation ranges) on annual average B-IBI scores. Derive recommendations applicable to future BMI monitoring, including for example guidance regarding appropriate BMI sample site selection criteria.
- Perform additional analysis regarding the influences of land use and physical habitat factors on benthic status, for example by analysis of indicators of degree of urbanization (such as

population density or percentage watershed impervious surface), canopy cover, or type of channel construction vs. B-IBI score.

- Perform additional analysis regarding the influences of various water quality parameters on B-IBI scores. Include consideration of the potential effects of urban runoff pollutants. Derive recommendations for acquisition of additional data needed for this analysis as part of the monitoring to be performed under the Municipal Regional Stormwater Permit.
- Incorporating the results of the previous four recommendations, perform an analysis of the ten-year BMI monitoring data set in an effort to answer the five key management questions shown in Table 1. For management questions 3 and 4 in particular, additional water quality data will be necessary.
- In the annual site selection process, attempt to include sites distributed throughout the high, middle and lower elevation ranges of each watershed monitored, to avoid skewing the average annual results to any one range. To aid in the analysis of year-to-year variability, attempt to monitor some sites for a minimum of 3 years in succession, before taking a year or two off.
- To facilitate standardization in site naming and locations, refer to the master list of current-year sampling locations each year prior to commencing field work, and provide field personnel with field data sheets that are pre-printed with site name, site code and location, which will then be field-verified.
- Note any adjustments to the CCMAP that may be required by the monitoring provisions of the NPDES Municipal Regional Permit for stormwater discharges (MRP), with respect to site locations, monitoring methods, or reporting requirements.
- Accommodate assessment of the presence of the New Zealand mud snail within the BMI identification process. Continue to pay careful attention to decontamination of sampling equipment to prevent cross-contamination of monitoring sites. Work with DF&G to identify an acceptable means of assessing the presence of this invasive species.

5.0 REFERENCES

Armand Ruby Consulting (ARC). (2008). Contra Costa Monitoring and Assessment Program, Summary of Benthic Macroinvertebrate Bioassessment Results (2007). Prepared for Contra Costa Clean Water Program. September.

Barbour, M.T., J. Gerritsen, B. D. Snyder, and J. B. Stribling. (1999). Revision to rapid bioassessment protocols for use in streams and rivers: periphyton, BMIs and fish. EPA 841-D-97-002.US Environmental Protection Agency, Washington, DC.

Cressey, S. and C.A. Sommers. (2002) Alhambra Creek Watershed Rapid Bioassessment Pilot Project Report. Prepared for the Contra Costa Clean Water Program. Martinez, CA. February 12.

_____. (2003) Contra Costa Monitoring and Assessment Plan (CCMAP) – 2002 Rapid Bioassessment Project Report. Prepared for the Contra Costa Clean Water Program. Martinez, CA. March 17.

_____. (2004) Contra Costa Monitoring and Assessment Plan (CCMAP) – 2003 Rapid Bioassessment Project Report. Prepared for the Contra Costa Clean Water Program. Martinez, CA. February 18.

_____. (2005) Contra Costa Monitoring and Assessment Plan (CCMAP) – 2004 Rapid Bioassessment Project Report. Prepared for the Contra Costa Clean Water Program. Martinez, CA. August 18.

_____. (2006) Contra Costa Monitoring and Assessment Plan (CCMAP) – 2005 Rapid Bioassessment Project Report. Prepared for the Contra Costa Clean Water Program. Martinez, CA. August 16.

Contra Costa Community Development Department (CDD). (2003). Contra Costa Watershed Atlas. Martinez, CA.

Cummins, K. W. and M.J. Klug (1979). Feeding Ecology of Stream Invertebrates. Annual Review of Ecology and Systematics, Vol. 10, 1979 (1979), pp. 147-172

Eisenberg, Olivieri and Associates (EOA). (2006). Contra Costa Citizen Monitoring Program Rapid Bioassessment Report. Prepared for the Contra Costa Community Development Department. December.

Eisenberg, Olivieri and Associates (EOA). (2007). Preliminary Assessment of Aquatic Life Use Condition in Contra Costa Creeks; Summary of Benthic Macroinvertebrate Bioassessment Results (2006). Prepared for the Contra Costa Clean Water Program. June 22, 2007.

Epler, J.H. (2001). Identification Manual for the Larval Chironomidae of North and South Carolina. USEPA Grant #X984170-97. September 27.

Gerth, W. J., and A. T. Herlihy. 2006. The effect of sampling different habitat types in regional macroinvertebrate bioassessment surveys. Journal of the North American Benthological Society 25:501–512.

Hughes, R. M., P. R. Kaufmann, A. T. Herlihy, T. M. Kincaid, L. Reynolds, and D. P. Larsen. (1998). A process for developing and evaluating indices of fish assemblage integrity. Canadian Journal of Fisheries and Aquatic Sciences 55:1618–1631.

Karr, J. R. and E. W. Chu. 1999. Restoring life in running waters – better biological monitoring. Island Press, Covelo, CA.

McCormick, F. H., R. M. Hughes, P. R. Kaufmann, D. V. Peck, J. L. Stoddard, and A. T. Herlihy. (2001). Development of an index of biotic integrity for the Mid-Atlantic Highlands Region. Transactions of the American Fisheries Society 130:857–877.

Ode, P.R., A. Rhen, A., J. May. (2005). Quantitative Tool for Assessing the Integrity of Southern Coastal California Streams. Environmental Management Vol. 35, No. 4, pp. 493–504.

Ode, P.R. 2007. Standard operating procedures for collecting macroinvertebrate samples and associated physical and chemical data for ambient bioassessments in California. California State Water Resources Control Board Surface Water Ambient Monitoring Program (SWAMP) Bioassessment SOP 001.

Rhen, A.C. and P. Ode. (2006). Development of a Benthic Index of Biotic Integrity (B-IBI) for Wadeable Streams in Northern Coastal California and its Application to Regional 305(b) Assessment. Draft Report. Prepared by the California Dept. of Fish and Game, Aquatic Bioassessment Laboratory. Rancho Cordova, CA.

SUMMARY OF FIELD MEASUREMENTS AND PHYSICAL HABITAT ASSESSMENT SCORES FOR SITES SAMPLED IN 2009

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
ALH130	Alhambra Creek	Alhambra Cr. below Arroro del Hombre	5/17/2009	10:00	17.0	7.78	81.10%	7.70	2053	336	150	124
ALH150	Arroyo del Hambre	Arroyo del Hambre above Castle Creek Ct.	5/17/2009	15:00	21.6	7.74	88.60%	7.80	2453	384	150	101
BAX030	Baxter Creek	Booker T. Anderson Park	4/30/2009	10:30	14.7	7.07	71.00%	7.60	1134	323	150	116
CER010	Cerrito Creek	Pacific East Mall	4/30/2009	15:15	17.9	14.52	205.50%	7.80	5620	444	150	103
MSH045	Lower Marsh Creek	Marsh Cr. Trail Off Sand Cr. Rd. - Pinn Bros.	4/19/2009	9:30	16.2	7.85	80.50%	7.60	2135	200	150	109
MSH052	Lower Marsh Creek	Between Dainta and Balfour	5/9/2009	14:00	22.7	11.61	136.90%	7.80	3485	230	150	115
MSH061	Lower Marsh Creek	Creekside Park	4/19/2009	13:30	18.1	6.51	69.50%	7.60	733	110	150	127
MSH130	Upper Marsh Creek	County Detention Center	5/1/2009	10:00	14.8	7.47	93.63%	7.70	389.7	300	150	138
MSH140	Upper Marsh Creek	210 Tumbleweed Ct.	5/9/2009	9:30	13.7	9.38	90.82%	7.80	1419	328	150	147
MTD020	Mt Diablo Creek	Diablo Cr. Golf Course (hole 16)	5/24/2009	16:30	na	na	na	7.80	na	360	150	82
MTD060	Mt Diablo Creek	Clayton Library	5/24/2009	11:00	na	na	na	7.60	na	340	150	125
PNL010	Pinole Creek	Pinole Creek at Senior Center	5/18/2009	15:00	23.0	10.90	126.42%	7.80	2984	368	150	121
PNL029	Pinole Creek	Pinole Library Demonstration Garden	4/16/2009	9:30	10.5	12.55	114.00%	na	1556	408	150	133
PNL100	Periera Creek	Bear Cr. Road - upstream of footbridge	4/16/2009	15:30	14.3	11.77	115.40%	na	725	300	150	125
PNL110	Pinole Creek	Bear Cr. Road - upstream of natural drop	5/18/2009	10:30	15.2	6.82	68.47%	7.60	2245	288	150	125
RDO009	Rodeo Creek	Downstream of Viewpoint Blvd.	5/31/2009	10:00	18.8	1.45	16.01%	7.20	3909	584.1	150	91
RHM030	Rheem Creek	Contra Costa Community College	5/22/2009	10:00	13.8	8.33	81.10%	7.70	1823	375	150	109
SLE208	Moraga Creek	Miramonte HS	5/23/2009	14:00	13.0	7.43	70.20%	7.70	1013	350	150	126
SPA110	Wilkie Creek	Santa Rita Rd by De Anza School	5/7/2009	9:30	15.4	7.72	77.80%	7.60	2057	212	150	129
SPA130	Castro Creek	Castro Ranch Rd. US of Olinda/Hillside	6/14/2009	9:30	13.8	8.75	85.10%	7.70	1467	396	150	150
SPA133	Castro Creek	Wagner Ranch Nature area	5/10/2009	11:00	13.5	6.81	66.60%	7.80	2525	392	150	131
SPA175	San Pablo Creek	EBRPD land near Conestoga way	5/16/2009	15:30	15.7	7.54	76.10%	7.70	135.3	44	150	165
SPA190	San Pablo Creek	EBMUD Orinda Treatment Plant	5/16/2009	10:00	15.0	9.23	92.30%	7.80	1423	340	150	135
SPA240	San Pablo Creek	Upstream of Camino Encinas Rd.	5/23/2009	9:10	12.6	9.00	15.50%	7.80	895	300	150	127
WAL200	Pine Creek	Via de Mercados	5/15/2009	10:00	18.5	11.31	120.90%	7.70	2148	420	150	118
WAL220	Gallindo Creek	Trailside Circle	4/22/2009	14:30	20.7	8.39	94.83%	7.60	3138	372	150	140
WAL290	Little Pine Creek	Mt. Diablo State Park - NW entrance	4/22/2009	10:00	17.7	7.25	76.00%	7.70	112.5	362	150	130
WAL365	Lafayette Creek	Village Center	5/6/2009	10:30	14.6	9.08	89.60%	7.70	998	320	150	119
WAL375	Las Trampos Creek	Leigh Creekside Park	6/2/2009	10:00	17.9	10.33	103.00%	8.00	1309	360	150	115
WAL500	San Ramon Creek	Creekside Street	4/20/2009	15:30	20.1	4.97	55.70%	7.70	1660	400	150	138
WAL730	Bollinger Creek	Chen's property off Bollinger Canyon Rd.	4/20/2009	10:00	15.3	10.12	101.10%	7.65	1077	336	150	135
WIL060	Wildcat Creek	At Vale Rd.	4/23/2009	14:00	14.7	10.68	105.80%	7.80	1177	322	150	119
WIL070	Wildcat Creek	Alvarado Park at Buckeye Picnic Area	4/25/2009	10:00	12.8	(na)	84.13%	7.80	1080	318	150	149
WIL130	Wildcat Creek	1/4 mile up Lone Oak Picnic Area Trail	4/14/2009	14:30	9.7	5.50	47.50%	na	(na)	316	150	153
WIL180	Wildcat Creek	Big Springs Picnic Area	4/14/2009	10:00	8.0	2.42	19.00%	na	428	108	150	141

Note: Site names and locations have been standardized. All other information in this table is derived directly from the field data sheets.
Note: the Las Trampas, Pine and San Ramon Creek sites are located within the Walnut Creek watershed.

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 2009 data collection effort.

2009 QC SUMMARY–Completeness/Representativeness

The following 2009 samples contained less than the expected 500 organisms, indicating relatively low abundance of BMI organisms at these 9 sites (and confirmed in the duplicate sample at WAL375):

SPA175
SPA190
WIL080
MSH061
WAL200
WAL290
WAL365
WAL375
WAL375dup
SLE208

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.

2009 QC SUMMARY - Field Duplicates

Four field duplicate samples were submitted to the BSI lab and analyzed in 2009. 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 2009 duplicates, the average RPD was 23% for the standard set of BMI metrics (so these metrics were on average 77% similar). An acceptable level of difference between duplicates is normally considered to be 20-25%.

2009 QC SUMMARY – Inter-lab Comparisons

Inter-lab comparative analysis was performed by the Aquatic Bioassessment Laboratory–Chico (ABL), at California State University, Chico. The QC analysis was performed in accordance to the Southwest Association of Freshwater Invertebrate Taxonomists (SAFIT)'s Standard Taxonomic Effort Document (STE) 28 November 2006 version (Richards and Rogers, 2006). Results of the inter-laboratory quality control indicated that the taxonomy was performed to level 1 standard taxonomic effort, but there were instances of taxonomic discrepancies involving Callibaetis, Agabus and Corticacarus. These taxa were reexamined by the original taxonomist and changes were made where appropriate prior to final metric calculations.

The raw inter-laboratory QC data files are available through the CCMAP.

INDIVIDUAL METRICS AND CALCULATED B-IBI SCORES FOR SITES SAMPLED IN 2009

Waterbody Name	Site	Collection Date	EPT Taxa	Metric Score	Number Diptera Taxa	Metric Score	Number Predator Taxa	Metric Score	% Collectors	Metric Score	% Non-insect Taxa	Metric Score	Total IBI
Alhambra	ALH130	5/17/09	3	3	10	10	9	9	92	3	28	8	**33**
Alhambra	ALH150	5/17/09	4	4	11	10	9	9	81	8	24	8	**39**
Baxter	BAX030	4/30/09	1	1	6	10	3	3	34	10	53	3	**27**
Cerrito	CER010	4/30/09	0	0	6	10	2	2	97	1	53	3	**16**
Marsh	MSH045	4/19/09	1	1	5	8	1	1	94	3	40	5	**18**
Marsh	MSH052	5/9/09	4	4	6	10	3	3	74	10	47	4	**31**
Marsh	MSH061	4/19/09	0	0	3	4	1	1	99	1	63	1	**7**
Marsh	MSH130	5/1/09	7	7	10	10	8	8	75	10	13	10	**45**
Marsh	MSH140	5/9/09	11	10	10	10	11	10	71	10	19	9	**49**
Mt. Diablo	MTD020	5/24/09	0	0	5	8	1	1	95	2	44	5	**16**
Mt. Diablo	MTD060	5/24/09	4	4	7	10	6	6	42	10	38	6	**36**
Pinole	PNL010	5/18/09	2	2	7	10	3	3	95	2	47	4	**21**
Pinole	PNL029	4/16/09	2	2	5	8	4	4	98	1	43	5	**20**
Pinole	PNL100	4/16/09	4	4	8	10	6	6	83	7	17	10	**37**
Pinole	PNL110	5/18/09	2	2	12	10	9	9	79	9	27	8	**38**
Rodeo	RDO009	5/31/09	2	2	5	8	5	5	72	10	33	7	**32**
Rheem	RHM030	5/22/09	1	1	5	8	2	2	96	2	54	3	**16**
San Leandro	SLE208	5/23/09	1	1	8	10	2	2	88	5	36	6	**24**
San Pablo	SPA110	5/7/09	1	1	10	10	4	4	81	8	20	9	**32**
San Pablo	SPA130	6/14/09	3	3	10	10	8	8	84	7	21	9	**37**
San Pablo	SPA133	5/10/09	1	1	7	10	5	5	95	2	33	7	**25**
San Pablo	SPA175	5/16/09	1	1	7	10	1	1	100	0	27	8	**20**
San Pablo	SPA190	5/16/09	2	2	7	10	3	3	82	8	29	7	**30**
San Pablo	SPA240	5/23/09	3	3	7	10	4	4	78	10	42	5	**32**
Pine	WAL200	5/15/09	3	3	5	8	2	2	82	8	50	4	**25**
Pine	WAL220	4/22/09	2	2	5	8	3	3	99	1	47	4	**18**
Pine	WAL290	4/22/09	5	5	8	10	13	10	55	10	18	9	**44**
Las Trampas	WAL365	5/6/09	1	1	8	8	4	4	76	10	38	6	**29**
Las Trampas	WAL375	6/2/09	2	2	4	6	2	2	94	3	30	7	**20**

San Ramon	WAL500	4/20/09	1	1	7	10	3	3	64	10	47	4	**28**
San Ramon	WAL730	4/20/09	8	8	12	10	12	10	79	9	17	10	**47**
Wildcat	WIL060	4/23/09	4	4	8	10	5	5	97	1	29	7	**27**
Wildcat	WIL070	4/25/09	8	8	7	10	6	6	82	8	26	8	**40**
Wildcat	WIL130	4/14/09	4	4	7	10	5	5	88	5	29	7	**31**
Wildcat	WIL180	4/14/09	11	10	9	10	10	10	54	10	12	10	**50**

APPENDIX D - Benthic Macroinvertebrate Taxa Identified in Contra Costa County, 2009

Taxonomic list of benthic macroinvertebrates identified in samples from Contra Costa County stream sites, spring 2009.

Phylum / Class / Order / Family / Final ID	CTV[1]	FFG[2]
Arthropoda		
Insecta		
Coleoptera		
Dytiscidae		
Agabus	8	p
Ametor	5	p
Laccophilus	5	p
Sanfillipodytes	5	p
Stictotarsus	5	p
Elmidae		
Optioservus	4	sc
Gyrinidae		
Gyrinus	5	p
Haliplidae		
Peltodytes	5	mh
Hydrophilidae		
Cymbiodyta	5	p
Enochrus	5	cg
Diptera		
Cyclorrhaphous/Brachycera	6	
Diptera (undetermined)		
Ceratopogonidae		
Bezzia/ Palpomyia	6	p
Ceratopogonidae	6	p
Probezzia	6	p
Chironomidae		
Chironomini	6	cg
Orthocladiinae	5	cg
Pseudochironomini	5	cg
Tanypodinae	7	p
Tanytarsini	6	cg
Dixidae		
Dixa	2	cg
Dixella	2	cg
Dixidae	2	cg
Meringodixa chalonensis	2	cg
Dolichopodidae		
Dolichopodidae	4	p
Empididae		
Clinocera	6	p
Empididae	6	p
Neoplasta	6	p
Trichoclinocera/Clinocera	6	p
Ephydridae		

Ephydra	6	sh
Ephydridae	6	
Muscidae		
Muscidae	6	p
Pelecorhynchidae		
Glutops	3	p
Psychodidae		
Pericoma/Telmatoscopus	4	cg
Psychoda	10	cg
Sciomyzidae		
Sciomyzidae	6	p
Simuliidae		
Prosimulium	3	cf
Simulium	6	cf
Stratiomyidae		
Caloparyphus/Euparyphus	8	cg
Euparyphus	8	cg
Stratiomys	8	cg
Tabanidae		
Tabanidae	8	p
Tipulidae		
Antocha	3	cg
Dicranota	3	p
Hexatoma	2	p
Limonia	6	sh
Rhabdomastix	3	p
Tipula	4	om
Ephemeroptera		
Ameletidae		
Ameletus	0	cg
Baetidae		
Baetis	5	cg
Callibaetis	9	cg
Fallceon quilleri	4	cg
Procloeon	4	cg
Ephemerellidae		
Drunella	0	cg
Ephemerella	1	cg
Heptageniidae		
Cinygmula	4	sc
Heptageniidae	4	sc
Leptophlebiidae		
Paraleptophlebia	4	cg
Siphlonuridae		
Siphlonurus	7	cg
Megaloptera		
Corydalidae		
Neohermes	0	p
Orohermes crepusculus	0	p
Sialidae		
Sialis	4	p
Odonata		

Aeshnidae		
Aeshnidae		p
Anax	8	p
Aeshna	5	p
Coenagrionidae		
Argia	7	p
Coenagrionidae		p
Zoniagrion exclamationis	9	p
Cordulegastridae		
Cordulegaster dorsalis	3	p
Lestidae		
Archilestes	9	p
Plecoptera		
Capniidae		
Capnia	1	sh
Capniidae	1	sh
Chloroperlidae		
Chloroperlidae	1	p
Nemouridae		
Malenka	2	sh
Nemouridae	2	sh
Perlidae		
Calineuria californica	1	p
Perlodidae		
Baumanella alameda	2	p
Isoperla	2	p
Kogotus nonus	2	p
Perlodidae	2	p
Taeniopterygidae		
Taenionema	2	om
Trichoptera		
Glossosomatidae		
Agapetus	0	sc
Hydropsychidae		
Hydropsyche	4	cf
Hydroptilidae		
Hydroptila	6	ph
Oxyethira	3	ph
Lepidostomatidae		
Lepidostoma	1	sh
Odontoceridae		
Parthina	0	sh
Polycentropodidae		
Polycentropus	6	p
Rhyacophilidae		
Rhyacophila	0	p
Sericostomatidae		
Gumaga	3	sh
Malacostraca		
Amphipoda		
Anisogammaridae		
Ramellogammarus	6	cg

APPENDIX D - Benthic Macroinvertebrate Taxa Identified in Contra Costa County, 2009, cont'd

Corophiidae		
Americorophium spinicorne	4	cf
Crangonyctidae		
Crangonyx	4	cg
Stygobromus	4	cg
Hyalellidae		
Hyalella	8	cg
Tanaidacea		
Tanaidae		
Sinelobus stanfordi		
Arachnoidea		
Acari		
Acari	5	p
Eylidae		
Eylais	5	p
Hygrobatidae		
Atractides	8	p
Hygrobates	8	p
Lebertiidae		
Lebertia	8	p
Mideopsidae		
Mideopsis	5	p
Pionidae		
Pionidae	5	p
Sperchontidae		
Sperchon	8	p
Ostracoda		
Ostracoda	8	cg
Annelida		
Hirudinea		
Arhynchobdellida		
Erpobdellidae		
Erpobdella punctata	8	p
Erpobdellidae	8	p
Oligochaeta		
Oligochaeta	5	cg
Lumbricida		
Megadrili		cg
Polychaeta		
Polychaeta		cf
Coelenterata		
Hydrozoa		
Hydroida		
Hydridae		
Hydra	5	p
Mollusca		
Bivalvia		
Veneroida		
Corbiculidae		
Corbicula	10	cf
Sphaeriidae		
Pisidium	8	cf

Gastropoda		
Basommatophora		
Lymnaeidae		
Lymnaeidae	6	sc
Physidae		
Physa	8	sc
Planorbidae		
Gyraulus	8	sc
Helisoma	6	sc
Menetus	7	sc
Hypsogastropoda		
Hydrobiidae		
Hydrobiidae	8	sc
Potamopyrgus antipodarum	8	sc
Nemertea		
Enopa		
Tertastemmatidae		
Prostoma	8	p
Platyhelminthes		
Turbellaria		
Turbellaria	4	p

1) 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

APPENDIX E – 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

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 in-crease	
Evidence of fires in reach or immediately upstream (<500 m)	NO		< 1 year		< 5 years	
Dominant landuse/ landcover in area surrounding reach	Agriculture		Forest		Range-land	
	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%)		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							
Rapid		Center Upstream					
Riffle							
Run		Center Down-stream		**Right Bank**	eroded	vulnerable	stable
Glide							
Pool							
Dry		Center Right					

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

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

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							
Rapid		Center Upstream					
Riffle							
Run		Center Down-stream		**Right Bank**	eroded	vulnerable	stable
Glide							
Pool							
Dry		Center Right					

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

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							
Rapid		Center Upstream					
Riffle							
Run		Center Down-stream		**Right Bank**	eroded	vulnerable	stable
Glide							
Pool							
Dry		Center Right					

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							
Rapid		Center Upstream					
Riffle							
Run		Center Down-stream		Right Bank	eroded	vulnerable	stable
Glide							
Pool							
Dry		Center Right					

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							
Rapid		Center Upstream					
Riffle							
Run		Center Down-stream		Right Bank	eroded	vulnerable	stable
Glide							
Pool							
Dry		Center Right					

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							
Rapid		Center Upstream					
Riffle							
Run		Center Down-stream		Right Bank	eroded	vulnerable	stable
Glide							
Pool							
Dry		Center Right					

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%)	
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: H**

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: I**

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: J**

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							
Rapid		Center Upstream					
Riffle							
Run		Center Down-stream		**Right Bank**	eroded	vulnerable	stable
Glide							
Pool							
Dry		Center Right					

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

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							
Rapid		Center Upstream					
Riffle							
Run		Center Down-stream		**Right Bank**	eroded	vulnerable	stable
Glide							
Pool							
Dry		Center Right					

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

REACH SLOPE (BASIC PHAB, Reach Based use as many segments as needed)	METHOD	C L		H L		T R		H L	

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 F – COMPLETED PHYSICAL HABITAT (PHAB) FIELD DATA SHEETS AND SWAMP STREAM CHARACTERIZATION FORMS, 2009

Completed Physical Habitat field data sheets and SWAMP Stream Habitat Characterization Forms from all sites collected in 2009 (on CD-ROM).

APPENDIX G – 2009 MONITORING SITE PHOTOGRAPHS

Photos from all sites monitored in 2009 (on CD-ROM)

APPENDIX H - COMPARISON OF B-IBI SCORES FOR SITES MONITORED IN 2007-09

Waterbody Name	Site Code	B-IBI 2007	B-IBI 2008	B-IBI 2009
Baxter Creek	BAX030	28	22	27
Cerrito Creek	CER010	10	17	16
Upper Marsh Creek	MSH130	43	30	45
Upper Marsh Creek	MSH140	48	48	49
Mt. Diablo Creek	MTD020	24	18	16
Mt. Diablo Creek	MTD060	34	21	36
Periera Creek	PNL100	32	41	37
Pinole Creek	PNL110	35	40	38
Rheem Creek	RHM030	17	20	16
Wilkie Creek	SPA110	35	24	32
Castro Creek	SPA130	35	26	37
San Pablo Creek	SPA240	30	31	32
San Ramon Creek	WAL500	27	23	28
Bollinger Creek	WAL730	49	31	47
Wildcat Creek	WIL070	42	43	40
	Average:	32.6	29.0	33.1

Highlighted cells indicate highest average BMI IBI score for that site.

CONTRA COSTA
CLEAN WATER
PROGRAM

Thomas Dalziel
Interim Program Manager

July 1, 2010

Bruce H. Wolfe, Executive Officer
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

Dear Mr. Wolfe:

This letter is to inform you that as per provision C.8.a.i of the Municipal Regional Permit, the Contra Costa Clean Water Program and all twenty-one (21) of its co-permittees affirm their participation in the Regional Monitoring Coalition (RMC) for the remainder of the permit term.

Co-permittees voted to affirm their individual participation in the RMC at the June 16, 2010 Management Committee meeting. Minutes of that meeting are attached documenting a vote in the affirmative from all twenty-one (21) of the Program's co-permittees (see "Action Item A"). As per the language of our Program Agreement, each Management Committee representative's vote is binding on their jurisdiction.

We appreciate the Water Board's role in fostering regional cooperation among stormwater programs by allowing us the option to create a regional framework for monitoring. We look forward to continued collaboration and the generation of meaningful water quality monitoring data in the years to come.

Sincerely,

Thomas Dalziel
Interim Program Manager
Contra Costa Clean Water Program

JC:TD:kh
G:\NPDES\WAM_Monitoring Cmte\BASMAA Monitoring_POCs Committee\RMC Workplan\ Ltr to B. Wolfe re RMC 7-1-10.doc

Attachment

CONTRA COSTA
CLEAN WATER
PROGRAM

CALIFORNIA REGIONAL WATER
JUL 1 2010
QUALITY CONTROL BOARD

LETTER OF TRANSMITTAL

TO: **Mr. Bruce H. Wolfe, Executive Officer**
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

DATE: **July 1, 2010**

SUBJECT: **Contra Costa Clean Water Program's 2009/2010 Trash Hot Spot Submittal**

We are transmitting to you [ ] by mail, [X] by messenger, [ ] by ________ the following items:

Copies	Description
1-DVD	CCCWP Trash Hot Spot Submittal Spreadsheet Folder of Trash Hot Spot Photo Documentation

These items are transmitted as checked below:

[ ] For approval
[x] For your use
[x] As requested
[ ] For review and comment

[ ] Approved as submitted
[ ] Approved as noted
[ ] Returned for corrections
[ ] ______ copies retained for our files

[ ] Reviewed/no additional comments
[ ] Reviewed/see additional comments
[ ] Return ______ corrected prints

Sincerely,

Thomas E. Dalziel
Interim Program Manager

G:\NPDES\MOC\Trash Hot Spot Submittal 060110\FINAL SUBMITTAL\TRANSMTL LTR SF 09 10.doc

Central Contra Costa Sanitary District

HHWCF Pollutant of Concern Tracking Log - Totals for July 2009 to June 2010

Mercury Containing Devices	# of Items or Units				Total Pounds Hg
Thermostats - 3 gms per unit	159	ea	477	Grams	1.05
Thermometers - 1gm / thermometer	2,227	ea	2,227	Grams	4.90
Elemental Hg					78.50
Switches - Pounds (-10% for container)	6.60	lbs.	6.00	lbs.	6.00
Mercury Batteries - 3,125 mg/lb batteries	15.00	lbs.	46,875	Milligrams	0.10
Fluorescent Lamps - 5.7mg/ft	270,026	Feet	1,539,148	Milligrams	3.39
				Grand total Hg in Lbs.	**93.94**

Description

Thermostats - Each HVAC type thermostat contains approximately 3 grams of Hg in each ampule.

Thermometers - A number of studies report that mercury containing thermometers contain between 0.5 and 3 grams depending on their size. As a result, the fever sized thermometer (1gram Hg / thermometer) will be used to calculate the quantity of mercury in thermometers.

Switches - As there are no standard sizes or quantities of mercury in switches, all switches will be weighed and 10% their gross weight will be subtracted to account for its container.

Mercury Batteries - Studies show that button cell batteries contain up to 25 mg of mercury in each battery. Since there is a wide variety in the sizes of button cells, the following is assumed: There are roughly 250 cells in one pound. Using the average of 12.5 mg/cell accounts for all sizes. Therefore, 250 cells x 12.5 mg = 3,125 mg of mercury/pound of cells.

Fluorescent Lamps - Based on numerous studies, fluorescent lamps have as little as 3.5 mg mercury with some having as much as 60 mg. For this report, 22.8 mg / 4ft. Lamp (or 5.7mg / foot of lamp) was used. 22.8 mg is the average concentration for a four foot lamp produced after 1994.

Central Contra Costa Sanitary District

HHWCF Pollutant of Concern Tracking Log - Totals for July 2009 to June 2010

Mercury Containing Devices	# of Items or Units				Total Pounds Hg
Thermostats - 3 gms per unit	159	ea	477	Grams	1.05
Thermometers - 1gm / thermometer	2,227	ea	2,227	Grams	4.90
Elemental Hg					78.50
Switches - Pounds (-10% for container)	6.60	lbs.	6.00	lbs.	6.00
Mercury Batteries - 3,125 mg/lb batteries	15.00	lbs.	46,875	Milligrams	0.10
Fluorescent Lamps - 5.7mg/ft	270,026	Feet	1,539,148	Milligrams	3.39
				Grand total Hg in Lbs.	**93.94**

Description

Thermostats - Each HVAC type thermostat contains approximately 3 grams of Hg in each ampule.

Thermometers - A number of studies report that mercury containing thermometers contain between 0.5 and 3 grams depending on their size. As a result, the fever sized thermometer (1gram Hg / thermometer) will be used to calculate the quantity of mercury in thermometers.

Switches - As there are no standard sizes or quantities of mercury in switches, all switches will be weighed and 10% their gross weight will be subtracted to account for its container.

Mercury Batteries - Studies show that button cell batteries contain up to 25 mg of mercury in each battery. Since there is a wide variety in the sizes of button cells, the following is assumed: There are roughly 250 cells in one pound. Using the average of 12.5 mg/cell accounts for all sizes. Therefore, 250 cells x 12.5 mg = 3,125 mg of mercury/pound of cells.

Fluorescent Lamps - Based on numerous studies, fluorescent lamps have as little as 3.5 mg mercury with some having as much as 60 mg. For this report, 22.8 mg / 4ft. Lamp (or 5.7mg / foot of lamp) was used. 22.8 mg is the average concentration for a four foot lamp produced after 1994.

West County Haz Waste

HHWCF Pollutant of Concern Tracking Log - Totals for July 2009 to June 2010

Mercury Containing Devices	Qty	Unit	X factor	unit	Mg Hg	Pounds Hg
Hg containing waste	135	lbs				Undeterminable w data provided
Fluorescent Lamps - all sizes	162904	feet	5.70	mg/foot	928553	2.05
Thermometers	38	ea	1000	mg/therm	38000	0.08
					966,553	**2.13 Grand Total hg in pounds**

Description

Fluorescent Lamps - Based on numerous studies, fluorescent lamps have as little as 3.5 mg mercury and as much as 60 mg. For this report, 22.8 mg / 4ft. Lamp (or 5.7mg / foot of lamp) was used. 22.8 mg is the average concentration for a four foot lamp produced after 1994.

For West County, the data provided was that 20,363 pounds of fluorescent bulbs were recycled. Bulbs weigh approximately 0.125 lbs per foot of bulb

Thermometers - A number of studies report that mercury containing thermometers contain between 0.5 and 3 grams depending on their size. As a result, the fever sized thermometer (1gram Hg / thermometer or 1,000 mg/thermometer) will be used to calculate the quantity of mercury in thermometers.

Delta Diablo Sanitation District

HHWCF Pollutant of Concern Tracking Log - Totals for July 2009 to June 2010

Mercury Containing Devices	Qty	Unit	X factor	unit	Mg Hg	Pounds Hg
Hg containing thermostats/switches etc.	13	lbs				Undeterminable w data provided
Hg containing waste (other)	36	lbs				Undeterminable w data provided
Fluorescent Lamps - 4' straight tube	59508	Feet	5.70	mg/ft	339196	
Fluorescent Lamps - 8' straight tube	13072	Feet	5.70	mg/ft	74510	
Fluorescent Lamps - CFLs	2488	Feet	5.70	mg/ft	14182	
Fluorescent Lamps - U-tube/circular	960	Feet	5.70	mg/ft	5472	
					433360	**0.96 Grand total Hg in Pounds**

Description

Thermostats - Each HVAC type thermostat contains approximately 3 grams of Hg in each ampule.

Thermometers - A number of studies report that mercury containing thermometers contain between 0.5 and 3 grams depending on their size. As a result, the fever sized thermometer (1gram Hg / thermometer) will be used to calculate the quantity of mercury in thermometers.

Switches - As there are no std sizes or quantities of mercury in switches, all switches will be weighed and 10% their gross weight will be subtracted to account for its container.

Mercury Batteries - Studies show that button cell batteries contain up to 25 mg of mercury in each battery. Since there is a wide variety in the sizes of button cells, the following is assumed: There are roughly 250 cells in one pound. Using the average of 12.5 mg/cell accounts for all sizes. Therefore, 250 cells x 12.5 mg = 3,125 mg of mercury/pound of cells.

Fluorescent Lamps - Based on numerous studies, fluorescent lamps have as little as 3.5 mg mercury and some as much as 60 mg. For this report, 22.8 mg / 4ft. Lamp (or 5.7mg / foot of lamp) was used. 22.8 mg is the average concentration for a four foot lamp produced after 1994.