

# Contents

## Volume I East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan

	<b>Page</b>
Chapter 1	<b>Introduction</b> ..... 1-1
1.1	Overview ..... 1-1
1.1.1	Background ..... 1-1
1.1.2	Mission Statement..... 1-3
1.1.3	Purpose..... 1-4
1.2	Scope of the HCP/NCCP ..... 1-5
1.2.1	Permit Duration ..... 1-5
1.2.2	Geographic Scope ..... 1-5
1.2.3	Covered Species..... 1-7
1.2.4	Covered Activities ..... 1-7
1.3	Regulatory Setting ..... 1-8
1.3.1	Federal and State Endangered Species Laws..... 1-8
1.3.2	Other Federal and State Wildlife Laws and Regulations ..... 1-12
1.3.3	National Environmental Policy Act ..... 1-14
1.3.4	California Environmental Quality Act..... 1-14
1.3.5	Federal and State Wetland Laws and Regulations ..... 1-15
1.3.6	California's Delta Protection Act..... 1-21
1.4	Overview of HCP/NCCP Preparation Process..... 1-22
1.4.1	Organization of the Process..... 1-22
1.4.2	Executive Governing Committee..... 1-22
1.4.3	Coordination Group..... 1-23
1.4.4	Science Advisors..... 1-23
1.4.5	HCPA Member Agency Staff..... 1-24
1.4.6	Consultant Team..... 1-24
1.4.7	Public Outreach and Involvement ..... 1-24
1.5	Document Organization ..... 1-25
Chapter 2	<b>Land Use and Covered Activities</b> ..... 2-1
2.1	Introduction ..... 2-1
2.2	Land Use..... 2-1
2.2.1	Background..... 2-1

	2.2.2	Rationale for Land Use Designations Evaluated in the HCP/NCCP .....	2-3
	2.2.3	Existing and Designated Land Uses .....	2-5
	2.2.4	Public Land and Open Space .....	2-8
2.3		Covered Activities and Projects .....	2-15
	2.3.1	Activities within the Urban Development Area.....	2-16
	2.3.2	Rural Infrastructure Projects .....	2-18
	2.3.3	Rural Infrastructure Operation and Maintenance Activities .....	2-29
	2.3.4	Activities within the HCP/NCCP Preserves.....	2-32
2.4		Projects and Activities Not Covered by this HCP/NCCP .....	2-35
Chapter 3		<b>Physical and Biological Resources</b> .....	3-1
	3.1	Introduction .....	3-1
	3.2	Data Collection.....	3-1
	3.2.1	Physical Features.....	3-1
	3.2.2	Land Cover Mapping.....	3-2
	3.3	Setting.....	3-6
	3.3.1	Physical Characteristics.....	3-6
	3.3.2	Existing Land Cover Types .....	3-8
	3.3.3	Historic Conditions .....	3-27
	3.3.4	Natural Communities (Vegetation Communities) .....	3-29
	3.3.5	Regulatory Context of Wetlands, Streams, and Other Jurisdictional Waters .....	3-35
	3.3.6	Biological Diversity .....	3-38
	3.3.7	Covered Species.....	3-39
Chapter 4		<b>Impact Assessment and Levels of Take</b> .....	4-1
	4.1	Introduction and Approach.....	4-1
	4.1.1	Approach to Estimating Take .....	4-1
	4.1.2	Approach to Jurisdictional Wetlands and Waters.....	4-2
	4.2	Impact Mechanisms .....	4-2
	4.2.1	Urban Development within the UDA .....	4-3
	4.2.2	Rural Infrastructure Projects outside the UDA.....	4-5
	4.2.3	Activities within HCP/NCCP Preserves .....	4-7
	4.2.4	Routine Agriculture near HCP/NCCP Preserves .....	4-8
	4.2.5	Methods and Assumptions for Assessing the Impact of Covered Activities.....	4-9
	4.3	Effects on Natural Communities and Jurisdictional Wetlands and Waters.....	4-11
	4.3.1	Existing Protection .....	4-12
	4.3.2	Effects of Urban Development within the UDA.....	4-12
	4.3.3	Effects of Rural Infrastructure Projects outside the ULL .....	4-13

	4.3.4	Effects of Activities in HCP/NCCP Preserves .....	4-14
4.4		Effects on Covered Species.....	4-14
	4.4.1	Mammals.....	4-14
	4.4.2	Birds .....	4-16
	4.4.3	Reptiles .....	4-17
	4.4.4	Amphibians .....	4-18
	4.4.5	Invertebrates .....	4-19
	4.4.6	Plants .....	4-20
4.5		Effects on Critical Habitat.....	4-21
	4.5.1	Vernal Pool Fairy Shrimp and Longhorn Fairy Shrimp.....	4-21
	4.5.2	Contra Costa Goldfields .....	4-22
4.6		Cumulative Impacts .....	4-22
	4.6.1	Urban Development in Antioch .....	4-23
	4.6.2	Los Vaqueros Reservoir Expansion.....	4-23
	4.6.3	Ongoing and Routine Agriculture .....	4-24
	4.6.4	Wind Turbine Operation and Repowering.....	4-25
	4.6.5	Use of Existing Roads.....	4-25
Chapter 5		<b>Conservation Strategy .....</b>	<b>5-1</b>
	5.1	Summary of Conservation Strategy .....	5-1
	5.2	Methods .....	5-2
	5.2.1	Approach to the Conservation Strategy .....	5-2
	5.2.2	Biological Goals and Objectives.....	5-4
	5.2.3	Mitigation for Jurisdictional Wetlands and Waters.....	5-22
	5.2.4	Sources .....	5-22
5.3		Conservation Measures .....	5-23
	5.3.1	Landscape-Level Conservation Measures .....	5-23
		Conservation Measure 1.1 .....	5-23
		Conservation Measure 1.2 .....	5-55
		Conservation Measure 1.3 .....	5-59
		Conservation Measure 1.4 .....	5-62
		Conservation Measure 1.5 .....	5-64
	5.3.2	Natural Community–Level Conservation Measures .....	5-69
		Conservation Measure 2.1 .....	5-69
		Conservation Measure 2.2 .....	5-72
		Conservation Measure 2.3 .....	5-75
		Conservation Measure 2.4 .....	5-79
		Conservation Measure 2.5 .....	5-83
		Conservation Measure 2.6 .....	5-86
		Conservation Measure 2.7 .....	5-88
		Conservation Measure 2.8 .....	5-91
		Conservation Measure 2.9 .....	5-93
		Conservation Measure 2.10 .....	5-96
		Conservation Measure 2.11 .....	5-100
	5.3.3	Species-Level Conservation Measures.....	5-101
		Conservation Measure 3.1 .....	5-102
		Conservation Measure 3.2 .....	5-105

	Conservation Measure 3.3 .....	5-106
	Conservation Measure 3.4 .....	5-107
	Conservation Measure 3.5 .....	5-108
	Conservation Measure 3.6 .....	5-113
	Conservation Measure 3.7 .....	5-114
	Conservation Measure 3.8 .....	5-119
	Conservation Measure 3.9 .....	5-121
<b>Chapter 6</b>	<b>Conditions on Covered Activities .....</b>	<b>6-1</b>
6.1	Introduction .....	6-1
6.2	Receiving Take Authorization under the Plan .....	6-2
6.2.1	Application Process.....	6-2
6.2.2	Application Review.....	6-3
6.2.3	Granting Take Authorization .....	6-5
6.3	Surveys for Covered Activities .....	6-6
6.3.1	Planning Surveys .....	6-7
	Land Cover.....	6-8
	Selected Covered Wildlife .....	6-8
	Covered and No-Take Plants.....	6-9
	Uncommon Vegetation and Uncommon Landscape Features .....	6-10
	Jurisdictional Wetlands and Waters .....	6-11
6.3.2	Preconstruction Surveys for Wildlife .....	6-12
6.3.3	Construction Monitoring .....	6-13
6.4	Specific Conditions on Covered Activities.....	6-14
6.4.1	Landscape-Level Measures .....	6-14
6.4.2	Natural Community–Level Measures .....	6-33
6.4.3	Species-Level Measures.....	6-36
	Townsend’s Big-Eared Bat.....	6-36
	San Joaquin Kit Fox.....	6-37
	Golden Eagle .....	6-38
	Western Burrowing Owl .....	6-39
	Swainson’s Hawk.....	6-41
	Giant Garter Snake .....	6-43
	California Tiger Salamander .....	6-45
	California Red-legged Frog.....	6-46
	Covered Shrimp .....	6-46
	Covered Plants.....	6-48
<b>Chapter 7</b>	<b>Monitoring and Adaptive Management Program .....</b>	<b>7-1</b>
7.1	Introduction .....	7-1
7.2	Process Overview .....	7-1
7.2.1	Regulatory Requirements .....	7-4
7.2.2	Monitoring and Adaptive Management Goals.....	7-4
7.2.3	Integration of Monitoring and Adaptive Management .....	7-5
7.2.4	Organizational Structure .....	7-6
7.3	Implementation Schedule for the Monitoring and Adaptive Management Program .....	7-7

	7.3.1	Monitoring Design Phase (First 5 Years of Plan Implementation) .....	7-8
	7.3.2	Inventory Phase (Immediately after Land Acquisition) .....	7-8
	7.3.3	Long-Term Monitoring Phase .....	7-9
7.4		Monitoring and Adaptive Management Program .....	7-10
	7.4.1	Adaptive Approach .....	7-10
	7.4.2	Definitions .....	7-12
	7.4.3	Scientific Principles .....	7-13
	7.4.4	Monitoring at Multiple Scales .....	7-21
7.5		Monitoring and Adaptive Management by Natural Community Type .....	7-27
	7.5.1	Wetlands (and other Aquatic) .....	7-28
	7.5.2	Grassland .....	7-32
	7.5.3	Chaparral/Scrub .....	7-37
	7.5.4	Oak Woodland .....	7-40
	7.5.5	Streams and Riparian Woodland/Scrub .....	7-44
7.6		Database Development and Reporting .....	7-47
7.7		Budget .....	7-47
Chapter 8		<b>Plan Implementation</b> .....	8-1
	8.1	Overview .....	8-1
	8.2	Implementation Structure .....	8-1
	8.2.1	Participating Local Jurisdictions .....	8-2
	8.2.2	Implementing Entity .....	8-3
	8.2.3	Other Land Management Agencies .....	8-4
	8.2.4	Regulatory Agencies .....	8-4
	8.2.5	Science Advisors .....	8-5
	8.2.6	Public Input .....	8-5
	8.3	Responsibilities of the Implementing Entity .....	8-7
	8.3.1	Executive Director .....	8-9
	8.3.2	Scientific Oversight .....	8-9
	8.3.3	Real-Estate Activities .....	8-10
	8.3.4	Grant Administration .....	8-10
	8.3.5	Budget Analysis .....	8-10
	8.3.6	GIS/Database Maintenance .....	8-10
	8.3.7	Preserve Management and Monitoring .....	8-11
	8.3.8	Legal and Financial Services .....	8-15
	8.3.9	Consultants and Contractors .....	8-16
	8.4	Participating Special Entities .....	8-16
	8.5	Local Implementing Ordinances .....	8-17
	8.6	Land Acquisition .....	8-18
	8.6.1	Stay-Ahead Provision .....	8-19
	8.6.2	Land Acquired by Other Organizations or through Partnerships .....	8-23
	8.6.3	Conservation Easements .....	8-27
	8.6.4	Grazing Leases within the Preserve System .....	8-30
	8.6.5	Willing Sellers .....	8-31
	8.6.6	Gifts of Land .....	8-32
	8.6.7	Land Dedication In Lieu of Development Fee .....	8-32

8.7	Roles and Responsibilities in Reviewing Applications for Take Authorization .....	8-34
8.7.1	Implementing Entity Responsibilities.....	8-35
8.7.2	CDFG and USFWS Responsibilities .....	8-36
8.8	Implementing Agreement.....	8-37
8.9	Data Tracking.....	8-37
8.9.1	Data Repository Development and Maintenance.....	8-37
8.9.2	Compliance Tracking .....	8-39
8.10	Reporting .....	8-40
8.11	Schedule .....	8-43
8.11.1	0–6 Months .....	8-43
8.11.2	6 Months–1 Year.....	8-44
8.11.3	1–5 Years.....	8-44
8.11.4	6–30 years .....	8-44
8.11.5	More than 30 Years.....	8-45
Chapter 9	<b>Funding</b> .....	9-1
9.1	Cost to Implement the HCP/NCCP .....	9-1
9.2	Cost Estimate Methodology .....	9-2
9.2.1	Program Administration.....	9-2
9.2.2	Land Acquisition.....	9-5
9.2.3	Management, Restoration/Creation, and Recreation Planning and Design.....	9-7
9.2.4	Habitat Restoration/Creation.....	9-9
9.2.5	Environmental Compliance .....	9-10
9.2.6	HCP/NCCP Preserve Management and Maintenance.....	9-11
9.2.7	Monitoring, Research, and Adaptive Management .....	9-13
9.2.8	Remedial Measures .....	9-15
9.2.9	Contingency .....	9-15
9.3	Funding Sources and Assurances .....	9-15
9.3.1	Mitigation Fees.....	9-17
9.3.2	Local Funding.....	9-33
9.3.3	State and Federal Funding.....	9-35
9.3.4	Funding Adequacy .....	9-39
Chapter 10	<b>Assurances</b> .....	10-1
10.1	Introduction .....	10-1
10.2	Assurances Requested by Permittees .....	10-1
10.2.1	Changed Circumstances.....	10-1
10.2.2	Unforeseen Circumstances.....	10-9
10.2.3	Federal No Surprises .....	10-9
10.2.4	Federal Section 7 Consultations .....	10-10
10.2.5	Federal Section 7 Critical Habitat Designations .....	10-11
10.2.6	State NCCP Assurances.....	10-12
10.2.7	Conservation Contributions by State and Federal Agencies .....	10-12

	10.2.8 Staffing Contributions by State and Federal Agencies .....	10-13
	10.2.9 Assurances to Private Landowners.....	10-13
10.3	Modifications to the Plan.....	10-17
	10.3.1 Administrative Changes .....	10-17
	10.3.2 Minor Modifications .....	10-18
	10.3.3 Major Amendments.....	10-19
Chapter 11	<b>Alternatives to Take</b> .....	11-1
	11.1 Alternatives to Take of San Joaquin Kit Fox.....	11-1
	11.2 Alternatives to Take of Alameda Whipsnake .....	11-2
	11.3 Alternatives to Take of Giant Garter Snake .....	11-3
	11.4 Alternatives to Take of California Red-Legged Frog.....	11-3
	11.5 Alternatives to Take of California Tiger Salamander .....	11-4
	11.6 Alternatives to Take of Longhorn Fairy Shrimp.....	11-5
	11.7 Alternatives to Take of Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp .....	11-6
Chapter 12	<b>Literature Cited</b> .....	12-1
	12.1 Printed References .....	12-1
	12.2 Personal Communications .....	12-23
Chapter 13	<b>List of Preparers</b> .....	13-1
	Jones & Stokes.....	13-1
	Economic and Planning Systems .....	13-2
	Resources Law Group.....	13-2
	Contra Costa County Community Development Department (HCPA Coordinating Agency).....	13-2
<b>Volume II</b>	<b>East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan Appendices</b>	
Appendix A	<b>Glossary</b>	
Appendix B	<b>Implementing Agreement</b>	
Appendix C	<b>Preliminary Analysis of Potential Impacts on Fish in Marsh Creek</b>	
Appendix D	<b>Species Profiles</b>	
Appendix E	<b>Urban-Wildland Interface Design Guidelines</b>	
Appendix F	<b>Template of Implementing Ordinance</b>	
Appendix G	<b>HCP/NCCP Cost Data</b>	
Appendix H	<b>HCP/NCCP Funding Analysis</b>	

Appendix I **List of Acronyms**

Appendix J **Aquatic Resources Inventory, Classification, and Function for East Contra Costa County HCP/NCCP Inventory Area**

# Tables

## At End of Chapter

- ES-1 Species Proposed for Coverage
- ES-2 HCP/NCCP Cost and Funding Overview
- ES-3 Summary Evaluation of Species Proposed for Coverage by the East Contra Costa County HCP/NCCP
- 2-1 Size and Populations of Jurisdictions within the Inventory Area
- 2-2 Grouping of Land Use Designations
- 2-3 Extent of Land Use Designation Types by Jurisdiction for the Inventory Area (acres)
- 2-4 Large Parks and Open Space Areas in the Inventory Area
- 2-5 Detention Basin Construction and Expansion by Contra Costa County Flood Control and Water Conservation District
- 3-1 Hierarchical Classification of Land-Cover Types
- 3-2 Land-Cover Types Cross Referenced to Other Classification Systems
- 3-3 Land-Cover Types in the Inventory Area
- 3-4 Land-Cover Types that May Be Federal or State Jurisdictional Waters
- 3-5 Potential Jurisdictional Wetlands and Waters in the Inventory Area
- 3-6 Land-Cover Types That Are Potential California Department of Fish and Game Jurisdictional Waters
- 3-7 Evaluation of Special-Status Species in East Contra Costa County for Coverage in the ECCC HCP/NCCP
- 3-8 Special-Status Species Proposed for Coverage

- 3-9 Association of Land-Cover Types with Covered Species
- 4-1 Potential Indirect Adverse Impacts on Covered Species from Urban Development and Operation of the HCP/NCCP Preserve System
- 4-2 Direct Impacts on Land-Cover Types and Covered Natural Communities under Initial Urban Development Area Scenario (acres)
- 4-3 Direct Impacts on Land-Cover Types and Covered Natural Communities under Maximum Urban Development Area Scenario (acres)
- 4-4 Direct Impacts on Covered Species under Initial Urban Development Area Scenario (acres)
- 4-5 Direct Impacts on Covered Species under Maximum Urban Development Area Scenario (acres)
- 4-6 Known Occurrences of and Potential Impacts on Covered Plants in the Inventory Area
- 4-7 Estimated Overlap of Critical Habitat with HCP/NCCP Covered Activities (acres)
- 4-8 Potential Impacts on Land-Cover Types from Urban Development in Antioch
- 5.1 Natural Community-Level and Additional Species-Specific Biological Goals and Objectives and Associated Conservation Measures
- 5-2 Relationship of Conservation Measure Type to Conservation Scale
- 5-3 Land-Cover Types in Acquisition Analysis Zones
- 5-4 Land Acquisition Requirements by Acquisition Analysis Zone
- 5-5a Required Preservation Ratios and Estimated Acquisition Requirements for Aquatic Land-Cover Types under Initial Urban Development Area
- 5-5b Required Preservation Ratios and Estimated Acquisition Requirements for Aquatic Land-Cover Types under Maximum Urban Development Area

- 5-6 Minimum Distance from Dense Urban Development Required for Aquatic Land-Cover Types to Count Toward Land Acquisition or Restoration/Creation Requirements
- 5-7 Land Acquisition Requirements for Terrestrial Land-Cover Types under the Initial Urban Development Area Scenario (acres)
- 5-8 Land Acquisition Requirements for Terrestrial Land-Cover Types under the Maximum Urban Development Area Scenario (acres)
- 5-9 Estimated Minimum and Maximum Size of Preserve System under each Urban Development Area Scenario (acres)
- 5-10 Land Acquisition Requirements for Zone 4 for Natural Land-Cover Types (acres)
- 5-11 Land Acquisition Requirements in Zones 5 and 6 under Each Urban Development Area Scenario (acres)
- 5-12 Estimates of the Range of Selected Covered Plant Species Included in HCP/NCCP Preserves (acres)
- 5-13 Estimates of Modeled Habitat for Covered Wildlife Species Included in HCP/NCCP Preserve System
- 5-14 Minimum Land Acquisition Requirements for Annual Grassland in Zone 2 (acres)
- 5-15 Jump-Start Guidelines
- 5-16 Restoration and Creation Requirements for Land-Cover Types under Initial Urban Development Area Scenario
- 5-17 Restoration and Creation Requirements for Land-Cover Types under Maximum Urban Development Area Scenario
- 5-18 Requirements for Enhancement, Restoration, and Creation of Land-Cover Types
- 5-19 Partial List of Potential Management Measures to Enhance Covered Species Habitat on Cultivated Agricultural Lands
- 5-20 Protection Requirements for Covered Plants
- 5-21 Interim Conservation in the Inventory Area
- 6-1 Summary of Survey Requirements and Best Management Practices for Key Covered Wildlife Species

- 6-2 Stream Setback Requirements for Streams within the Urban Development Area
- 6-3 Recommended Setbacks to Preserve Riparian and Stream Function (from studies throughout the United States)
- 6-4 Regulatory Guidance on Stream Setbacks
- 6-5 No-Take Species (Extremely Rare Plants and Fully Protected Species)
- 6-6 Conditions on Rural Road Projects Covered by the HCP/NCCP
- 7-1 Example Performance Indicators for Monitoring Effectiveness of Key Conservation Measures
- 7-2 Potential Experimental Pilot Projects
- 9-1 Summary of East Contra Costa County HCP/NCCP Implementation Costs (Rounded to the Nearest \$10,000) for Initial Urban Development Area
- 9-2 Summary of East Contra Costa County HCP/NCCP Implementation Costs (Rounded to the Nearest \$10,000) for Maximum Urban Development Area
- 9-3 Public Funding Sources for HCPs/NCCPs in California
- 9-4 HCP/NCCP Development Fee
- 9-5 Wetland Fee and Acreage Determination Methods
- 9-6 Rural Road Fees
- 9-7 Fee Adjustment Indices
- 9-8 HCP/NCCP Cost and Funding Overview
- 9-9 Estimated Funding Availability for Post-Permit Management and Monitoring

# Figures

## At End of Chapter

- 1-1 Inventory Area
- 1-2 Place Names in the Inventory Area
- 2-1 Land Use Designation Types
- 2-2 Publicly Owned Open Space, Private Lands with Conservation Easements and Public Facilities with Undeveloped Land
- 2-3 Initial Urban Development Area
- 2-4 Location of Covered Rural Infrastructure Projects
- 3-1 Topography of the Inventory Area
- 3-2 Watersheds, Streams and Drainages in the Inventory Area
- 3-3 Landcover in the Inventory Area
- 4-1 Impact of Initial Urban Development Area on Modelled Habitat Distribution for San Joaquin Kit Fox
- 4-2 Impact of Initial Urban Development Area on Modelled Habitat Distribution for Alameda Whipsnake
- 4-3 Impact of Initial Urban Development Area on Modelled Habitat Distribution for California Red-Legged Frog
- 4-4 Impact of Initial Urban Development Area on Modelled Habitat Distribution for Recurved Larkspur
- 5-1 Acquisition Analysis Zones and Sub-Zones
- 5-2 Acquisition Priorities with Initial Urban Development Area
- 5-3 Acquisition Priorities with Maximum Urban Development Area
- 5-4 Byron Airport Avoidance and Preservation Program Alternative

- 5-5 Potential Primary Movement Routes for San Joaquin Kit Fox
- 5-6 Southwestern End of Los Vaqueros Reservoir, Looking Southwest
- 5-7 Briones Valley at the Northwestern End Looking West
- 5-8 Deer Valley near the Roddy Ranch Golf Course Looking Northwest into Black Diamond Mines Regional Park
- 5-9 Roddy Ranch Golf Course Looking Northwest into Deer Valley
- 5-10 Sand Creek and the Lone Tree Valley from Black Diamond Mines Regional Park, looking east
- 5-11 Needed Regional Connections with HCP/NCCP Preserve System under the Maximum Urban Development Area
- 5-12 Lands Conserved During Preparation of the HCP/NCCP
- 6-1 Process for Project Approval under HCP/NCCP
- 7-1 Flowchart of the Adaptive Management Process
- 7-2 Continuum of Experimental Management
- 7-3 Timing of Monitoring Phases
- 7-4 Adaptive Management Concept Model
- 7-5 Example Stress-Response Model 1
- 7-6 Example Stress Response Model 2
- 8-1 Organizational Structure of HCP/NCCP Implementation
- 8-2 Potential Organizational Functions and Roles of Implementing Entity
- 8-3 Land Acquisition Process for East Contra Costa County HCP/NCCP
- 9-1 Development Fee Zones