

Proposal for Carmel River Three-Year Bioassessment Summary Report

Prepared for:

Monterey Peninsula Water Management District

Prepared by:

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Introduction

The California Stream Bioassessment Procedure (CSBP) was adapted from the U.S. Environmental Protection Agency's Rapid Bioassessment Procedures (<http://www.epa.gov/owow/monitoring/rbp/>) and modified by the California Department of Fish and Game (Harrington 1999) for characterizing benthic macroinvertebrate (BMI) assemblages and riparian habitat in wadeable stream systems in California. This proposal outlines the tasks for consolidating and summarizing three years of habitat and benthic macroinvertebrate data collected within the Carmel River watershed for three successive years during the fall and spring seasons starting in the fall of 2000. The final data set will be gathered in the spring season of 2003.

Background

The Monterey Peninsula Water Management District (District) has been conducting stream bioassessment surveys at four sites on the Carmel River between Mid-Carmel Valley (Red Rock, River Mile [RM] 7.5) and below Los Padres Dam (RM 24.0) twice each year beginning in Fall 2000, using the methods outlined in the CSBP. In the spring of 2001, two new sites were sampled as part of a large wood habitat project (DeDampierre, RM 13.6, CRDDus and

CRDDDs). In the fall of 2002, another site was added at the Russell Wells (CRRW), RM 16.2, between the Stonepine Resort (CRSP), RM 15.6, and Sleepy hollow (CRSH), RM 17.6, to better analyze the effects of the future sediment release from San Clemente Reservoir. The District conducted the benthic sampling and habitat assessments and BioAssessment Services (BAS) processed the benthic samples using the CSBP and prepared summary reports. The summary reports included laboratory methods and tables of biological metric values and BMI taxonomic lists.

The objectives of work outlined in this proposal are to consolidate the three years of biological and habitat data and identify trends in BMI assemblages using a multi-metric approach. The proposed summary report with associated data will serve as a reference or baseline, from which future biological and habitat data may be compared for the Carmel River Bioassessment Program (CRBP).

Scope of Work

Task I – Literature Review

This task will include compiling existing information on BMIs and associated habitat data within the Carmel River drainage including the lagoon and nearby streams (e.g. San Lorenzo, Pajaro, Salinas and Big Sur Rivers). Pertinent information from the documents will be summarized and, if applicable, integrated into the analysis of CRBP data. The District will assist BAS by identifying sources of relevant background information.

Task II - Data Processing and Analysis

BMI data for the three year monitoring period will be reviewed for consistency. Adjustments in standard taxonomic effort may be made to make the data comparable. Habitat and site location data gathered by the District will be input into an MS Access® data base from which queries can be made for organizing data for presentation in tables.

Biological metrics as suggested in the CSBP will be used as a guide for characterizing the BMI assemblages and will be tabulated in an appendix. A subset of the metrics identified by Karr and Chu (1999) to be responsive to perturbations in water and habitat quality will be integrated into site ranking scores. An additional analysis will include cluster analysis, which is a multivariate procedure for detecting natural groupings in sites/ samples based on the composition of BMIs. PC-ORD® (version 4) software will be used for performing cluster analysis on the BMI data. Since reference sites have not been identified for the CRBP, definitive assessments of site quality based on metrics from a fixed reference cannot be done. Instead, relative quality of sites will be shown by plotting integrated metric scores by site. Spring and fall season data sets will be evaluated by site for differences in taxonomic composition and integrated metric scores. Also, trends along elevation gradients will be explored. Data from other bioassessment programs may be integrated into the analyses when appropriate.

Task III - Report Preparation

A draft report will include five sections:

- 1) Introduction - Background on the CRBP, its value as an indicator of water quality and implementation of the program in 2000. Much of this background will be provided by District staff.
- 2) Methods – Description of study design, field sample collection methods, site locations, laboratory procedures, and analyses of data. Information pertinent to the study design will be provided by District staff. Exceptions to the CSBP sampling techniques will also be discussed by District staff if necessary.
- 3) Literature Review – Summaries of work done in the Carmel River watershed pertaining to BMIs. Some of the information sources will be provided by District staff.
- 4) Results – Organization of taxa lists, metrics, and transect scale habitat data into tables and presented in appendices for each of the three years. Results of analyses including site ranking scores based on integrated metric scores by site and cluster dendrograms will be presented in the body of the report. Tables of site scale habitat and water quality data will also be included in the body of the report. Instantaneous water quality values measured during the sampling events will be tabulated but not emphasized. Photographs will be limited to the 12 most dominant BMI taxa sampled from the Carmel River drainage. Or, BAS will coordinate with District staff with regard to selection of the 12 BMI photomicrographs to be used in the report. Maps, site and transect scale habitat data, site coordinates and background program information will be provided by District staff.

Note regarding maps: if the District has access to GIS Arcview®, then an overly of ecological subregion boundaries would be a helpful addition to the region site map.

- 5) Discussion/Conclusions - Patterns, relationships and trends in biological and habitat data will be discussed. A discussion of the relative quality of Carmel River BMIs in terms of metrics will be compared with BMI metrics for other nearby drainages provided they are comparable. Factors for determining what constitutes comparable inter-drainage data will be discussed. Seasonal differences in BMI composition and metrics will be discussed and recommendations presented regarding optimal season for sampling.

A draft report will be prepared and submitted to District staff by November 15, 2003 for review and comment. Recommendations/ comments will be integrated into a final report.

Cost Summary

Task I – Literature Review

16 hours @ \$20.00 per hour*	\$320.00
4 hours @ \$40.00 per hour	\$160.00

Task II - Data Processing and Analysis

10 hours @ \$20.00 per hour*	\$200.00
32 hours @ \$40.00 per hour	\$1,280.00

Task III – Report Preparation

8 hours @ \$20.00 per hour*	\$160.00
48 hours @ \$40.00 per hour	\$1,920.00

Total..... \$4,040.00

* distinct task elements including compiling literature, data entry and report review may be subcontracted.

Literature Cited

Harrington, J.M. 1999. California Stream Bioassessment Procedures. California Department of Fish and Game, Water Pollution Control Laboratory. Rancho Cordova, CA.

Karr, J.R. and E.W. Chu. 1999. Restoring Life in Running Waters. Island Press, Covelo, CA.