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**CALLEGUAS CREEK WATERSHED
MANAGEMENT PLAN**

**Calleguas Creek Watershed
OC Pesticides and PCBs TMDL
Special Study #1 Work Plan:
Sediment Transport and Effects**

DRAFT

prepared for:

**LOS ANGELES REGIONAL WATER QUALITY
CONTROL BOARD**

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Introduction

The *Total Maximum Daily Load for Organochlorine Pesticides, Polychlorinated Biphenyls, and Siltation in Calleguas Creek, Its Tributaries, and Mugu Lagoon (TMDL)* was adopted by the Los Angeles Region Water Quality Control Board on July 7, 2005 and became effective on March 24, 2006. The TMDL was developed to address impairments to Calleguas Creek and its tributaries caused by organochlorine (OC) pesticides and Polychlorinated Biphenyls (PCBs) in water, sediment, and fish tissue. OC pesticides and PCBs are often called historic or legacy pollutants, since concentrations of these chemicals persist in the environment despite enactment of regulations to restrict and/or end their use. The TMDL was adopted to address the continued impairment of waterbodies due to the persistence of OC pesticides in the environment, despite the fact that many of these pesticides have not been used in more than 20 years.

The OCs TMDL Basin Plan Amendment (BPA) contained several special studies. The following Work Plan was developed to address Special Study #1 as required in the BPA:

Submit a workplan and convene a Science Advisory Panel to quantify sedimentation in Mugu Lagoon and sediment transport throughout the Calleguas Creek Watershed. Evaluate management methods to control siltation and contaminated sediment transport to Calleguas Creek, identify appropriate BMPs to reduce sediment loadings, evaluate numeric targets and wasteload and load allocations for siltation/sedimentation to support habitat related beneficial uses in Mugu Lagoon, evaluate the effect of sediment on habitat preservation in Mugu Lagoon, and evaluate appropriate habitat baseline, effectiveness of sediment and siltation load allocations on a subwatershed basis, and methods to restore habitat for approval by the Executive Officer. Additionally, this special study will evaluate the concentration of organochlorine pesticides and polychlorinated biphenyls in sediments from various sources/land use types.

The parties identified as responsible for developing and conducting Special Study #1 include POTW Permittees, MS4 Permittees, Agricultural Dischargers, and the US Navy. This Work Plan is submitted on March 24, 2007 (one year after the effective date of the BPA). The requirements of Special Study #1 are being addressed by the following members of the Calleguas Creek Watershed Management Plan (Management Plan):

| POTW Permittees | MS4 Permittees | Other Entities Specifically Identified |
|--|-----------------------|---|
| Camrosa Water District | Caltrans | Agricultural Dischargers |
| Camarillo Sanitary District | City of Camarillo | US Navy |
| Ventura County Waterworks District No. 1 | City of Moorpark | |
| City of Simi Valley | City of Oxnard | |
| City of Thousand Oaks | City of Simi Valley | |
| | City of Thousand Oaks | |
| | County of Ventura | |

In an attempt to address the complexity of Special Study #1 the requirements as outlined in the BPA are broken out into two distinct elements: Review Process and Technical Analysis. Each element contains tasks as outlined below and discussed in detail in the Work Plan.

Element 1: Review Process

Task 1.1 Identify and select members of a Technical Advisory Committee (TAC).

Task 1.2 Convene TAC meeting to review Work Plan and other work products.

Element 2: Technical Analysis

Task 2.1 Quantify Sedimentation and Transport – Quantify sedimentation in Mugu Lagoon and sediment transport throughout the Calleguas Creek Watershed.

Task 2.2 Evaluate Sedimentation Effects and Identify Habitat Baseline – Evaluate the effect of sediment on habitat and habitat preservation in Mugu Lagoon, and identify an appropriate habitat baseline.

Task 2.3 Evaluate Targets and Allocations – Evaluate numeric targets and wasteload and load allocations for siltation/sedimentation to support habitat related beneficial uses in Mugu Lagoon and effectiveness of sediment and siltation load allocations on a subwatershed basis.

Task 2.4 Evaluate Management and Restoration Methods – Evaluate management methods to control siltation and contaminated sediment transport to Calleguas Creek, identify appropriate BMPs to reduce sediment loadings and methods to restore habitat.

The workplan has been developed using a phased approach because the results of Task 2.1 and Task 2.2 will inform the need to progress with Task 2.3 and Task 2.4. As a result, the workplan provides a process for moving forward with Task 2.3 and 2.4, but does not provide specific actions. Additionally, a large amount of work has been completed on Task 2.1 and a clearly defined list of tasks was developed for that task. However, the work effort for Task 2.2 is more amorphous and requires the review of existing information to inform the approach for defining the sediment effects and habitat baselines.

The requirement in the BPA to evaluate the concentrations of OC pesticides and PCBs in sediments from various land use types/sources is being addressed through other monitoring in the CCW. Special Study #2 to identify high concentration areas of OC pesticides includes sediment monitoring from a variety of land uses. The TMDL monitoring program will be collecting storm samples from a number of land uses in the watershed and conducted grain size analysis on the whole storm samples. This information will likely provide all the information necessary to identify sediment concentrations from different land use types. However, the data from these studies will be evaluated and additional monitoring implemented if necessary to address this requirement.

Element 1: Review Process

The review process is intended to allow the various stakeholders of the CCW Management Plan, the ability to actively guide the development and implementation of the Work Plan. The Flood and Sediment Subcommittee of the CCW Management Plan will act as the lead for Work Plan

review and implementation. Subcommittee meetings will provide an ongoing venue for discussion. Additionally, a Technical Advisory Committee (called a Science Advisory Panel in the BPA) will be convened to review the Work Plan and subsequent deliverables. The Review Process tasks are discussed below. The schedule for completing these tasks is outlined in the Schedule section of the Work Plan.

TASK 1.1 IDENTIFY AND SELECT MEMBERS OF A TECHNICAL ADVISORY COMMITTEE (TAC).

The TAC may consist of local, regional, and/or national experts in estuarine habitat biology, hydrology, sediment transport, flood control issues, and best management practices. Stakeholders will identify potential TAC members and make recommendations to the Flood and Sediment Subcommittee. The subcommittee will then select three to five candidates and contact them to determine their interest, availability, and desired compensation. Interested and available TAC members will be contracted through one of the members of the CCW Management Plan. If TAC members are unable to maintain their involvement in the process a replacement member will be retained, if necessary.

TASK 1.2 CONVENE TAC MEETING TO REVIEW WORK PLAN AND OTHER WORK PRODUCTS.

TAC members will be provided copies of the TMDL, BPA, and the Special Study #1 Work Plan once under contract. The TAC will then be convened to provide input on the Work Plan approach and identify subsequent deliverables for review. Additional meetings with the TAC will be convened on an as needed basis to review subsequent deliverables.

Element 2: Technical Analysis

The tasks outlined under the Technical Analysis element are derived from Special Study #1 text presented in the Implementation Plan of the BPA. The tasks have been organized to represent a stepped approach to meeting the requirements of the BPA. The schedule for completing these tasks is outlined in the Schedule section of the Work Plan.

TASK 2.1 QUANTIFY SEDIMENTATION AND TRANSPORT

The following three tasks have been identified to complete the aspects of the Work Plan pertaining to quantifying sedimentation in Mugu Lagoon and sediment transport throughout the CCW:

- Task 2.1A** Review and summarize available reports and studies on sedimentation, sediment loading, etc. in the CCW and Mugu Lagoon
- Task 2.1B** Identify information/data gaps that must be addressed to quantify sedimentation and sediment transport.
- Task 2.1C** Propose an approach to fill information/data gaps.
- Task 2.1D** Implement approach to fill information/data gaps.

Task 2.1A Review and summarize available reports and studies on sedimentation, sediment loading, etc. in the CCW and Mugu Lagoon.

Available information pertaining to sedimentation for the fluvial system of the CCW will be reviewed and compiled. Such information pertains to the sediment source, sediment delivery, stream channel changes, etc. Sediment studies in recent years were made by Simons, Li & Associates, WEST Consultants, and Chang Consultants. Sediment transport data collection has recently been conducted by the Navy and the USGS. A sediment modeling effort for Mugu Lagoon was conducted by RMA. Additional modeling efforts, such as the development of an HSPF model for the CCW, may provide additional tools and will be considered in the review of available information. These studies provide different aspects of sedimentation, but not all necessary aspects of sedimentation required for the present purpose. The results of the review of available information will be summarized.

Task 2.1B Identify information/data gaps that must be addressed to quantify sedimentation and sediment transport.

Necessary information for sedimentation not yet covered in previous studies will be identified, such as an understanding of the role of wash load in the CCW. Previous studies were conducted primarily for identifying potential problems and for developing methods to achieve channel stabilization. They were not specifically developed to evaluate the sediment budget. It is important to note that the concern for sedimentation requires analysis of bed load and wash load. A list of both information and data gaps that must be addressed through the implementation of the Work Plan will be created. Preliminary consideration of potential areas of information and data gaps are listed below:

- Calibration of Sediment Yield Formula – Field data are needed in order to calibrate a sediment yield formula. Sediment accumulation in the existing debris basins may provide useful data for the purpose of calibrating predictive methods for sediment yield.
- Selection of a Sediment Transport Formula – A suitable sediment transport formula will need to be selected to compute the sediment load based on calibration using field data, such as measured transport rate, changes in channel geometry, dredging and maintenance records, etc. Previous flow records are also needed for this effort.
- Historical changes in the stream channel geometry and Mugu Lagoon.
- A baseline characterizing sediment transport and sedimentation in Mugu Lagoon.
- An evaluation of sediment sources for Calleguas creek and Mugu Lagoon.
- Sediment transport in stream channels.
- Sediment budget as affected by stream channel changes.

Task 2.1C Propose an approach to fill information/data gaps.

The proposed approach to filling information/data gaps may include GIS or modeling based analysis as well as the collection of data to improve the accuracy of methods used for sediment computation, if necessary. The Review Process would be utilized during the development of the proposed approach to solicit input from the Stakeholders and TAC.

Task 2.1D Implement approach to fill information/data gaps.

The final task to quantify sedimentation and transport is to implement the proposed approach to fill information/data gaps and generate a final report for Stakeholder and TAC review.

TASK 2.2 EVALUATE SEDIMENTATION EFFECTS AND IDENTIFY HABITAT BASELINE

Mugu Lagoon was included on the 1998 303(d) list of water quality limited segments as impaired for sedimentation/siltation. The Siltation TMDL Technical Document (LARWQCB, 2005) states the listing was based on the following two studies:

- A report titled “Calleguas Creek Watershed Erosion and Sediment Control Plan for Mugu Lagoon” (USDA 1995) concluded that 430 acres of lagoon intertidal salt marsh will be converted to upland habitat by the year 2030 (pg. viii).
- A 1998 report State Water Resources Control Board (SWRCB) Bay Protection and Toxic Cleanup Program (BPTCP) found limited species quality and diversity among benthic species in Mugu Lagoon. However, the BPTCP report does not identify a link between sedimentation/siltation and benthic community degradation. A general statement is made that sedimentation rates are a factor, along with others, that influence benthic community structure (pg. 74). Additionally, in the study limitation section of the report (pg. 86) the authors point out that unmeasured factors that were not consider may have influenced benthic community structure.

These studies provide important information regarding potential impacts to the lagoon due to sedimentation. However, the studies were not specifically designed to evaluate the effect of sedimentation on habitat. Task 2.2 will address the BPA requirement to evaluate the effect of sedimentation on habitat, habitat preservation, and identify an appropriate base line by which to measure effects. Task 2.2 will attempt to recommend a biological and habitat condition to protect habitat related beneficial uses that will allow for an evaluation of targets and allocations.

As described in the Staff Report for the Siltation TMDL, the workplan development for this study was envisioned as a phased approach with the first year being the development of a TAC and review of available data and the remaining years the development of a workplan and implementation of a workplan to address the habitat impacts, targets and allocations (Siltation Staff Report, Page 9). As a result, the first step in conducting Task 2.2 will be a review of existing information. After the organization of a TAC and review of existing information has been completed, an approach for Task 2.2 will be proposed to the Stakeholders and TAC for consideration and revision. Possible elements of the approach could include evaluation of observed and potential habitat impacts, estimates of historic habitat areas and the relationship of those habitats to sediment loadings, and the habitat changes in the lagoon over time as a result of sedimentation.

TASK 2.3 EVALUATE TARGETS AND ALLOCATIONS

The BPA identifies two numeric targets:

- **Siltation reduction** – Annual average reduction in the import of silt of 5,200 tons/year, which will be measured at the US Naval Base total suspended sediment gauge at the entrance to Mugu Lagoon.
- **Maintenance of existing habitat in Mugu Lagoon** – Preservation of the existing 1400 acres of aquatic habitat in Mugu Lagoon.

The BPA allocations assigned to MS4 Permittees and agriculture for siltation to achieve these targets are:

- **Waste Load Allocations for MS4** – MS4 Permittees will receive an allocation of 2,496-tons/year reduction in sediment yield to Mugu Lagoon.
- **Load Allocations** – Agriculture will receive an allocation of 2,704 tons/year reduction in sediment yield to Mugu Lagoon.

Per the BPA, the baseline from which the load reduction will be evaluated will be determined by Special Study #1 and the allocations will apply after the baseline is established.

Task 2.3 is intended to evaluate numeric targets and the wasteload and load allocations for siltation/sedimentation to support habitat related beneficial uses in Mugu Lagoon as well as the effectiveness of allocations on a subwatershed basis. The approach taken to completing the Task 2.3 will be guided by the results of the previous analyses. Completion of the sedimentation and effects analysis are imperative before initiation of Task 2.3 as these first two tasks will inform the group on the impairment in the lagoon, and will have established baselines for both habitat in the lagoon and sediment transport through the lagoon by which to evaluate the targets and allocations.

TASK 2.4 EVALUATE MANAGEMENT AND RESTORATION METHODS

As the final Technical Analysis element, Task 2.4 will bring to bear all of the information generated in the previous tasks to evaluate management methods to address the effects of sedimentation identified in the previous tasks by identifying appropriate BMPs to reduce sediment loadings. Additionally, methods to restore habitat will be evaluated, if necessary.

Schedule

The following table outlines the schedule to complete tasks addressing Special Study #1. The completion time frame is based on EO approval of this Work Plan. The timeframe to complete some of the tasks could not be identified because the approach, which will ultimately be adopted by Stakeholders and TAC, will be developed after initial data review.

Estimated Schedule to Complete Tasks Addressing the CCW OCs TMDL Special Study #1

| Task | | Timeframe for Completion |
|---------------------------|--|--|
| Review Process | | |
| Task 1.1 | Establish TAC | Within 6 Months of EO Approval of Work Plan |
| Task 1.2 | Convene TAC to review Work Plan and work completed to date | Within 9 Months of EO Approval of Work Plan |
| | Convene TAC meeting to review additional work products | As needed |
| Technical Analysis | | |
| Task 2.1A and 2.1B | Review available information and identify information/data gaps. | Within 3 Months of EO Approval of Work Plan |
| Task 2.1C | Propose approach to address gaps | Within 9 Months of EO Approval of Work Plan |
| Task 2.1D | Implement approach | Within 12 Months of EO Approval of Work Plan |
| | Complete approach | To be determined based on approach ultimately adopted by Stakeholders and TAC |
| Task 2.2 | Evaluate Sedimentation Effects and Identify Habitat Baseline | To be determined based on approach ultimately adopted by Stakeholders and TAC but no later than March 24, 2014 |
| Task 2.3 | Evaluate Targets and Allocations | |
| Task 2.4 | Evaluate Management and Restoration Methods | |

References

Los Angeles Regional Water Quality Control Board (LARWQCB). 2005. Technical Components of the Mugu Lagoon Siltation TMDL for Calleguas Creek. April 25, 2005.

Los Angeles Regional Water Quality Control Board (LARWQCB). 2005. Basin Plan Amendment for the Total Maximum Daily Load for Organochlorine Pesticides, Polychlorinated Biphenyls, and Siltation in Calleguas Creek, Its Tributaries, and Mugu Lagoon.

State Water Resources Control Board (SWRCB). 1998. Bay Protection and Toxic Cleanup Program (BPTCP) Sediment Chemistry, Toxicity, and Benthic Community Conditions in Selected Water Bodies of the Load Angeles Region. August 1998.

United States Department of Agriculture and Natural Resources Conservation Service (USDA, NRCS). 1995. Calleguas Creek Watershed Erosion and Sediment Control Plan for Mugu Lagoon. USDA Report prepared by Water Resources Planning Staff.