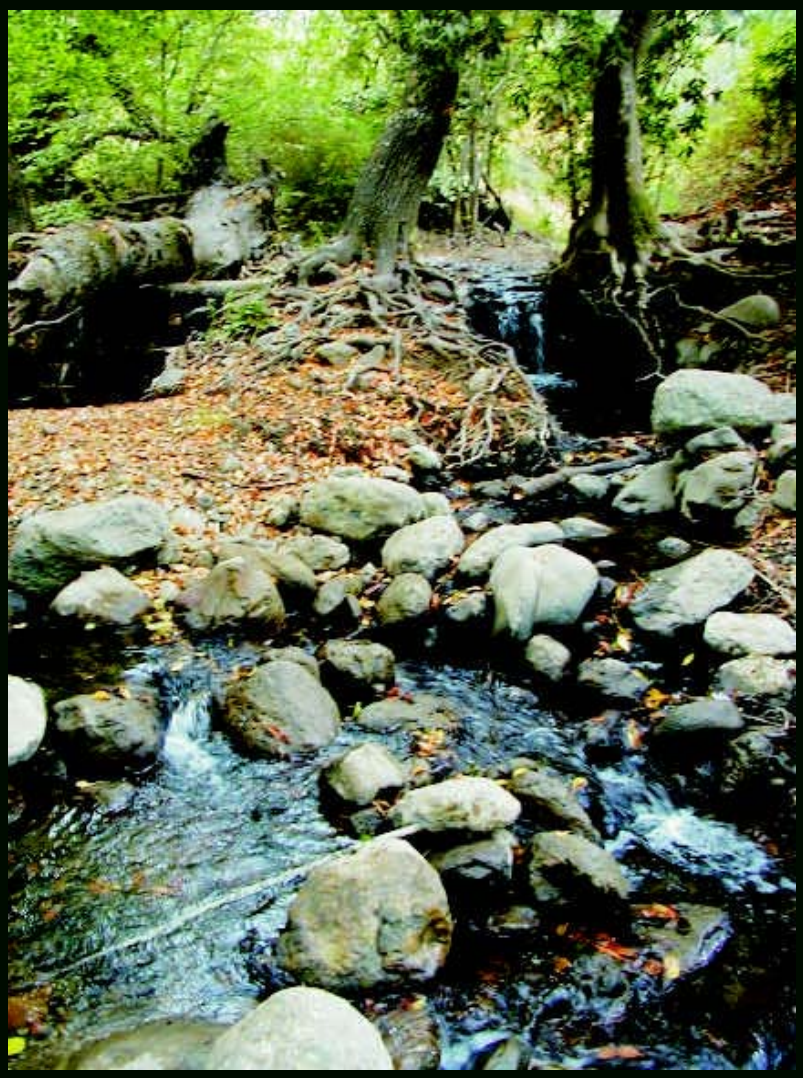
Maintaining Corte Madera Creek: A Citizens' Guide to Creek-Side Property Protection



Prepared by Philip Williams & Associates, Ltd.
in collaboration with H.T. Harvey & Associates

PWA
Philip Williams & Associates, Ltd.
Consultants in Hydrology

Table of Contents

Acknowledgments

Executive Summary

Introduction **1**

1.1 Project Introduction
1.2 History
1.3 Goals
1.4 Typical Issues/ Challenges for Creekside Property Owners?

Purpose of the Study/ Report **7**

2.1 Overview
2.2 Project Approach

Creek Function **11**

3.1 How Do Creeks Work?
3.2 What is Riparian Habitat?
3.3 Riparian Functions and Values
3.4 Creek Terminology/ Glossary

Corte Madera Creek Watershed - Existing Conditions **23**

4.1 Existing Conditions
4.2 Geomorphic Setting and Conditions
4.2.1 Geomorphic Approach
4.3 Corte Madera Creek – Study Area Reaches
4.4 Reach 4/ The Headwaters
4.5 Existing Bank Stabilization Treatments

4.6 Existing Biotic Conditions of Corte Madera Creek
4.6.1 Fish and Wildlife of Corte Madera Creek
4.6.2 Habitat Descriptions
4.7 Special-Status Species
4.7.1 Regulatory Overview

Conceptual Restoration Approaches and Permitting **59**
5.1 Introduction
5.2 Methods
5.3 How to Protect Creek Banks?
5.4 Conceptual Restoration Approaches
5.5 Undertaking a Stabilization Project
5.6 Permitting
5.7 Recommended Trees and Plants for Corte Madera Creek
5.8 Non-Native/ Undesirable Plant Species on Corte Madera Creek

Creek Walks **89**
Next Steps **93**

Appendices

A. References
B. Example Projects
C. Creek Walk Materials

List of Figures

Figure 1 – Corte Madera Creek Watershed Map
Figure 2 – Project Study Area, Corte Madera Creek, Portola Valley
Figure 3 – Reach 1 (Mapache Drive to Westridge Bridge)
Figure 4 – Reach 2 (Westridge Bridge to Willowbrooke Drive)
Figure 5 – Reach 3 (Willowbrooke to Alpine Road)

Acknowledgements

The authors wish to acknowledge and thank a number of individuals, committees and agencies that provided their expertise, experience and importantly their time to review and provide input to the Report. The comments received helped to clarify and focus the organization, intent and content of the document:

- **Mayor Edward Davis**
- **Planning Commission Chairman Craig Breon**
- **Planning Commissioner Linda Elkind**
- **Angela Howard, Town Administrator**
- **Howard Young, Public Works Director**
- **George Mader, Town Planner, Spangle Associates**
- **Tom Vlasic, Deputy Town Planner, Spangle Associates**
- **John Wallace, Senior Engineering Geologist - Town Geologist (Cotton, Shires & Associates)**
- **Marge DeStaebler, Member of the Town of Portola Valley Conservation Committee**
- **Philippe Cohen, Administrative Director, Jasper Ridge Biological Preserve**

Acknowledgements

We also want to thank the following individuals for their interest, support and participation in the study:

- **Leslie A. Lambert, Planning Manager, Town of Portola Valley**
- **Kevin Murray, Project and Natural Resources Manager, San Francisquito Creek Joint Powers Authority**
- **Cynthia D'Agosta, Executive Director, San Francisquito Creek Authority**
- **Phil Chang, Former Watershed Coordinator and Project Director, San Francisquito Watershed Council**
- **Pam Sturner, Coordinator and Project Director, San Francisquito Watershed Council**
- **Robert Katz, Portola Valley Resident**
- **Philip & Jean Eastman, Portola Valley Residents**
- **Belinda Brent, Portola Valley Resident**
- **Kenneth Rosen & Larisa Fong, Portola Valley Residents**

Funding for the study was generously provided by the California Department of Water Resources' Urban Stream Restoration Program.

The primary authors of the report are:

- **Jorgen Blomberg, Philip Williams & Associates**
- **Dr. Andrew Collison, Philip Williams & Associates**
- **Max Busnardo, H.T. Harvey & Associates**
- **Matt Quinn, H.T. Harvey & Associates**

Executive Summary

The Corte Madera Creek Watershed sustains some of the most intact and valuable riparian habitat areas in the Santa Cruz Mountains and surrounding region. Corte Madera Creek has been impacted by a number of human (anthropogenic) actions including urban development, flood control and bank protection. These activities have constrained the creek to a narrow corridor and reduced native vegetation. Due to increased storm runoff in the watershed and the degraded and confined condition of the creek, erosion processes (high velocities and shear stresses) exist and create the need for bank protection. In response to ongoing erosion as well as specific emergency situations associated with significant storm events in the recent past, individual property owners in the Town of Portola Valley have employed a variety of engineered and non-engineered bank protection measures, some of which are failing or are incompatible with the upstream and downstream bank protection structures. Some of the existing bank stabilization measures have in turn created problems along the creek and generally reduced habitat values.

Creek channel and bank protection can be achieved through sustainable and cost effective approaches that are consistent with and potentially enhance creek function, habitat and aesthetic values. Geomorphic and engineering analyses are important to undertake effective long-term bank stabilization.

The intent of creating the Maintaining Corte Madera Creek: A Citizens' Guide to Creek-Side Property Protection report was to develop a tool for the Town and its residents to use in guiding bank stabilization and revegetation efforts along Corte Madera Creek within the Town of Portola Valley. Importantly the report was created to facilitate communications between the Town and private property owners who wish to address erosion and property loss. The guide was also developed to:

1. Provide guidelines to the Town and its residents for feasible and sustainable bank stabilization approaches that protect property while improving creek function and habitat values.
2. Develop a broader view of the Corte Madera Creek Watershed as a natural resource (habitats, water quality and interesting plant and animal species) and community amenity in an effort to build community stewardship of the Creek.
3. Facilitate permitting acquisition for property owners and project proponents.

The report builds on the growing local and regional experience with creek restoration efforts to assist property owners with the project planning process including analysis, design, permitting and implementation phases. The report emphasizes a holistic and balanced approach for bank protection that considers the Corte Madera Creek system as opposed to single isolated problems.

Conceptual Restoration Approaches

The Conceptual Restoration Approaches outlined in the Citizens' Guide provide an outline for property owners and stakeholders to use for design, permitting and construction of future stabilization and revegetation projects on Corte Madera Creek. The Conceptual Approaches presented in the Citizens' Guide are based on a series of geomorphic assessments and vegetation and habitat surveys undertaken by a multi-disciplinary team within the project study area. The recommendations emphasize limiting hard-armored solutions or adapting them to integrate roughness and revegetation components. Some typical guidelines for bank stabilization approaches include:

- Do not reduce the width of the creek, as this will almost certainly cause erosion both in the bed and downstream.
- Do not reduce the length of the creek (by straightening a bend for example). This action will steepen the bed profile, increasing erosion locally, and on the next bend downstream.
- Where possible, combine grading activities to flatten bank angle and use a mixture of biotechnical methods such as brush mats and willow planting.
- Where rock is required, place rock (mechanically or by hand) rather than by dumping. Dumped rock generally forms an unsustainably steep angle, which eventually collapses and rolls rock into the creek.
- Limit the upper vertical extent of placed rock for structural and erosion protection requirements on the bank slope to maximize plantable areas. Key rock into the bed several feet to prevent undercutting.
- Utilize rock sizes based on calculations of flow force and resistance.
- Integrate native trees such as willow and alder with the engineered rock bank protection. Integrated planting has several benefits:
    1. Roots anchor the soil beneath the rock, providing a living support system that increases the strength of the bank protection over time
    2. Vegetation slows water velocities, reducing erosion both at the bank and downstream, and
    3. Trees provide shaded cover for the creek, improving habitat conditions.

Six conceptual restoration approaches are described in the Citizens' Guide. The recommendations for bank stabilization and revegetation are intended to address physical and biological conditions found within the study area.

- Vegetated Rock
- Bulkhead Wall (Rock)
- Grade Control Structure (GCS)
- Biotechnical Stabilization
- Bioengineering Stabilization/ Planting
- Native Planting – Stable Channel

Planning and undertaking a successful stabilization project requires the coordination of different experts and review and approval from several key state and regulatory agencies. The process, key tasks and players required to undertake an environmentally sensitive bank stabilization project are outlined in order to inform potential future project sponsors about these expectations.

The Maintaining Corte Madera Creek: A Citizens' Guide to Creek-Side Property Protection report was prepared by:

- Philip Williams & Associates
- H.T. Harvey & Associates

Blank Page