



Carpinteria Creek Watershed Plan
March, 2005

Carpinteria Creek Watershed Plan

March, 2005

By Cachuma Resource Conservation District
& the Carpinteria Creek Watershed Coalition

For the California Department of Fish and Game

This watershed plan was made possible through Grant #P0150016 from the Department of Fish and Game, the National Oceanic and Atmospheric Administration and the California Coastal Salmonid Recovery Program.

EXECUTIVE SUMMARY

Carpinteria Creek is 15 square miles of high quality watershed that contributes runoff to a creek system which possesses the highest total habitat value and best restoration potential for endangered steelhead among all South Coast streams. In 2001, Carpinteria Creek Watershed Coalition was organized and began setting goals for the restoration of Carpinteria Creek. A major objective for restoration was the development of this watershed plan.

Historical, geographic and hydrologic characteristics of the watershed are described, based on existing documents and data. The Conception Coast Project provides an inventory of all of the significant steelhead passage barriers in the creek, and relevant portions of their report are included here. A survey of stream habitat conditions has been conducted for the endangered Southern California Steelhead Trout using Fish and Game protocols. Projects, both existing and proposed were inventoried. Water quality monitoring data, both historic, and current has been analyzed in relation to stream health.

Habitat for steelhead is pristine in the upper watershed. From the debris basins down to Highway 101, habitat is good when water is present. Habitat in the lower watershed from Highway 101 down to the ocean habitat is marginal due to poor water quality. In-stream habitat is lacking in the downstream reaches.

Several low-water crossing removal projects are being implemented. Discussions are underway to modify the two debris basins and to replace of pipe and wire revetment with bioengineered bank stabilization measures. A riparian modeling project is underway. Invasive weeds are being inventoried and proposals for eradication are being prepared. Agricultural property owners are preparing water quality management plans for private land in the watershed. The forest service has joined in discussion regarding fire protection for the upper watershed. Water quality monitoring will continue.

The Carpinteria Creek Watershed Coalition is crucial to carrying out all of the projects identified here. In the case of barrier removal projects, the Coalitions role will include organizing funding sources. The on-farm water quality management plans will benefit from the Coalition's education and outreach efforts. Water quality monitoring will be coordinated and reported by the Coalition.

Table of Contents

LIST OF FIGURES	ix
LIST OF TABLES	x
LIST OF APPENDICES	xii
SECTION 1: INTRODUCTION	1
1.1 Introduction and Background	1
1.1.1 Vision and Goals	1
1.1.2 Purpose and Need for a Plan	1
1.1.3 Plan scope, focus and scale	2
1.1.4 Participants	2
1.1.5 Public Outreach and Participation	2
1.1.6 Other Plans and Processes	3
1.1.7 Ongoing Projects	3
1.2 Relevant Policies	4
1.2.1 Federal Policies	4
1.2.2 State Law and Policies	5
1.2.3 Local Law and Policies	6
1.3 Carpinteria Creek Watershed Description	7
1.3.1 Size and Location	7
1.3.2 Species of Concern	9
1.3.3 Geology and Geomorphology	9
1.3.4 Carpinteria Population	10
SECTION 2: HISTORICAL CONDITIONS ASSESSMENT	13
2.1 Historical Narrative	13
2.1.1 History Prior to Exploration/Settlement	13
2.1.2 Early Exploration and Settlement	13
2.1.3 Conditions During the First Half of the 20th Century	15
2.2 Historical Timeline	20
2.3 Summary and Conclusions	20
SECTION 3: CLIMATE, HYDROLOGY AND WATER USE	23
3.1 Overview	23
3.2 Land Use Summary	23
3.3 Precipitation Summary	24
3.4 Stream Discharge Summary	27
3.5 Channel Modification Assessment	30
3.6 Flood History	32
3.7 Prediction of Storm Water Runoff	34
3.8 Hydrologic Soil Conditions	34
3.9 Evaporation and Transpiration	38
3.10 Surface Water and Groundwater Supply	38
3.11 Water Rights Summary	41
3.12 Springs and Wells	41
SECTION 4: WATER QUALITY ASSESSMENT	42
4.1 Overview of Water Quality	42
4.1.1 Introduction to Water Quality	42

4.1.2	Components of Water Quality	42
4.1.3	Designated Beneficial Uses	44
4.1.4	Water Quality Criteria	45
4.1.5	EPA's 303(d) List	46
4.2	Pollutant Sources	46
4.2.1	Point Sources	46
4.2.2	Non-Point Sources	46
4.3	Water Quality Data Sources	47
4.3.1	United States Geological Survey	47
4.3.2	County of Santa Barbara Environmental Health Services	47
4.3.3	County of Santa Barbara, Project Clean Water	47
4.3.4	Central Coast Ambient Monitoring Program	48
4.3.5	UC Santa Barbara, Coastal Long Term Ecological Research Project	48
4.4	Water Quality Constituents Analysis	49
4.4.1	Temperature	49
4.4.2	Dissolved Oxygen	50
4.4.3	pH	50
4.4.4	Nutrients	51
4.4.5	Turbidity/Suspended Sediment	52
4.4.6	Bacteria and viruses	53
4.4.7	Pesticides	55
4.4.8	Metals	56
4.5	Water Quality Condition Summary	57
	SECTION 5: SEDIMENT SOURCES ASSESSMENT	58
5.1	Overview	58
5.1.1	Introduction	58
5.1.2	Creek Banks	59
5.1.3	Fire Management	60
5.1.4	Debris Basins	60
5.1.5	Agriculture	61
5.1.6	Stream Crossings	63
5.1.7	Pipe and Wire Revetment	65
5.1.8	Gabion Baskets	66
5.2	Methodology	67
5.2.a	Surface Geology	68
5.2.b	Soils	70
5.2.c	Climate	71
5.2.d	Runoff	73
5.2.e	Topography	73
5.2.f	Effective Ground Cover	75
5.2.g	Land Type and Land Management Quality	77
5.2.h	Upland Erosion	77
5.2.i	Channel Erosion and Sediment Transport	79
5.3	Sediment Risk Potential	81
5.3.1	Stable Bedrock Materials	81
5.3.2	Impervious Surfaces	81

5.3.3	Runoff from Large Storms	81
5.3.4	Wildfire Effect on Erosion	82
5.3.5	Seasonal Stream Crossings	82
5.3.6	Debris Basins	82
5.3.7	Pipe and Wire Revetment	82
5.4	Conclusions	83
SECTION 6: BIOLOGICAL RESOURCES		85
6.1	Overview	85
6.2	Fish	85
6.2.1	Distribution, Abundance and Population	85
6.3	Birds	87
6.3.1	Distribution, Abundance and Population	87
6.3.2	Native and Introduced Bird Species	87
6.4	Fauna	88
6.4.1	Distribution, Abundance, and Population of Fauna Species	88
6.4.2	Introduced Fauna	88
6.5	Amphibians and Reptiles	89
6.5.1	Distribution, Abundance, and Population	89
6.5.2	Introduced Amphibians and Reptiles	90
6.6	Invertebrates	90
6.6.1	Benthic Macroinvertebrates	90
6.6.2	Monarch Butterflies	91
6.7	Vegetation	92
6.7.1	Distribution, Abundance, and Population	92
6.7.2	Sensitive Plant Species	93
6.7.3	Native vs. Introduced Species	93
SECTION 7: HABITAT INVENTORY		96
7.1	Introduction	96
7.2	Field Methods	96
7.2.1	Channel Typing	98
7.2.2	Habitat Typing	98
7.2.3	Water Quality Parameters Measured in the Field	98
7.2.4	Large Woody Debris Surveys	98
7.2.5	Fish Surveys	98
7.3	Results and Discussion	99
7.3.1	Channel Type	99
7.3.2	Stream Discharge	100
7.3.3	Habitat Inventory Data	100
7.3.4	Fish Passage Impediments	105
7.3.5	Water Quality	106
7.3.6	Large Woody Debris Inventory	109
7.3.7	Riparian Plant Community	110
7.3.8	Benthic Macroinvertebrates	111
7.3.9	Vertebrates	112
7.4	Fish Survey Data	112
7.5	Steelhead Habitat and Population Summary	114

7.5.1	Synopsis	116
7.5.2	Recommendations for Steelhead Habitat Restoration and Recovery	117
SECTION 8: POTENTIAL RESTORATION OPPORTUNITIES		119
8.1	Outreach and Education	119
8.2	Barrier Removal Opportunities	119
8.2.1	Barrier ID: BR_CA_1	124
8.2.2	Barrier ID: BR_CA_2	125
8.2.3	Barrier ID: BR_CA_3	127
8.2.4	Barrier ID: BR_CA_4	128
8.2.5	Barrier ID: BR_CA_5	129
8.2.6	Barrier ID: BR_CA_6	131
8.2.7	Barrier ID: BR_CA_7	133
8.2.8	Barrier ID: BR_CA_8	134
8.2.9	Barrier ID: BR_CA_9	136
8.2.10	Barrier ID: BR_CA_GR_1	137
8.2.11	Barrier ID: BR_CA_GR_2	138
8.2.12	Barrier ID: BR_CA_GR_3	139
8.2.13	Barrier ID: BR_CA_GR_4	140
8.2.14	Barrier ID: BR_CA_GR_5	141
8.2.15	Barrier ID: BR_CA_GR_6	142
8.3	Restoration Action: Estuary Study	143
8.4	Weed Management Area	144
8.4.1	Arundo donax	144
8.5	Singing Springs Condominium’s Streambank Restoration	146
8.6	Monitoring	147
8.6.1	Proposed Monitoring	147
8.6.2	Proposed Data and Information Management	148
8.7	Creekside Property Purchases for Conservation and Nature Parks	149
8.8	Pipe and Wire Revetment	149
8.9	Bank Stabilization Projects	150
8.10	The 8th Street Bridge Renovation and Habitat Restoration	150
8.11	Agricultural Land Use	150
8.11.1	Tree Crops	151
8.11.2	Field Crops	151
8.11.3	Greenhouses	152
8.11.4	Regulation of Agricultural Properties	152
8.12	Outreach and Education	154
8.13	Addition of In-Stream Habitat for Steelhead	154
SECTION 9: WATERSHED CONDITION EVALUATION		155
9.1	Summary of Key Information Collected	155
9.2	Data Gaps and Missing Information	156
9.3	Issues Requiring Additional Prioritization	158
SECTION 10: RECOMMENDED IMPLEMENTATION PROGRAM		159
10.1	Expected Uses of This Plan	159
10.1.1	Creek Restoration Approach	159
10.1.2	Organizations that Manage Projects	159

10.1.3	Agencies that Regulate Projects	161
10.1.4	Recommended Restoration Actions	163
10.1.5	Criteria for Evaluating Alternatives	163
10.2	Funding	163
10.3	Schedule For Implementation	164
10.4	Strategy For Incorporating Into Local Plans And Activities	164
10.5	Limits To Implementation	164
10.5.1	Funding	164
10.5.2	Local Capacity	164
10.5.3	Permit Coordination	165
10.5.4	Water Supply and Water Quality	165
10.6	Long-Term Data Collection And Watershed Management	165
10.6.1	Data collection	165
10.6.2	Watershed management	165
10.7	Measures of Success	166
SECTION 11: REFERENCES		167
SECTION 12: GLOSSARY OF TERMS, UNITS AND ACRONYMS		182

LIST OF FIGURES

Figure 1.1 Location Map of Carpinteria Creek Watershed	8
Figure 1.2 Species of Concern Carpinteria Creek Watershed.	11
Figure 1.3 Geology of Carpinteria Creek Watershed.....	12
Figure 2.1 Fire History in Carpinteria Creek Watershed.....	22
Figure 3.1 Rainfall patterns on the coastal plain and mid elevation sites	25
Figure 3.2 Carpinteria Creek Watershed in the Carpinteria Valley	26
Figure 3.3 Two of the four gauging locations on Carpinteria Creek, 8 th Street Footbridge and the USGS station near Hwy 154 Bridge.....	27
Figure 3.4 Carpinteria Creek monthly stream discharge characteristics	28
Figure 3.5 Annual instantaneous peak discharge on Carpinteria Creek	29
Figure 3.6 Nested stream hydrographs during the March 15, 2003	30
Figure 3.7: FEMA Flood Map	33
Figure 3.8 SCCWRP modeling of storm water runoff by land use type for Santa Barbara County.	35
Figure 3.9 Soil Types in Carpinteria Creek Watershed	37
Figure 4.1 Project Clean Water (PCW) Monitoring Sites	49
Figure 4.2 Dissolved Oxygen (DO) concentrations in Carpinteria Creek at 8 th Street.	50
Figure 4.3 Annual Nitrate (NO ₃) and Phosphate (PO ₄) Concentrations Measured at the 8 th Street Footbridge.....	51
Figure 4.4 Nitrate as Nitrogen (NO ₃ -N) from Four Sampling Sites within the Carpinteria Creek Watershed	52
Figure 4.5 Bacteria Mean Levels	53
Figure 4.6 Total Coliform Counts at the 8 th Street Monitoring Station on Carpinteria Creek.....	54

Figure 4.7 Fecal Coliform Counts at the 8th Street Monitoring Station on Carpinteria Creek.....	55
Figure 5.1 Channel Modifications in Carpinteria Creek Watershed.....	64
Figure 5.2 Divisions of Carpinteria Creek Watershed	69
Figure 5.3 Soils “K” Factor in Carpinteria Creek Watershed	72
Figure 5.4 Average Slopes in Carpinteria Creek Watershed	74
Figure 5.5 Land-use and Vegetative Cover for the Carpinteria Creek Watershed...76	
Figure 5.6 Areas Subject to Accelerated Erosion in the Carpinteria Creek Watershed	78
Figure 7.1 Habitat Study Reaches in the Carpinteria Creek Watershed	97
Figure 7.2 Steelhead Habitat Distribution and Quality and Fish Passage Impediments in the Carpinteria Creek Watershed	107
Figure 8.1 Restoration Project Locations in Carpinteria Creek Watershed	123
Figure 8.2 Arundo donax found in Carpinteria Creek September, 2003.....	145

LIST OF TABLES

Table 2.1 Land Values in and around Carpinteria, in recent history.....	16
Table 2.2 Historical Timeline for the Carpinteria Region.	20
Table 3.1 Land use characteristics for Carpinteria Creek Watershed.....	24
Table 3.2 Precipitation gauges for the Carpinteria Valley.	26
Table 3.3 Stream discharge gauging stations on Carpinteria Creek.	27
Table 3.4 Peak stream discharge for the highest years on record.....	32
Table 3.5 Flood frequency for Carpinteria and Franklin creeks	33
Table 3.6 Soil types found in the Carpinteria Creek Watershed	36
Table 3.7 Recent CIMIS meteorological data	38

Table 3.8 Water supply for the Carpinteria Valley Water District	39
Table 3.9 Population estimates for the Carpinteria Valley	39
Table 3.10 Past, present and projected water use for the Carpinteria Valley Water District.....	40
Table 4.1 Identified Beneficial Uses of Inland Surface Waters, for Carpinteria Creek Watershed	44
Table 4.2 Standards for fecal indicator bacteria in coastal (Ocean) waters.	45
Table 4.3 Current Regional and State Nutrient Standards	45
Table 4.4 Total Annual Nitrate (NO₃) and Phosphate (PO₄), Leaving Carpinteria Creek	52
Table 4.5 Samples which have exceeded one or more of state fecal indicator bacteria standards.....	54
Table 4.6 Common Pesticides Sampled by Project Clean Water Results Downstream of Carpinteria Avenue.	55
Table 4.7 Project Clean Water results for common metals in Carpinteria Creek ...	56
Table 5.2a PSIAC Surface Geology Rating for Carpinteria Creek Watershed.....	70
Table 5.2b PSIAC Soil Ratings for Carpinteria Creek Watershed.....	71
Table 5.2e PSIAC Topography Rating for the Carpinteria Creek Watershed.....	73
Table 5.2f PSIAC Ground Cover Ratings for the Carpinteria Creek Watershed....	75
Table 5.2h PSIAC Upland Erosion Rating for the Carpinteria Creek Watershed ..	79
Table 5.2i PSIAC Channel Erosion Rating for the Carpinteria Creek Watershed..	80
Table 5.2j Sub-watershed average annual sediment yield for the Carpinteria Creek Watershed.....	80
Table 6.1 Native fish species in Carpinteria Creek with Habitat Occurrence Classification	87
Table 6.2 Mammals using habitat within Carpinteria Creek.....	88

Table 7.1 Habitat Units Found During this Assessment in Carpinteria Creek	102
Table 7.2 Fish Passage Impediments in the Carpinteria Creek Watershed.....	108
Table 7.3 Water Quality Data from this Assessment in Carpinteria Creek.....	109
Table 7.4 LWD Inventory	110
Table 7.5 Trout Survey Data.....	113
Table 8.1 Project Locations in Carpinteria Creek Watershed	120

LIST OF APPENDICES

APPENDIX A: GOALS AND OBJECTIVES OF THE CARPINTERIA CREEK WATERSHED COALITION

APPENDIX B: GROUNDWATER AND MUNICIPAL WATER SUPPLY

APPENDIX C: BIOLOGICAL RESOURCES

APPENDIX D: HABITAT INVENTORY INFORMATION

APPENDIX E: SUMMARY OF FARM WATER QUALITY MANAGEMENT PLAN

APPENDIX F: FARM MANAGEMENT PRACTICES

APPENDIX G: FUNDING SOURCES

APPENDIX H: STAKEHOLDER CONTACT LIST