Economic Analysis of Critical Habitat Designation for the San Jacinto Valley Crownscale

Prepared for:

U.S. Fish and Wildlife Service
Division of Economics
Arlington, Virginia

Prepared by:

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This report addresses the economic effects associated with the designation of critical habitat for the San Jacinto Valley crownscale (*Atriplex coronata* var. *notatior,* hereafter "crownscale"). The U.S. Fish and Wildlife Service (hereafter "Service") published a proposed rule designating critical habitat for the crownscale in the *Federal Register* on October 6, 2004.[1] The purpose of this report is to identify and estimate the economic effects associated with the proposed designation of critical habitat for the crownscale. The analysis attempts to quantify the economic effects associated with the proposed critical habitat designation (CHD) by taking into account the cost of conservation-related measures that are likely to be associated with future economic activities that may adversely affect the habitat within the proposed boundaries. The analysis also includes the cost of measures voluntarily undertaken by government and non-profit entities to conserve crownscale habitat. Economic costs are measured here in terms of the impacts of the listing and the CHD on the efficient use of society's resources, as well as how those costs are distributed across segments of society. This analysis is intended to assist the Secretary in determining whether the benefits of excluding particular areas from the final designation outweigh the biological benefits of including those areas in the final designation. This analysis is consistent with the designation as described in the proposed rule. As such, this analysis does not reflect potential changes to the proposed CHD in the final rule. Description of the habitat designation in the final rule may consequently differ from that presented in this analysis.

The crownscale is an annual plant in the goosefoot family (*Chenopodiaceae*), and is a bushy, erect plant with grayish leaves that grows about 4 to 12 inches tall. The crownscale is restricted to highly alkaline and silty-clay soils found in certain alkali sink scrub, alkali playa, vernal pool, and annual alkali grassland habitats. It occupies seasonal wetlands, including vernal pools and floodplains typically flooded by winter rains. The Service proposed endangered status for the crownscale on December 15, 1994, in a proposed rule which included three other plant species.[2] Following an extended comment period, the Service published a final rule listing the crownscale as endangered in the October 13, 1998, edition of the Federal Register.[3]

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1 U.S. Fish and Wildlife Service, October 6, 2004, "Proposed Designation of Critical Habitat for *Atriplex coronata* var. *notatior* (San Jacinto Valley crownscale), Proposed Rule," *Federal Register,* Vol. 69, No. 193, pp. 59844-59859.

2 U.S. Fish and Wildlife Service, December 15, 1994, "Proposed Rule to List Four Southwestern California Plants as Endangered or Threatened, Proposed Rule," *Federal Register*, Vol. 59, No. 240, pp. 64812-64823.

3 U.S. Fish and Wildlife Service, October 13, 1998, "Determination of Endangered or Threatened Status for Four Southwestern California Plants from Vernal Wetlands and Clay Soils, Final Rule" *Federal Register*, Vol. 63, No. 197, pp. 54975-54994.

SCOPE OF THE ANALYSIS

The crownscale critical habitat economic analysis applies a distinct analytical framework, as outlined in Section 1.2. The framework includes the following elements:

- Consistent with recent court rulings, the analysis includes impacts that occur co-extensively with the listing under the Act. Enforcement actions taken in response to violations of the Act are not included.

- The analysis considers conservation and protection efforts for the crownscale. No distinction is made between impacts that occur due to listing and those that result from the CHD. It also includes any protective measures taken as a result of other Federal, State, or local laws that aid habitat conservation in the areas identified in the proposed rule.

- Inevitably, actions taken to protect crownscale provide benefits to other species. Where possible, this analysis addresses this issue by (1) focusing on the costs of conservation efforts rather than general habitat improvements; and (2) excluding activities implemented prior to the final crownscale listing in October 1998. Finally, when conservation efforts are implemented in areas of habitat overlap between crownscale and other listed species, the analysis includes the full costs of the conservation efforts as co-extensive with crownscale and other listed species.

- Both pre-designation and post-designation costs are considered. Pre-designation costs include those that have accrued since the time that the crownscale was listed as endangered (October 1998), but prior to the final designation of critical habitat (October 2005). Post-designation effects include likely future costs associated with crownscale conservation efforts following the final designation of critical habitat in October 2005, effectively 2006 through 2025.

- The geographic scope of the analysis reflects distinct areas identified as essential to the conservation of the crownscale. Most of the essential habitat is located within the approved Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) criteria area. For essential habitat located outside of the MSHCP criteria area (a portion of Unit 2), the MSHCP provides protection for the quality and quantity of runoff entering the conservation area under the MSHCP's Guidelines Pertaining to the Urban/Wildlands Interface.[4] Because of the protective measures afforded the crownscale under the MSHCP, no lands are proposed by the Service as critical habitat for the crownscale. These essential habitat lands are all located within Riverside County, California.

- The geographic unit of analysis is the area defined by the Service as each of three units, as shown on the map included as a Map Attachment to this report.

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[4] Personal communication with Service Biologist, Carlsbad Fish and Wildlife Office, April 7, 2005.

- The localized economic efficiency effects reflect the area specifically identified as essential habitat excluded from proposed critical habitat. However, activities occurring in adjacent land or beyond the boundaries of the essential habitat with the potential to affect essential habitat, such as water quantity and quality, are also considered when appropriate. Thus, all relevant costs in adjacent areas may be included.

- This analysis utilizes a "with" and "without" framework, and emphasizes those effects that are determined to be attributable to crownscale conservation efforts. Impacts that would have occurred without the crownscale listing and CHD are evaluated on a case-by-case basis to determine if they are driven, in part, by conservation efforts for the crownscale.

- The period of analysis and discounting is guided by the availability of information concerning the start date and duration of the activity. Each potential cost component is examined over the time period that is appropriate for that specific activity or investment. Some of these are costs that are incurred one time only, while others are recurring. These costs are presented in undiscounted dollars[5] and as net present values and annualized costs, using three and seven percent discount rates.

PROPOSED CRITICAL HABITAT

The Service has identified approximately 15,232 acres of habitat in Riverside County as essential for the conservation of the crownscale ("essential habitat"). All of the essential habitat areas are protected by the approved Western Riverside County MSHCP in Riverside County. The Service evaluated the conservation efforts afforded crownscale under the MSHCP and excluded all essential habitat lands from the proposed designation of critical habitat for the crownscale, pursuant to section 4(b)(2) of the Act (see Section 1.8.1). Because all essential habitat areas have been excluded from the proposal, no lands are proposed for designation of critical habitat for the crownscale.[6] Therefore, this analysis considers only the essential habitat for the crownscale that have been excluded from critical habitat ("excluded lands").

The Service has identified three units of essential habitat for the crownscale, based on the location of primary constituent elements and populations of the plants. The three units are described briefly below, and shown on the map included as a Map Attachment to this report.

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5 "Undiscounted" dollars represent the sum of the future costs in 2005 dollars that are not adjusted for inflation (expected changes in purchasing power).

6 U.S. Fish and Wildlife Service, October 6, 2004, "Proposed Designation of Critical Habitat for *Atriplex coronata* var. *notatior* (San Jacinto Valley crownscale), Proposed Rule," *Federal Register,* Vol. 69, No. 193, pp. 59844-59859.

Unit 1: San Jacinto River

The San Jacinto River Unit encompasses approximately 12,046 acres and includes two occurrence complexes of the crownscale: (1) the San Jacinto River floodplain at the San Jacinto Wildlife Area/Mystic Lake (Wildlife Area); and (2) the San Jacinto River floodplain between the Ramona Expressway and Railroad Canyon Reservoir. Just over half of the unit is privately owned (6,535 acres), with the remainder (5,511 acres) owned by the California Department of Fish and Game (CDFG).

Unit 2: Salt Creek (Hemet)

The Salt Creek (Hemet) Unit is located west of Hemet, and is comprised of approximately 3,154 acres of privately owned land. The unit includes one occurrence complex, the Upper Salt Creek Vernal Pool Complex in the west Hemet area, and provides the watershed that maintains the ecological function of the vernal pool complex supporting the crownscale.

Unit 3: Alberhill Creek

The smallest of the essential habitat units identified for crownscale, the Alberhill Creek Unit, includes about 32 acres of privately owned land. This unit supports one known occurrence complex in the Alberhill Creek floodplain north of Lake Elsinore. The unit is made up of a small pocket of Willows soils within the floodplain of Alberhill Creek, bounded on the north by Nichols Road and on the south by a large stand of riparian vegetation.

SUMMARY OF RESULTS

This section addresses the economic effects of conservation efforts attributable to both the listing of the crownscale under the Act (pre-designation) and the designation of critical habitat (post-designation). The analysis measures effects on residential, commercial, and industrial development, flood control facilities, pipelines, public lands management, and transportation. All costs are presented in 2005 dollars. Total post-designation costs are presented in undiscounted dollars and with a three percent and seven percent discount rate. Annualized post-designation costs are also presented using three percent and seven percent discount rates.

Table ES-1 provides a summary of the economic impacts due to crownscale conservation efforts in essential habitat for each of the activities analyzed. Pre-designation costs total $3.9 million, with water pipelines bearing $2.7 million of the costs. The pipeline costs are associated with the Inland Pipeline Project and the Eastside Pipeline Project. The remainder of the pre-designation costs is split among public lands, development, and flood control. Post-designation costs are estimated to total $31.8 to $110.8 million in undiscounted dollars, or $23.6 to $82.4 million and $16.8 to $58.8 million in present value terms using a discount rate of three percent and seven percent, respectively. Annualized costs are estimated to range from $1,589,000 to $5,541,300 and $1,588,100 to $5,545,700, also at three and seven percent, respectively.

The annualized costs at discount rates of three and seven percent are similar, and the similarity is a function of (1) the unknown timing of many of the projects or activities, and (2) recurring equal undiscounted dollar costs for projects or activities during the post-designation period. When the timing of a project or activity is unknown or uncertain, the costs are assumed to have a uniform probability of occurrence across the future years. As such, the annualized post-designation costs at three and seven percent discount rates are equal for that particular project or activity. Similarly, with an undiscounted recurring cost during the forecast period, the annualized post-designation costs for that particular project or activity is equal regardless of discount rate. In this analysis, many of the conservation costs consist primarily of projects and activities of unknown timing, or with recurring undiscounted dollar costs during the post-designation period. Thus, the annualized costs at three and seven percent discount rates are similar. Costs and timing for each project and activity analyzed in this report are discussed in Sections 5.0 and 6.0, and are summarized below:

- Pre-Designation Development Projects: The annual conservation costs are equal during the post-designation period (i.e., $7,640 in annual monitoring, maintenance, and operating costs during the post-designation period).

- Post-Designation Development Projects: The annual conservation costs, a function of the number of acres developed to low-, medium-, and high-density residential, commercial, and industrial land classes, vary with the forecasted annual population growth rate for the county during the post-designation period. The forecasted development and conservation costs vary by year, but not significantly, resulting in similar annualized costs when discounted at three and seven percent.

- Transportation Projects: Four transportation projects are expected during the 2006 to 2009 period; the timing for one project is known and the timing of the remaining three projects is unknown. Likewise, the timing of the 16 projects forecast during the 2010-2025 period is also unknown. The analysis assigns an equal probability of occurrence to conservation costs being incurred in each year within respective timeframes (i.e., 2006-2009 or 2010-2025) for those projects with unknown timing.

- San Jacinto Valley Flood Control Project: The timing of the project is unknown, and the analysis assigns an equal probability of occurrence across the 20 year time frame to project modification costs.

- San Jacinto Valley Wildlife Area: The timing of conservation costs (i.e., approximately $5,000 in vernal playa conservation efforts every third year) are unknown, and the analysis assigns an equal probability of occurrence to conservation costs being incurred in each year across the 20 year time frame of the analysis.

- Administrative Cost of Section 7 Consultation: The timing of section 7 consultations is unknown and the analysis assigns a uniform probability across the 20 year time frame to administrative consultation costs being incurred.

Table ES-1
Summary of Administrative and Conservation Costs for Crownscale, by Activity[a/]

Category of Impact	Pre-Designation (Total) (1998-2005)	Post-Designation (Total) (2006-2025)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Development	$977,200	$6,099,000 - $15,030,600	$4,575,800 - $11,279,700	$3,295,100 - $8,125,500	$307,600 - $758,200	$311,000 - $767,000
Flood Control	$213,200	$20,000,000 - $90,000,000	$14,902,000 - $66,973,000	$10,611,100 - $47,690,100	$1,001,600 - $4,501,600	$1,001,600 - $4,501,600
Pipelines	$2,702,400	$0	$0	$0	$0	$0
Public Lands	$0 - $13,300	$0 - $46,700	$0 - $24,800	$0 - $17,700	$0 - $1,700	$0 - $1,700
Transportation	$0	$5,656,500	$4,161,800	$2,917,300	$279,800	$275,400
Total Essential Habitat	**$3,892,700 - $3,906,100**	**$31,787,800 - $110,766,100**	**$23,639,500 - $82,439,200**	**$16,823,600 - $58,750,600**	**$1,589,000 - $5,541,300**	**$1,588,100 - $5,545,700**

a/ Tables ES-1 and ES-2 include both the administrative costs (provided in Table ES-3) and the conservation costs (provided in Table ES-4).

Note: Numbers may not sum due to rounding.

RESULTS BY CRITICAL HABITAT UNIT

Table ES-2 provides a summary of the economic impacts due to crownscale conservation efforts by habitat unit. The costs include all of the categories of impacts shown in Table ES-1. Pre-designation costs range from $0 in Unit 3, Alberhill Creek, to $2.8 million in Unit 2, Salt Creek. Both Unit 1, San Jacinto River, and Unit 2, Salt Creek, have costs associated with water pipeline projects. Total post-designation costs are also concentrated in Units 1 and 2, 70 to 85 percent and 15 to 30 percent, respectively. Estimated post-designation costs in Unit 1 are associated primarily with flood control, transportation, and development, while post-designation costs in Unit 2 are associated with development and transportation.

Table ES-3 provides a summary of administrative costs that have occurred (pre-designation) or are anticipated to occur (post-designation) associated with section 7 consultations and CHD. An estimated cost of about $115,500 has occurred prior to the designation, with 70 percent incurred by action agencies. After designation, approximately $800,000 in post-designation administrative costs are forecast (in undiscounted dollars), or $613,500 and $437,500 in present value terms using a discount rate of three

percent and seven percent, respectively. Annualized costs are estimated at approximately $41,300, and it is anticipated that action agencies will incur about 70 percent of these costs.[7]

Table ES-2
Summary of Administrative and Conservation Costs by Unit[a/]

Habitat Unit	Pre-Designation (Total) (1998-2005)	Post-Designation (Total) (2006-2025)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Unit 1 - San Jacinto River	$1,099,200 - $1,112,500	$22,355,300 - $94,334,900	$16,600,300 - $70,146,900	$11,791,100 - $49,933,100	$1,115,700 - $4,714,900	$1,113,000 - $4,713,400
Unit 2 -Salt Creek	$2,793,700	$9,425,400 - $16,410,700	$7,034,000 - $12,277,000	$5,028,600 - $8,806,400	$472,800 - $825,200	$474,700 - $831,300
Unit 3 - Alberhill Creek	$0	$7,100 - $20,500	$5,400 - $15,400	$3,800 - $11,100	$300 - $1,000	$400 - $1,000
Total Essential Habitat	**$3,892,700 - $3,906,100**	**$31,787,800 - $110,766,100**	**$23,639,500 - $82,439,200**	**$16,823,600 - $58,750,600**	**$1,588,900 - $5,541,200**	**$1,588,100 - $5,545,700**

a/ Tables ES-1 and ES-2 include both the administrative costs (provided in Table ES-3) and the conservation costs (provided in Table ES-4).

Note: Numbers may not sum due to rounding.

Table ES-3
Summary of Administrative Costs by Agency

Agency	Pre-Designation (Total) (1998-2005)	Post-Designation (Total) (2006-2025)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Action Agency	$80,900	$593,100	$441,400	$314,800	$29,700	$29,700
Service	$19,100	$129,600	$96,400	$68,800	$6,400	$6,400
Third Party	$15,600	$101,500	$75,700	$53,900	$5,100	$5,100
Total Essential Habitat	**$115,500**	**$824,200**	**$613,500**	**$437,500**	**$41,300**	**$41,300**

Note: Numbers may not sum due to rounding.

Table ES-4 provides a summary of conservation costs by category of landowner. The landowner types that are relevant in this analysis include private, State of California, and local government (cities and Riverside County). Total pre-designation conservation costs of $3.8 million are concentrated among local

[7] Because the time frame of the future section 7 consultations is unknown, the analysis assigns a uniform probability to administrative consultation costs being incurred in each year. As a result, the annualized post-designation administrative consultation costs are equal at three and seven percent discount rates.

governments; in particular, conservation costs associated with the water pipelines were borne by the Metropolitan Water District and its customers. Local government also incurred costs for flood control activities. In addition, the State bore costs associated with transportation projects. Private sector costs were related to residential, commercial, and industrial development.

Post-designation costs are concentrated on local government owned lands, which account for 65 to 82 percent of the costs. Local government costs are associated entirely with expected flood control efforts in Unit 1. Private landowners account for another 14 to 20 percent of the costs, primarily through conservation activities imposed on land development. The remaining costs, 5 to 16 percent, are borne by the State. These costs relate primarily to conservation efforts associated with transportation projects.

Table ES-4
Summary of Conservation Costs by Landowner

Landowner	Pre-Designation (Total) (1998-2005)	Post-Designation (Total) (2006-2025)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Local Government	$2,850,900	$20,000,000 - $90,000,000	$14,878,000 - $66,949,000	$10,594,000 - $47,673,000	$1,000,000 - $4,500,000	$1,000,000 - $4,500,000
Private	$926,300	$5,953,600 - $14,885,200	$4,467,600 - $11,171,500	$3,218,100 - $8,048,500	$300,300 - $750,900	$303,800 - $759,700
State Government	$0 - $13,300	$5,010,000 - $5,056,700	$3,680,400 - $3,705,200	$2,574,000 - $2,591,700	$247,400 - $249,100	$243,000 - $244,700
Total Essential Habitat	**$3,777,200 - $3,790,600**	**$30,963,600 - $109,941,900**	**$23,026,000 - $81,825,700**	**$16,386,100 - $58,313,100**	**$1,547,700 - $5,500,000**	**$1,546,800 - $5,504,400**

Note: Numbers may not sum due to rounding.

SUMMARY OF RESULTS BY MAJOR ACTIVITY

FLOOD CONTROL COSTS

The County of Riverside, the Riverside County Flood Control and Water Conservation District, the City of Perris, and the CDFG are developing a flood control project to channelize the San Jacinto River between Ramona Expressway and Railroad Canyon in Unit 1, San Jacinto River. To avoid sensitive habitat, the size of the project was reduced, and six alternatives are under consideration, including the no project alternative. The five feasible project alternatives include partial channelization, conserving more lands, and altering the project so that crownscale sensitive areas still receive water during flood events.

RESIDENTIAL AND COMMERCIAL DEVELOPMENT

As discussed in Section 2.2.2.1, the impact of CHD on residential, commercial, and industrial development may include:

- Cost of project modifications for development (e.g., employ biological monitoring and flagging of vernal pools during construction activities, protect the vernal pool site by fencing and signage, prohibit the planting of exotic plants, and restrict the use of pesticides); and

- Cost of habitat conservation plan-related mitigation fees and activities for development (e.g., seasonally flooded alkali vernal playa (hereafter "vernal playa") habitat restoration, enhancement, creation, and conservation).

In this analysis, development costs are estimated based on the assumption that development is allowed in the designated areas if appropriate project modifications and/or conservation activities are taken, and/or habitat conservation plan-related mitigation fees paid. Thus, this analysis assumes that no land is removed from potential development as a result of development restrictions. The costs for these project modifications and/or habitat conservation plan-related mitigation fees and activities are paid by developers or landowners.

The basis for the development analysis is the open city model, which is considered the most appropriate approach for analyzing the effects of the CHD on development. Inherent in this model is the recognition or understanding that people are unconstrained from moving. Therefore, housing prices will not be affected by the CHD. It is possible that land purchased for mitigation purposes could decrease the supply of developable land; however, the analysis suggests that this will not be a constraint on development.

Although not explicitly written into the Western Riverside County MSHCP, mitigation ratios for impacts to vernal pools typically range from one-to-one (1:1), to three-to-one (3:1). To account for the range of mitigation ratios and the variety of mitigation measures available to the developer for off setting impacts, the analysis presents the potential costs associated with crownscale conservation efforts incurred by developers and landowners as a range.

TRANSPORTATION COSTS

The California Department of Transportation (Cal Trans) has six road projects planned in or around the crownscale essential habitat areas near the east-west Route 74, the north-south Route 215, and Route 79 during 2006 to 2009. In addition, an estimated 16 road projects are forecasted to occur in essential habitat during 2010 through 2025. A suite of conservation efforts and costs for a representative road project is developed for protecting a listed plant during construction activities. Before a project begins, a survey of the area is done to identify the plant species in the proposed project area. If crownscale are identified through the surveys, several measures are available to minimize the disturbance. Fencing areas that include listed plant species, or flagging sensitive plants are avoidance tactics that will likely be used for the crownscale. A qualified biologist may be required to monitor activities in the project area during construction in order to avoid disturbing the crownscale and/or its habitat. It is also likely that seed collection in the project area will be required. Following construction activity, it is typical that monitoring will occur in the project area and/or in the mitigation area. Five years of monitoring is a standard practice for listed species.

PUBLIC LANDS COSTS

The CDFG owns and manages the land in the San Jacinto Wildlife Area in Unit 1, San Jacinto River. The crownscale benefits from the operation of the Wildlife Area, and therefore, at least a portion of the annual management and maintenance budget for the Wildlife Area is attributable to crownscale habitat and species conservation and protection. Furthermore, the Wildlife Area incurs costs to ensure the protection of vernal playa areas. In addition to protecting crownscale habitat, however, the management of the Wildlife Area also provides recreational benefits to hunters and wildlife viewers. The annual benefits associated with recreation activities in the Wildlife Area more than offsets the total annual management and maintenance costs.

Although recreational benefits more than offset management costs at the Wildlife Area, this analysis presents a range of economic costs incurred in the Wildlife Area to conserve the crownscale. Since the recreational benefits are greater than the general management and maintenance expenses, no such expenses are attributed to the crownscale. It is unclear, however, whether expenditures incurred specifically to preserve vernal playa result in additional recreational benefits. Therefore, for both pre-designation and post-designation periods, a range of management costs is presented from zero (assuming additional recreational benefits offset vernal playa conservation costs) to the full cost of conservation efforts to protect vernal playa (assuming no recreational benefit from protection of vernal playa.) Finally, although the Wildlife Area may voluntarily acquire additional crownscale habitat (and recreation lands) in the future, these purchases are transfers between willing sellers and buyers, and do not result in net costs to society. Therefore the total costs attributed to public land management in crownscale essential habitat represent the range of economic costs of protecting vernal playa habitat in the San Jacinto Wildlife Area.

ECONOMIC EFFECTS TO SMALL ENTITIES AND THE ENERGY INDUSTRY

This report presents a screening level analysis of the potential effects of conservation efforts for the crownscale on small entities, including small businesses, organizations, and governments, due to the rulemaking to assist the Service in its certification that the proposed rule will not have a significant economic impact on a substantial number of small entities.[8] In addition, in response to Executive Order 13211 "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," this analysis considers the impacts of conservation efforts on the energy industry and its customers.[9] While small business impacts are discussed, significant impacts on the energy sector are not expected. See Appendix A for an analysis of impacts to small entities and the energy industry.

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8 5 U.S.C. § 601 *et seq.*

9 Executive Order 13211, May 18, 2001, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use."

1.0
INTRODUCTION AND BACKGROUND

This report addresses the economic effects of conservation efforts associated with the listing and proposed critical habitat designation (CHD) for the San Jacinto Valley crownscale (*Atriplex coronata* var. *notatior,* hereafter "crownscale"). The U.S. Fish and Wildlife Service (hereafter "Service") published a proposed rule designating critical habitat for the crownscale in the *Federal Register* on October 6, 2004.[10] This analysis is consistent with the designation as described in the proposed rule. As such, this analysis does not reflect potential changes to the proposed CHD in the final rule. Description of the habitat designation in the final rule may consequently differ from that presented in this analysis.

This analysis is intended to assist the Secretary in determining whether the benefits of excluding particular areas from the designation outweigh the biological benefits of including those areas in the designation.[11] In addition, this information allows the Service to address the requirements of Executive Orders 12866 and 13211, and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).[12] This report also complies with direction from the U.S. 10th Circuit Court of Appeals that "co-extensive" effects should be included in the economic analysis to inform decision-makers regarding which areas to designate as critical habitat.[13]

This section provides the general analytic approach to estimating economic effects, including discussion of both efficiency and distributional effects. Next, it discusses the scope of the analysis, including the link between existing and critical habitat-related protection efforts and economic impacts. Then, it describes the information sources employed to conduct this analysis. Finally, it describes the background of the listing and proposed designation of critical habitat for the crownscale.

1.1 APPROACH TO ESTIMATING ECONOMIC EFFECTS

This economic analysis considers both the economic efficiency and regional economic impacts that may result from species and habitat protection. Economic efficiency effects generally reflect "opportunity costs" associated with the commitment of resources required to accomplish species and habitat

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10 Ibid.

11 16 U.S.C. § 1533(b)(2).

12 Executive Order 12866, September 30, 1993, "Regulatory Planning and Review;" Executive Order 13211, May 18, 2001, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use;" 5 U.S.C. § 601 *et seq*; and Pub. Law No. 104-121.

13 In 2001, the U.S. 10th Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of proposed CHD, regardless of whether those impacts are attributable co-extensively to other causes (*New Mexico Cattle Growers Ass'n vs. U.S.F.W.S.,* 248 F.3d 1277 (10th Cir. 2001)).

conservation. For example, if activities on private lands are limited as a result of the designation or the presence of the species, and thus the market value of the land is reduced, this reduction in value represents one measure of opportunity cost or change in economic efficiency. Similarly, the costs incurred by a Federal action agency to consult with the Service under section 7 of the Endangered Species Act (Act) represent opportunity costs of conservation efforts, given that those resources committed to the consultation process are not available for alternative activities. To the extent possible, the efficiency analysis also measures the distribution of these opportunity costs across groups, such as producers and consumers. For example, some costs related to conservation actions may fall entirely on one group, or may fall on individuals within a group, such as low income farmers. While economic efficiency is concerned with the total change in societal welfare from a given policy or action, and is thus the appropriate measure to ensure efficient use of resources, distributional measures can also be useful to policymakers in assessing who gains and who loses from such policies or actions.

This analysis also addresses the impacts associated with the CHD, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation efforts on small entities, the energy industry, or governments. This information may be used by decision-makers to assess whether the effects of the designation unduly burden a particular economic sector. For example, while habitat conservation efforts may have a small impact relative to the national economy, individuals employed in a particular sector of the regional economy may experience a significant level of impact. The difference between economic efficiency effects and regional economic impacts, as well as their application in this analysis, are discussed in greater detail below.

Where data are available, the analysis attempts to capture the net economic impact imposed on regulated entities and the regional economy of crownscale conservation actions. That is, the economic impact of crownscale conservation to the land management agencies and regulated community net of any direct offsetting benefit they experience.

1.1.1 Efficiency Effects

At the guidance of the Office of Management and Budget (OMB) and in compliance with Executive Order 12866 "Regulatory Planning and Review," Federal agencies measure changes in economic efficiency in order to discern the implications on a societal level of a regulatory action. For regulations specific to the conservation of the crownscale, efficiency effects represent the opportunity cost of resources used, or benefits foregone, by society as a result of the regulations. Economists generally characterize opportunity costs in terms of changes in producer and consumer surplus in affected markets.[14]

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[14] For additional information on the definition of "surplus" and an explanation of consumer and producer surplus in the context of regulatory analysis, see Gramlich, Edward M., 1990, *A Guide to Benefit-Cost Analysis (2nd Ed.)*, Prospect Heights, Illinois: Waveland Press, Inc.; and U.S. Environmental Protection Agency, September 2000, *Guidelines for Preparing Economic Analyses*, EPA 240-R-00-003, http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html.

In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a landowner or manager may enter into a consultation with the Service to ensure that a particular activity will not adversely modify critical habitat. The effort required for the consultation is an economic opportunity cost, because the landowner or manager's time and effort would have been spent in an alternative activity had his or her land not been designated critical habitat. In the case that compliance activity is not expected to significantly affect markets – that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price – the measurement of compliance costs provides a reasonable estimate of the change in economic efficiency.

Where habitat protection measures are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, a designation that precludes the development of large areas of land may shift the price and quantity of housing supplied in a region. In this case, changes in economic efficiency (i.e., social welfare) can be measured by considering changes in producer and consumer surplus in the real estate market.

This analysis begins by measuring costs associated with measures taken to protect species and habitat. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. In the case of the crownscale, compliance costs are in fact expected to represent a reasonable estimate of efficiency effects, and thus impacts on consumer and producer surpluses in affected markets are considered but not estimated.

1.1.2 Distributional and Regional Economic Effects

Measurements of changes in economic efficiency focus on the net impact of conservation efforts across broad aggregates of people (e.g., producers and consumers), without consideration of how certain economic sectors or groups of people (e.g., low income farmers) are affected. As noted above, these distributional or equity effects regarding how efficiency gains or losses are borne may be important to policymakers. In addition, economic efficiency effects do not address issues related to impacts on local or regional economies. Thus, a discussion of efficiency effects alone may miss important distributional considerations, as well as impacts on local economies. OMB encourages Federal agencies to consider these latter effects separately from efficiency effects.[15] This analysis considers several types of these effects, including impacts on small entities; impacts on energy supply, distribution, and use; and regional economic impacts. It is important to note that these impacts on local economies or sectors are fundamentally different measures of economic costs than efficiency effects, and thus cannot be added to or compared with estimates of changes in economic efficiency.

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[15] U.S. Office of Management and Budget, September 17, 2003, "Circular A-4," http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf.

1.1.2.1 Impacts on Small Entities and Energy Supply, Distribution, and Use

This report presents a screening level analysis of the potential effects of conservation efforts for the crownscale on small entities, including small businesses, organizations, and governments, due to the rulemaking to assist the Service in its certification that the proposed rule will not have a significant economic impact on a substantial number of small entities.[16] In addition, in response to Executive Order 13211 "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," this analysis considers the impacts of conservation efforts on the energy industry and its customers.[17] While small business impacts are discussed, significant impacts on the energy sector are not expected. See Appendix A for an analysis of impacts to small businesses and the energy industry.

1.1.2.2 Secondary and Regional Economic Impacts

Regional economic impact analysis can provide an assessment of the potential localized and distributive impacts of proposed conservation efforts. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models, such as those created using IMPLAN modeling software and databases. These models rely on multipliers that mathematically represent the relationship between a change in one sector of the economy (e.g., expenditures by recreationists) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreationists). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy. These additional impacts are referred to as "secondary impacts."

The use of regional input/output models in an analysis of the impacts of species and habitat conservation efforts can overstate the long-term impacts of a regulatory change. Most importantly, these models provide a static view of the economy of a region. That is, they measure the initial impact of a regulatory change on an economy but do not consider long-term adjustments that the economy will make in response to this change. For example, these models provide estimates of the number of jobs lost as a result of a regulatory change, but do not consider re-employment of these individuals over time or other adaptive responses by impacted businesses. In addition, the flow of goods and services across the regional boundaries defined in the model may change as a result of the regulation, compensating for a potential decrease in economic activity within the region.

Despite these and other limitations, in certain circumstances regional economic impact analysis may provide useful information about the scale and scope of localized impacts. It is important to remember that measures of regional economic effects generally reflect shifts in resource use rather than efficiency

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16 5 U.S.C. § 601 *et seq.*

17 Executive Order 13211, May 18, 2001, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use."

losses. Thus, these types of secondary impacts are reported separately from efficiency effects (i.e., not summed). In addition, measures of regional economic impact cannot be compared with estimates of efficiency effects, but should be considered as distinct measures of impact.

Because this report assumes that development is not restricted by CHD, and that the developers will use mitigation to address crownscale conservation concerns, it is not appropriate to measure secondary and regional impacts. Therefore, regional economic impact analysis is not part of this analysis.

1.2 SCOPE OF THE ANALYSIS

This analysis identifies those economic activities believed to most likely threaten the listed species and its habitat and, where possible, quantifies the economic impact to avoid, mitigate, or compensate for such threats within the boundaries of the CHD. In instances where critical habitat is being proposed after a species is listed, some future impacts may be unavoidable, regardless of the final designation and exclusions under section 4(b)(2). However, due to the difficulty in making a credible distinction between listing and critical habitat effects within critical habitat boundaries, this analysis considers all future conservation-related impacts to be co-extensive with the designation.[18]

Co-extensive effects may also include impacts associated with overlapping protective measures of other Federal, State, and local laws that aid habitat conservation in the areas proposed for designation. It is noted that in past instances, some of these measures have been precipitated by the listing of the species and impending designation of critical habitat. Because habitat conservation efforts affording protection to a listed species likely contribute to the efficacy of the CHD efforts, the impacts of these actions are considered relevant for understanding the full effect of the proposed CHD. Enforcement actions taken in response to violations of the Act, however, are not included.

The crownscale critical habitat economic analysis includes the following items:

- Consistent with recent court rulings, the analysis includes impacts that occur co-extensively with the listing under the Act. Enforcement actions taken in response to violations of the Act are not included.

- The analysis considers conservation and protection efforts for the crownscale. No distinction is made between impacts that occur due to listing and those that result from the CHD. It also

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[18] In 2001, the U.S. 10th Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of proposed CHD, regardless of whether those impacts are attributable co-extensively to other causes (*New Mexico Cattle Growers Ass'n vs. U.S.F.W.S.,* 248 F.3d 1277 (10th Cir. 2001)). In 2004, the U.S. 9th Circuit invalidated the Service's regulation defining destruction or adverse modification of critical habitat (*Gifford Pinchot Task Force v. United States Fish and Wildlife Service)*. The Service is currently reviewing the decision to determine what effect it (and to a limited extent *Center for Biological Diversity v. Bureau of Land Management* (Case No. C-03-2509-SI, N.D. Cal.)) may have on the outcome of consultations pursuant to section 7 of the Act.

includes conservation efforts at the State or local level that are the result of either the listing or CHD.

- Inevitably, actions taken to protect crownscale provide benefits to other species. Where possible, this analysis addresses this issue by (1) focusing on the costs of conservation efforts rather than general habitat improvements; and (2) excluding efforts implemented prior to the final crownscale listing in October 1998. Finally, when conservation efforts are implemented in areas of habitat overlap between crownscale and other listed species, the analysis includes the full costs of the conservation efforts as co-extensive with crownscale and other listed species.

- Both pre-designation and post-designation costs are considered. Pre-designation costs include those that have accrued since the time that the crownscale was listed as endangered (October 1998), but prior to the final designation of critical habitat (October 2005). Post-designation effects include likely future costs associated with crownscale conservation efforts following the final designation of critical habitat in October 2005, effectively 2006 through 2025.

- The geographic scope of the analysis reflects distinct areas identified as essential to the conservation of the crownscale. All essential habitat is protected by the approved Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). For essential habitat located outside of the MSHCP conservation area (a portion of Unit 2), the MSHCP provides protection for the quality and quantity of runoff entering the conservation area under the MSHCP's Guidelines Pertaining to the Urban/Wildlands Interface.[19] Because of the protective measures afforded the crownscale under the MSHCP, no lands are proposed by the Service as critical habitat for the crownscale. These essential habitat lands are all located within Riverside County, California.

- The geographic unit of analysis is the area defined by the Service as each of three units, as shown on the map included as a Map Attachment to this report.

- The localized economic efficiency effects reflect impacts in the areas specifically identified as essential habitat, which are excluded from critical habitat in the proposed rule. However, efforts occurring in adjacent land or beyond the boundaries of the essential habitat with the potential to affect attributes within essential habitat, such as water quantity and quality, are also considered when appropriate.

- This analysis utilizes a "with" and "without" framework, and emphasizes those effects that are determined to be attributable to crownscale conservation efforts. Impacts that would have occurred without the crownscale listing and CHD are evaluated on a case-by-case basis to determine if they are driven, in part, by conservation efforts for the crownscale.

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[19] Personal communication with Service Biologist, Carlsbad Fish and Wildlife Office, April 7, 2005.

- The period of analysis and discounting is guided by the availability of information concerning the start date and duration of the activity. Each potential cost component is examined over the time period that is appropriate for that specific activity or investment. Some of these are costs that are incurred one time only, while others are recurring. These costs are presented in undiscounted dollars[20] and as net present values and annualized costs, using three and seven percent discount rates.

1.2.1 SECTIONS OF THE ACT RELEVANT TO ECONOMIC ANALYSIS

The analysis focuses on activities that are influenced by the Service through sections 4, 7, 9, and 10 of the Act. Section 4 of the Act focuses on the listing and recovery of endangered and threatened species, as well as CHD. Pursuant to this section, the Secretary is required to list species as endangered or threatened "solely on the basis of the best scientific and commercial data available."[21]

The protections afforded to threatened and endangered species and their habitat are described in sections 7, 9, and 10 of the Act. The economic effects of these protections are considered in this analysis:

- Section 7 of the Act requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of the species' designated critical habitat. The administrative costs of these consultations, along with the costs of project modifications resulting from these consultations, represent compliance costs associated with the listing of the species and the designation of critical habitat.[22]

- Section 9 defines the actions that are prohibited by the Act, and in particular, prohibits the "take" of endangered wildlife. The term "take" means to "harass, harm, pursue, ... or collect, or to attempt to engage in any such conduct."[23] The economic impacts associated with this section manifest themselves in sections 7 and 10. While the prohibition against "take" does not apply to plant species such as the crownscale, the Service is obligated to ensure that proposed activities adequately minimize the impact to the species.

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20 "Undiscounted" dollars represent the sum of the future costs in 2005 dollars that are not adjusted for inflation (expected changes in purchasing power).

21 16 U.S.C. § 1533.

22 The Service notes, however, that a recent Ninth Circuit judicial opinion, *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, has invalidated the Service's regulation defining destruction or adverse modification of critical habitat. The Service is currently reviewing the decision to determine what effect it (and to a limited extent *Center for Biological Diversity v. Bureau of Land Management* (Case No. C-03-2509-SI, N.D. Cal.)) may have on the outcome of consultations pursuant to section 7 of the Act.

23 16 U.S.C. § 1532.

- Under section 10(a)(1)(B) of the Act, an entity (e.g., a landowner or local government) may develop a Habitat Conservation Plan (HCP) for a species in order to meet the conditions for issuance of an incidental take permit in connection with the development and management of a property.[24] The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately minimized and mitigated. The designation of critical habitat does not require completion of an HCP; however, the designation may influence conservation efforts provided under HCPs. While HCPs are not developed solely for plant species, if listed plants occur in the area subject to the HCP, the Service must consider whether the proposed activities may adversely affect or jeopardize the continued existence of the plant species. In the case of the crownscale, all areas of essential habitat are protected by an existing HCP and have been excluded from proposed critical habitat (see Section 4.3).

1.2.2 Other Relevant Protection Efforts

The protection of listed species and habitat is not limited to the Act. Other Federal agencies, as well as State and local governments, may also seek to protect the natural resources under their jurisdiction. In general, economic impacts will be evaluated regardless of whether or not species protection efforts required by the Act are also required by other Federal agencies or State or local governments. The impact of these protection efforts will be treated as "co-extensive" with, or attributable to, crownscale listing and designation. Examples of these types of regulations include, but are not limited to, the California Environmental Quality Act (CEQA) and Section 404 of the Clean Water Act (CWA).

In some cases, non-habitat related regulations will limit land use activities within critical habitat in ways that will directly or indirectly benefit the crownscale or its habitat. For example, local zoning ordinances that specify the amount and type of development that may occur, if any, in a certain area may benefit the crownscale and its habitat. The impact of these types of local, non-habitat related regulations and land use controls are not considered "co-extensive," with or attributable to the crownscale listing and designation. Examples of these types of local regulations or controls include, but are not limited to, local zoning ordinances and local hillside of view shed protection ordinances.

1.2.3 Additional Analytic Considerations

Previous economic impact analyses prepared to support critical habitat decisions have considered other types of economic impacts related to conservation efforts associated with CHD, including time delay, regulatory uncertainty, and stigma impacts. This analysis considers these other types of economic impacts that can be a consequence of crownscale CHD, as described below.

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[24] U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," http://endangered.fws.gov/hcp/, accessed August 6, 2002. Sections 9 and 10 of the Act do not apply to plants. While HCPs are not typically developed specifically for listed plant species, an HCP may include listed or non-listed plant species that may be affected by the project subject to the HCP.

1.2.3.1 Stigma Effects

Stigma refers to the change in economic value of a particular project or activity due to negative (or positive) perceptions of the role critical habitat will play in developing, implementing, or conducting that project or activity. For example, "stigma effects" could include changes to private property values associated with public attitudes about the limits and costs of implementing a project in critical habitat. Stigma effects are a form of uncertainty that relate more to perceived fluctuations rather than observation, when there is limited information on actual outcomes. There is currently a void of peer-reviewed literature that has successfully identified or attempted to quantify empirical estimates of stigma effects. As such, while there is a potential for some developable land to be subject to short-term stigma effects due to uncertain regulatory requirements, no attempt is made to estimate its magnitude.

1.2.3.2 Time Delay and Regulatory Uncertainty

In addition to direct costs of consultation and project modification associated with crownscale conservation efforts, the analysis considers potential indirect impacts, such as may result from project delays. Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the section 7 consultation process and/or compliance with other laws associated with the designation. The need to conduct a section 7 consultation will not necessarily delay a project, as often the consultation may be coordinated with the existing regulatory approval process. However, depending on the schedule of the consultation, a project may experience additional delays, resulting in an unanticipated extension in the time needed to fully realize returns from the planned activity. Delays of this nature were considered in the development of this analysis and it was determined that they may result in an impact that is not likely to materially change the quantitative results of this analysis.

Regulatory uncertainty costs can occur in anticipation of having to modify project parameters, and might include, for example, project proponents retaining outside experts or legal counsel to better understand their responsibilities with regard to critical habitat.

1.2.3.3 Other Impacts

Under certain circumstances, CHD may provide new information to a community about the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under other State or local laws. In cases where these costs would not have been triggered absent the CHD, they are included in this economic analysis. In this regard, the analysis considers the extent to which the crownscale CHD might trigger the completion of an environmental impact report (EIR) under the California Environmental Quality Act (CEQA).

1.2.4 BENEFITS

Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.[25] OMB's Circular A-4 distinguishes two types of economic benefits: direct benefits and ancillary benefits. Ancillary benefits are defined as favorable impacts of a rulemaking that are typically unrelated, or secondary, to the statutory purpose of the rulemaking.[26]

In the context of CHD, the primary purpose of the rulemaking (i.e., the direct benefit) is the potential to enhance conservation of the species. The published economics literature has documented that social welfare benefits can result from the conservation and recovery of endangered and threatened species. In its guidance for implementing Executive Order 12866, OMB acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency's part to conduct new research.[27] *Rather than rely on economic measures, the Service believes that the direct benefits of the proposed rule are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.*

CHD may also generate ancillary benefits. Critical habitat aids in the conservation of species specifically by protecting the primary constituent elements on which the species depends. To this end, CHD can result in maintenance of particular environmental conditions that may generate other social benefits aside from the preservation of the species. That is, management actions undertaken to conserve a species or habitat may have coincident, positive social welfare implications, such as increased recreational opportunities in a region. While they are not the primary purpose of critical habitat, these ancillary benefits may result in gains in employment, output, or income that may offset the direct, negative impacts to a region's economy resulting from actions to conserve a species or its habitat.

It is often difficult to evaluate the ancillary benefits of CHD. To the extent that the ancillary benefits of the rulemaking may be captured by the market though an identifiable shift in resource allocation, they are factored into the overall economic impact assessment in this report. For example, if decreased off-road vehicle use to improve species habitat leads to an increase in opportunities for wildlife viewing or hiking within the region, the local economy may experience an associated measurable, positive impact. Where data are available, this analysis attempts to capture the net economic impact (i.e., the increased regulatory burden less any discernable offsetting market gains) of species conservation efforts imposed on regulated entities and the regional economy.

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25 Executive Order 12866, September 30,1993, "Regulatory Planning and Review."

26 U.S. Office of Management and Budget, September 17, 2003, "Circular A-4," http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf.

27 Ibid.

1.2.4.1 The Potential for Amenity Values

When wetland areas are designated as critical habitat for a species, they may generate amenity values to adjacent property owners and residents. These amenity values are derived from the associated visual amenities and other environmental and ecosystem benefits that may arise from the CHD. The existence and magnitude of economic values for environmental amenities are well documented in the environmental economics literature. If a CHD provides additional protection of the area, habitat, or ecosystem from which such environmental services may flow, the existence of positive values (negative costs) from a CHD is possible.

In the case of a CHD, owners of adjacent or nearby residential property may benefit from the "internalization" of the environmental public goods arising from the CHD. However, the extent of the impact on the welfare of owners of undeveloped land and developers in general is not always clear. For example, landowners and developers would not have an incentive to provide open space or related amenities unless they could capture some of the resulting value in the price of lots and houses. Some land developers of larger areas have voluntarily set aside portions of the potential development as open space, and have built in price premiums in remaining parcels to account for the advertised amenity. However, it is expected that owners of smaller parcels would have to engage in cooperative behavior with adjacent property owners to provide sufficient open space to provide price premiums adequate to offset the loss of revenue from reduced numbers of developable lots.

In the literature, the existence of amenity values has been demonstrated in a wide variety of settings and these values have been quantified with a number of non-market valuation techniques. Time and resource constraints often prohibit the performance of original, site-specific research to measure amenity values. Instead, potential amenity values are often quantified via the "benefits transfer" approach. This approach essentially borrows (transfers) estimates of value for the same non-marketed commodity (e.g., open space) from extant studies and applies them to a new site or setting. The conditions under which such procedures are valid are well discussed in the literature. The OMB also provides guidance for an appropriate use of benefits transfer methods, including criteria for their use.[28] In general, however, the closer the two sites are in terms of key physical and economic factors, the more likely it is that the transferred value is appropriate for the new setting. In addition, the literature cautions that values be used conservatively; i.e., that among those previous estimates judged to be appropriate, lower bound estimates should be used for the new application or setting. This analysis recognizes the potential for the existence of amenity values within the crownscale CHD, but leaves such values unquantified.

1.3 ANALYTIC TIME FRAME

The analysis examines activities taking place both within and adjacent to the essential lands proposed for exclusion from critical habitat, and considers activities that have occurred since the final listing (October

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[28] Ibid.

1998) and prior to the final designation (October 2005), as well as activities anticipated to occur after designation. Estimates of post-designation effects are based on activities that are "reasonably foreseeable," including, but not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public. The analysis estimates economic effects of activities from 1998 (year of the final rule for listing) through 2025 (20 years from the year of final CHD).

1.4 INFORMATION SOURCES

The analysis contained in this report is based on data and information collected from a wide range of sources. Communications with and data provided by Service personnel include maps and Geographic Information Systems (GIS) data, information on past section 7 consultation project modification and terms and conditions, copies of informal and formal crownscale consultation documents such as Biological Opinions (BOs), and other material directly related to the proposed designation. Other Federal, State, and local agencies provided information, as well as independent or private sector entities and individuals. The specific sources used to address the effects of crownscale conservation efforts are identified within each section, and citations are provided where appropriate. The reference section at the end of this document includes a full list of information sources.

1.5 BACKGROUND OF THE CROWNSCALE LISTING

The Service published a notice of review of plants in the Federal Register on February 21, 1990, which included crownscale as a category 2 candidate.[29] Category 2 species include those for which "information in the possession of the Service indicated that a listing proposal was possibly appropriate, but for which sufficient data on biological vulnerability and threat were not available to support a proposed rule."[30] A notice of review published in the Federal Register on September 30, 1993, revised the list to include crownscale as a category 1 candidate species.[31] Category 1 species are defined as "those for which the Service had on file substantial information on biological vulnerability and threats to support preparation of listing proposals."[32]

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29 U.S. Fish and Wildlife Service, February 21, 1990, "Review of Plant Taxa for Listing as Endangered or Threatened Species, Notice of Review," *Federal Register*, Vol. 55, No. 35, pp. 6184-6229.

30 U.S. Fish and Wildlife Service, October 13, 1998, "Determination of Endangered or Threatened Status for Four Southwestern California Plants from Vernal Wetlands and Clay Soils, Final Rule" *Federal Register*, Vol. 63, No. 197, p. 54978.

31 U.S. Fish and Wildlife Service, September 30, 1993, "Review of Plant Taxa for Listing as Endangered or Threatened Species, Notice of Review," *Federal Register,* Vol. 58, No. 188, pp. 51144-51190.

32 U.S. Fish and Wildlife Service, October 13, 1998, "Determination of Endangered or Threatened Status for Four Southwestern California Plants from Vernal Wetlands and Clay Soils, Final Rule," *Federal Register*, Vol. 63, No. 197, p. 54978.

The Service proposed endangered status for the crownscale on December 15, 1994, in a proposed rule which included three other plant species.[33] Following an extended comment period, the Service published a final rule listing the crownscale as endangered in the October 13, 1998, edition of the Federal Register.[34] At that time, the Service also determined the designation of critical habitat was not prudent for the crownscale as such designation would provide no benefit to the species beyond that provided by listing.[35]

1.6 BACKGROUND OF THE CROWNSCALE CRITICAL HABITAT DESIGNATION

As noted earlier, critical habitat was not designated for crownscale at the time of its final endangered listing in October 1998. Lawsuits challenging the Service's determination that designation of critical habitat for crownscale (and seven other listed plant species) was not prudent were filed in November 2001 by the Center for Biological Diversity and California Native Plant Society and Building Industry Legal Defense Foundation.[36] The parties in both cases agreed to a remand of the critical habitat determinations to the Service for additional consideration. On July 1, 2002, the U.S. District Court ordered the Service to reconsider the not prudent finding and publish a proposed critical habitat rule by January 30, 2004. At the Service's request, the court extended the deadline for the proposed rule until October 1, 2004. The proposed rule designating critical habitat for the crownscale was published in the October 6, 2004, edition of the Federal Register, complying with the court order.[37]

1.7 DESCRIPTION OF THE SPECIES AND HABITAT[38]

The crownscale is an annual plant in the goosefoot family (*Chenopodiaceae*), and is a bushy, erect plant with grayish leaves that grows about 4 to 12 inches tall. The crownscale generally flowers in April and

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33 U.S. Fish and Wildlife Service, December 15, 1994, "Proposed Rule to List Four Southwestern California Plants as Endangered or Threatened, Proposed Rule," *Federal Register*, Vol. 59, No. 240, pp. 64812-64823.

34 U.S. Fish and Wildlife Service, October 13, 1998, "Determination of Endangered or Threatened Status for Four Southwestern California Plants from Vernal Wetlands and Clay Soils, Final Rule" *Federal Register*, Vol. 63, No. 197, pp. 54975-54994.

35 Ibid., p. 54991.

36 *Center for Biological Diversity, et al. v. Norton,* No. 01-CV-2101 (S.D. Cal.); and *Building Industry Legal Defense Foundation v. Norton,* No. 01-CV-2145 (S.D. Cal.).

37 U.S. Fish and Wildlife Service, October 6, 2004, "Proposed Designation of Critical Habitat for *Atriplex coronata* var. *notatior* (San Jacinto Valley crownscale), Proposed Rule," *Federal Register,* Vol. 69, No. 193, pp. 59844-59859.

38 Information on the crownscale and its habitat is derived from U.S. Fish and Wildlife Service, October 6, 2004, "Proposed Designation of Critical Habitat for *Atriplex coronata* var. *notatior* (San Jacinto Valley crownscale), Proposed Rule," *Federal Register,* Vol. 69, No. 193, pp. 59844-59859. It is provided in summary form only; specific citations have been omitted here.

May, and sets fruit by May or June, although some sources indicate the flowering period may extend to August.

The crownscale is restricted to highly alkaline and silty-clay soils found in certain alkali sink scrub, alkali playa, vernal pool, and annual alkali grassland habitats. The crownscale occupies seasonal wetlands, including vernal pools and floodplains typically flooded by winter rains. Seasonal flooding is necessary for dispersal of the floating seeds of the crownscale, and plants emerge in the spring as waters recede and seeds germinate. These seasonal wetlands occupied by the crownscale are dependent upon adjacent transitional wetlands and marginal wetlands within the watershed.

The crownscale has not been studied extensively, but is only known to occur within western Riverside County, California. There are four general population centers of the plant: (1) in the San Jacinto River floodplain at the San Jacinto Wildlife Area/Mystic Lake; (2) in the San Jacinto River floodplain between the Ramona Expressway and Railroad Canyon Reservoir; (3) in the Upper Salt Creek Vernal Pool Complex in the west Hemet area; and (4) in the Alberhill Creek floodplain north of Lake Elsinore. Most of the known occurrences of crownscale are on private land, although there are also occurrences on State land (within the San Jacinto Wildlife Area), land owned by the Riverside County Habitat Conservation Agency, and land owned by the Metropolitan Water District (Upper Salt Creek Wetland Preserve). There are no known occurrences of crownscale on Federal lands.

The crownscale has declined throughout its range due to a number of factors, which continue to threaten the known occurrences of the species. The Service identifies these threats in the proposed CHD rule as:

> "…habitat destruction and fragmentation resulting from urban and agricultural development, pipeline construction, alteration of hydrology and floodplain dynamics, excessive flooding, channelization, off-road vehicle activity, trampling by cattle and sheep, weed abatement, fire suppression practices (including discing and plowing), and competition from non-native plant species."[39]

Using the best available scientific data, the Service has determined the primary constituent elements essential to the conservation of the crownscale. The physical ranges described in the primary constituent elements may not capture all of variability that is inherent in natural systems that support the crownscale. In summary, these primary constituent elements include:

1. Seasonal wetland habitats, including floodplains and vernal pools, and the natural hydrologic processes upon which these habitats depend;

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[39] U.S. Fish and Wildlife Service, October 6, 2004, "Proposed Designation of Critical Habitat for *Atriplex coronata* var. *notatior* (San Jacinto Valley crownscale), Proposed Rule," *Federal Register,* Vol. 69, No. 193, p. 59847 (citations omitted).

2. Vegetation communities, including alkali playa, alkali scrub, and alkali grassland habitats, within which the taxon is known to occur; and

3. Slow-draining alkali soils with a hard pan layer that provides for a perched water table, including the Willows, Domino, Traver, Waukena, and Chino Soils Series (Knecht 1971).

1.8 CRITICAL HABITAT DESIGNATION

The Service has identified approximately 15,232 acres of habitat in Riverside County as essential for the conservation of the crownscale ("essential habitat"). Furthermore, the Service estimates that all of the essential habitat areas are or will be conserved and managed protected by the approved Western Riverside County MSHCP in Riverside County. In the proposed rule, the Service excluded all essential habitat lands protected by this MSHCP from the proposed designation of critical habitat for the crownscale. Because all essential habitat areas have been excluded from the proposal, no lands are proposed for designation of critical habitat for the crownscale.[40] Therefore, in considering the essential habitat for the crownscale, this analysis considers only lands excluded from critical habitat ("excluded lands").

1.8.1 EXCLUDED LANDS

Section 4(b)(2) of the Act states that critical habitat shall be designated, and revised, on the basis of the best available scientific data after taking into consideration the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. An area may be excluded from critical habitat if it is determined that the benefits of exclusion outweigh the benefits of specifying a particular area as critical habitat, unless the failure to designate such area as critical habitat will result in the extinction of the species.[41] In the case of the crownscale, the Service has excluded all areas of essential habitat from critical habitat as discussed in the proposed rule. The Service has identified three units of essential habitat for the crownscale, based on the location of primary constituent elements and populations of the plants. The three units are described briefly below, and shown on the map included as a Map Attachment to this report.

1.8.1.1 Unit 1: San Jacinto River

The San Jacinto River Unit encompasses approximately 12,046 acres and includes two occurrence complexes of the crownscale: (1) the San Jacinto River floodplain at the San Jacinto Wildlife Area/Mystic Lake (Wildlife Area); and (2) the San Jacinto River floodplain between the Ramona Expressway and Railroad Canyon Reservoir. Just over half of the unit is privately owned (6,535 acres), with the remainder (5,511 acres) owned by the California Department of Fish and Game (CDFG).

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[40] Ibid., pp. 59844-59859.

[41] Ibid., p. 59852.

1.8.1.2 Unit 2: Salt Creek (Hemet)

The Salt Creek (Hemet) Unit is located west of Hemet, and is comprised of approximately 3,154 acres of privately owned land. The unit includes one occurrence complex, the Upper Salt Creek Vernal Pool Complex in the west Hemet area, and provides the watershed to maintain the ecological function of the vernal pool complex that supports the crownscale.

1.8.1.3 Unit 3: Alberhill Creek

The smallest of the essential habitat units identified for crownscale, the Alberhill Creek Unit includes about 32 acres of privately owned land. This unit supports one known occurrence complex in the Alberhill Creek floodplain north of Lake Elsinore. The unit is made up of a small pocket of Willows soils within the floodplain of Alberhill Creek, bounded on the north by Nichols Road and on the south by a large stand of riparian vegetation.

1.9 ORGANIZATION OF THE REPORT

The remainder of this report is divided into six sections. The following section describes the framework for analyzing the economic impacts associated with crownscale conservation efforts in the essential habitat areas proposed for exclusion. This includes a description of the general analytic approach to estimating economic effects, operating definitions of pre-designation and post-designation effects, general categories of economic effects, and assumptions such as time frame of analysis and discount rate.

The next section provides a socioeconomic profile of Riverside County, which encompasses the essential habitat for crownscale. The profile is presented in terms of the affected county as the smallest unit of measure for much of the data presented. This is followed by a discussion of the regulatory environment, which includes the Federal, State, and local laws and regulations that are relevant to the analysis.

The different categories of economic effects are examined in the next two sections. The first addresses the effects on residential and commercial development; the application of an "open city" model of development is presented. The second of the two sections on economic effects addresses the other categories that may apply. Finally, the last section of the report presents a summary of the findings and discussion of the results for the crownscale.

A number of appendices are included with this report. Appendix A addresses the economic effects of crownscale conservation efforts on small entities and the nation's energy supply. Appendix B includes a presentation of the analytic framework for determining effects on residential and commercial development. Appendix C includes a list of the acronyms used in the report. A Map Attachment is also provided and contains all maps referenced in the text of the report.

This section describes the framework used in measuring the economic impacts associated with conservation actions to protect crownscale and its habitat.[42] This section first describes the general concepts that underlie the estimation of economic costs of a CHD, as well as the costs associated with conservation-related measures that are likely to be associated with future economic activities that may adversely affect the habitat within the proposed boundaries. These concepts include efficiency and distributional effects, as well as pre-designation and post-designation effects. Methods used to evaluate each of the different general categories of economic effects, such as efficiency effects on Federal or private entities, as well as distributional effects, are then described. The time frame and discount rate used in the analysis are also described and the cost categories used to report the results of the analysis (i.e., economic impacts) are defined. Finally, this section describes general caveats and assumptions that apply to all categories of costs examined.

2.1 PRE-DESIGNATION AND POST-DESIGNATION EFFECTS

The economic analysis includes both pre-designation and post-designation effects. Pre-designation effects include those that have accrued since the time that the crownscale was listed as endangered but prior to the final designation of critical habitat. This pre-designation analysis begins with the October 1998 final rule listing the crownscale as endangered.[43] The final designation of critical habitat for crownscale is expected in October 2005, which represents the end of the pre-designation period. Pre-designation impacts include costs associated with *implementing* crownscale conservation efforts between 1998 and 2005, even if the impetus for those efforts was a Federal, State, or local regulation promulgated prior to 1998. Post-designation impacts include likely future cost associated with crownscale conservation efforts following the final designation of critical habitat in October 2005, effectively 2006 through 2025. The post-designation analysis attempts to forecast the costs of conservation efforts likely to occur within the essential habitat, all of which is excluded from critical habitat for the crownscale.

2.2 GENERAL CATEGORIES OF ECONOMIC EFFECTS

The impacts associated with past and potential future species and habitat management efforts are manifested in economic efficiency effects (i.e., social welfare) as outlined below.

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42 Much of the general framework discussion represents guidance from the Service and incorporates language employed in prior economic analyses of CHD.

43 U.S. Fish and Wildlife Service, October 13, 1998, "Determination of Endangered or Threatened Status for Four Southwestern California Plants from Vernal Wetlands and Clay Soils, Final Rule" *Federal Register*, Vol. 63, No. 197, pp. 54975-54994.

Administrative Costs: Costs associated with engaging in section 7 consultation, including time spent attending meetings, preparing letters and biological assessments (BAs), and in the case of formal consultations, the development of a Biological Opinion (BO) by the Service are quantified as administrative costs. Section 7 consultation can require substantial administrative effort on the part of all participants. These impacts are measured as the cost of labor required to fulfill these managerial duties. Estimates of per-effort costs associated with informal and formal consultations are presented in Table 1. Costs of the BA are typically borne by the action agency. Unless otherwise stated, this table is used to develop total administrative costs for consultations associated with activities within the crownscale essential habitat.[44]

Table 1
Estimated Administrative Costs of Section 7 Consultations (2005 dollars)

Party	Formal	Informal
Service		
Consultation Cost	$4,908	$2,187
Action Agency		
Consultation Cost	$5,548	$2,774
BA Cost	$18,137	$2,134
Third Party Costs		
Consultation Cost	$3,734	$2,187

Source: Industrial Economics, April 2005, "Final Economic Analysis of Proposed Critical Habitat Designation for the Lane Mountain Milk-Vetch," as modified by NEA. The administrative cost model is based on data from the Federal Government Schedule Rates, Office of Personnel Management, a review of consultation records from several Service Field offices across the country, and communications with Biologists in the Service. Average costs by type of consultation for each party, brought to 2005 dollars using the "Consumer Price Index – All Urban Consumers" from the U.S. Department of Labor, Bureau of Labor Statistics (Series ID: CUUROOOOSAO Not Seasonally Adjusted).

Project Modification Costs: Management efforts taken to protect the species and or its habitat are likely to result in project modifications to comply with the goals of the

[44] This analysis employs a consultation cost model (see Table 1) to represent a likely range of administrative costs of informal and formal section 7 consultations. The cost model is based on anticipated administrative effort from a survey of a number of Federal agencies and Service Field Offices across the country. The administrative effort is typically defined in number of hours spent, and than translated into a dollar value by applying the appropriate average government salary rates. In interviewing the agencies relevant to this analysis, the representatives were asked if the estimated administrative costs seemed reasonable. In the case that the agency anticipated a different range of costs for their particular activities within the proposed designation that cost range was applied to the relevant consultations in place of the generic cost model estimates. That is, where improved information was available regarding the level of effort for a particular consultation, the unique cost estimates were applied.

management efforts. Costs of implementing these modifications are associated with changes in labor or material requirements that may occur at one point in time and/or be ongoing.

2.2.1 FEDERAL

Federal agencies incur costs that are directly attributable to compliance with the Act. As noted above, the Service is charged with enforcement, administration, consultation, and monitoring; these costs are predominantly programmatic, and some may be discernable as attributable to the crownscale listing. However, action agencies—those responsible for authorizing or carrying out projects or activities that could have an impact on an endangered species or its habitat—also incur costs through consultations, environmental studies, or project modifications that can be directly or indirectly attributable to crownscale conservation efforts.

2.2.1.1 Section 7 Consultations, Technical Assistance, and Project Modifications

All Federal agencies are required by the Act to ensure the activities they authorize, fund, or carry out do not jeopardize a listed species or adversely modify or destroy designated critical habitat. Consultations may be formal or informal, but in either case the action agency incurs costs to interact with the Service. Costs include preparing BAs, meeting with Service staff to discuss project details, and implementing project modifications to avoid, minimize, or offset impacts to listed species. Federal agencies may also incur costs for monitoring habitat conditions.

Administrative costs of consultations, along with the costs of project modifications resulting from these consultations, represent compliance costs associated with the listing of the species and CHD. In this report, the number and types of consultations with the Service are identified and presented. The costs associated with compliance and project modifications are addressed, and administrative costs are included.

2.2.2 PRIVATE

The CHD for the crownscale or any other threatened or endangered species has the potential to impose costs on private individuals or groups of individuals if there is a connection or nexus between private activities and Federal actions. For example, if a Federal permit is required before developers can begin construction or if there is Federal funding for a private activity, then it is possible that the provisions of the Act, including CHD, may potentially restrict private actions if the action results in a section 7 consultation.

This section identifies and briefly discusses a framework for analyzing economic impacts on development activities that may occur in or near the essential habitat areas excluded from critical habitat.

2.2.2.1 Framework for Residential, Industrial, and Commercial Development Effects

When critical habitat areas are designated in a region, developers may face the following three types of restrictions and costs: 1) development may be prohibited in designated areas, which will impose costs to developers and landowners; 2) development may be allowed in the designated areas, but developers in these areas are required to take additional on-site measures (i.e., project modifications) to reduce the impact of their activities on the listed species and its habitat; and/or 3) development may be allowed in the designated areas, but appropriate habitat conservation plan-related mitigation fees must be paid and conservation activities must be taken to offset the impact of their activities on the listed species and its habitat. The conservation activities can be on-site or off-site. Thus, the impact of CHD on residential, industrial, and commercial development may include the following components:

- Cost of development restrictions (e.g., prohibit development in designated areas and thus reduce the supply of developable land);

- Cost of project modifications for development (e.g., employ biological monitoring and flagging of vernal pools during construction activities, protect the vernal pool site by fencing and signage, prohibit the planting of exotic plants, and restrict the use of pesticides); and

- Cost of habitat conservation plan-related mitigation fees and activities for development (e.g., vernal playa habitat restoration, enhancement, creation, and conservation).

Two types of models are used by economists to evaluate the effect of land use regulations. The first is the "closed city model," and the second is the "open city model." The open city model is more appropriate for measuring the potential impacts of CHD on urban development. The closed city model assumes that the total number of households in a metropolitan area is fixed and does not respond to market conditions. Thus, if the supply of land is reduced, more people must fit into less space or must live in less desirable locations. The open city model assumes that the number of households in a particular market is determined in a multi-market equilibrium, and households will relocate in response to changes in economic conditions. Housing markets in California, including the southern California counties examined in this analysis, feature a large volume of in- and out-migration and are better described using an open city model.

In this analysis, the costs to residential, industrial, and commercial development arising from crownscale conservation efforts are estimated based on the assumption that development is allowed in the designated areas if appropriate project modifications and/or conservation activities are taken, and/or habitat conservation plan-related mitigation fees paid. Thus, this analysis assumes that no land is removed from potential development as a result of development restrictions. The costs for these project modifications and/or habitat conservation plan-related mitigation fees and activities are paid by developers or landowners. Thus, of the three cost components, only the last two are relevant for this analysis. The method for calculating these components is discussed below. The method for calculating the first component of cost is discussed in Appendix B.

Cost of Project Modification and Conservation Activities

The net present value approach is used to measure the cost of project modification and habitat conservation plan-related mitigation fees and activities to past and future developments that may be associated with designation of critical habitat. This approach allows us to estimate the cost by different types of development (e.g., commercial, industrial, and residential) and by region (e.g., a particular unit). The framework requires several pieces of information, including: a) projected acres of each type of development in each area designated for critical habitat, b) percent of development actually "burdened" by project modification and habitat conservation plan-related mitigation fees and activities, and c) per-acre costs of project modification and habitat conservation plan-related mitigation fees and activities for the "burdened" development. With these data, the post-designation cost of CHD for commercial, industrial, and residential development during a given time period (e.g., from 2006 to 2025) can be estimated by the following formula, where total cost (TC) is measured in 2005 dollars:

(1) $$TC = \sum_{t=2006}^{2025} \sum_{i=1}^{I} \frac{A_t^i S_t^i C_t^i}{(1+r)^{t-2005}}$$

i = types of development (e.g., low-density residential, high-density residential, commercial, mixed development, etc.)

A_t^i = projected acres of type i development in year t

S_t^i = percent of type-i development actually burdened

C_t^i = per-acre project modification and mitigation activity cost

r = discount rate

Likewise, the pre-designation cost of habitat designation for commercial, industrial, and residential development during a given time period (e.g., from 1998 to 2005) can be estimated by the following formula, where the pre-designation cost is also measured in 2005 dollars:

(2) $$TC = \sum_{t=1998}^{2005} \sum_{i=1}^{I} [A_t^i S_t^i C_t^i (1+r)^{2005-t}]$$

2.2.3 Effects on Small Entities

This analysis considers how small entities, including small businesses, organizations, and governments, might be affected by future crownscale conservation efforts. The analysis follows guidelines appropriate

for the Regulatory Flexibility Act (RFA).[45] Those activities involving small entities are identified, affected small entities described, and potential effects estimated, depending on the availability of data. This analysis is included in Appendix A of this report.

2.2.4 EFFECTS ON ENERGY SUPPLY

In adherence with Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," the analysis considers the future impacts of conservation efforts on the energy industry and its customers.[46] This involves analyzing impacts associated with changes in existing or proposed energy generating facilities as a result of the CHD. If the proposed designation results in a reduction of more than 500 megawatts of installed capacity, the potential electricity price impacts are also considered. This analysis is included in Appendix A of this report.

2.3 PROJECT LIFE, PERIOD OF ANALYSIS, AND DISCOUNT RATE

The period of analysis and discounting is guided by the availability of information concerning the start date and duration of the activity. Each potential cost component has a time period that is appropriate for that specific activity or investment. The time period used is therefore discussed in each section describing the effects of individual types of activities. For example, in evaluating the effects of conservation efforts on residential, industrial, and commercial development, a time frame of 20 years was used to reflect the useful life of modifications to construction of protective measures.

The time frame associated with each activity is important because as the time horizon for an economic analysis is expanded, the forecast of future projects becomes increasingly speculative. As a result, a consistent time frame of 20 years is applied to all activities. This provides a time frame within which economic assumptions and forecasts are likely to remain viable. Also, from a practical standpoint, any values beyond 20 years will be substantially reduced by the process of discounting, and thus would have little effect on the present value of the activity or action in question.

Some costs are recurring while others are one time costs. These costs are presented both as net present values and as annualized costs. The total cost per unit of essential habitat represents the summation of annualized costs obtained for each of the component economic impacts. Post-designation (future) costs are presented using both a seven and three percent discount rate.

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[45] 5 U.S.C. § 601 *et seq*.

[46] Executive Order 13211, May 18, 2001, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use."

2.4 DEFINITION OF ECONOMIC IMPACTS

This report presents four results for each land use category analyzed: (1) pre-designation economic impacts; (2) "undiscounted" post-designation economic impacts; (3) "present value" of post-designation economic impacts (at a three and seven percent discount rate); and (4) "annualized" post-designation economic impacts (also at a three and seven percent discount rate). Procedures used to calculate each set of results are described below.

For each land use category, this analysis first determines and then presents the "undiscounted" economic costs of crownscale conservation efforts. The undiscounted cost is the sum of the future costs in 2005 dollars that are not adjusted for inflation (expected changes in purchasing power). That is, the economic costs across time are not subject to the process of "discounting." Discounting converts a series of future cash flows (in this case, future costs) to their present value in terms of today's dollars. Discounting is employed in economic analyses involving multiple time periods because it is assumed that an individual or society would not be indifferent between receipt of a dollar today and a dollar received in the future. This is because a dollar today could either be invested, for example, in the bond market, to earn a positive rate of return over time, or the dollar could be used today for present consumption. The process of discounting places the future dollar values into a present value context, and thus facilitates comparison of alternative investments or activities which occur over time. Typically, the greater the opportunities for investment of that dollar today, the higher will be the discount (interest) rate that is applied in the discounting process. Since the present value of a series of payments or costs will usually vary with the number of payments (time periods), the present value estimate is often converted to an annualized value to compare activities or investment alternatives which occur over multiple time periods.

This analysis also presents the economic impacts incurred during the pre-designation and post-designation time periods in common dollar terms. First, the cost of pre-designation conservation efforts known to occur in specific years between 1998 and 2005 are adjusted to 2005 dollars using the Bureau of Labor Statistics' Consumer Price Index (accessed at http://www.bls.gov/cpi/). Pre-designation costs are adjusted to 2005 dollars so that they may be expressed in common terms and compared with future costs, which are also adjusted to 2005 dollars through the discounting process.

Next, the cost of post-designation conservation efforts forecast to occur in specific years between 2006 and 2025 are discounted and presented in present value terms. As noted above, present value terms are used to compare economic costs incurred in different time periods. The present value represents the value of a payment or stream of payments to be made in the future in common dollar terms. In the context of CHD activities involving future costs, translation of these future economic costs to present value terms requires the following: a) projected future costs of crownscale conservation efforts (the undiscounted costs); and b) the specific years in which these impacts are expected to be incurred. With these data, the

present value of the future stream of impacts (PV_c) of crownscale conservation efforts from year t to T is measured in 2005 dollars according to the following standard formula:[47]

$$PV_c = \sum_{t}^{T} \frac{C_t}{(1+r)^{t-2005}}$$

C_t = forecast cost of crownscale conservation efforts in year t

r = discount rate[48]

As a final output of this analysis, costs of future conservation efforts for each land use category in each unit are expressed as annualized values. Annualized values are calculated to provide comparison of impacts across activities with varying time periods (T). For this analysis, however, all land use categories employ a forecast period of 20 years, 2006 through 2025. Annualized impacts of future crownscale conservation efforts (APV_c) are calculated by the following standard formula:

$$APV_c = PV_c \left[\frac{r}{1-(1+r)^{-(N)}} \right]$$

N = number of years in the forecast period (in this analysis, 20 years)

2.5 CAVEATS AND ASSUMPTIONS

The assumptions presented here include only those which in general apply to all activity areas included in the analysis. Similar information on assumptions and possible bias that apply to specific activities appear later in the report, within the particular section related to each activity analyzed.

These general caveats, and those presented later relevant to each activity, describe factors that introduce uncertainty into the results of this analysis. Table 2 contains a summary of these key assumptions. These caveats and assumptions may be revised as additional information becomes available. The Service therefore solicits from the public further information on any of the issues presented in the discussions and tables of caveats. Additionally, information pertaining to the following questions is requested:

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47 To derive the present value of future conservation efforts, t is 2006 and T is 2025.

48 To discount and annualize costs, guidance provided by the OMB specifies the use of a discount (interest) rate of seven percent and three percent (U.S. Office of Management and Budget, Circular A-4, September 17, 2003 and U.S. Office of Management and Budget, "Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations; Notice," 68 Federal Register 5492, February 3, 2003.).

- Are data available to develop more accurate estimates of the number of future consultations, project modifications, and costs for the activities related to private or public lands?

- Are data available on additional land use practices, or current or planned activities in essential habitat areas, that are not specifically or adequately addressed in this analysis?

- Are data available on additional co-extensive impacts (such as additional regulatory burdens from State or local laws triggered by the designation of critical habitat) that are not specifically or adequately addressed in this analysis?

Table 2
Assumptions and Uncertainties Applicable to the General Analysis[a/]

Assumption	Direction of Bias
The analysis considers the cost of conservation and protection efforts for the crownscale including those attributable to the listing, to CHD, or other State and local regulations.	+
Inevitably, actions taken to protect crownscale provide benefits to other listed species. When conservation efforts are implemented in areas of habitat overlap between crownscale and other listed species, the analysis attributes the costs of the conservation efforts co-extensively to crownscale.	+
Non-market benefits are not easily measured without additional resources, unless directly applicable and peer-reviewed analyses are readily available. Consequently, this analysis makes no attempt to measure the non-market benefits that may be associated co-extensively with CHD.	+

+: This assumption is likely to produce an upward bias in cost estimates.

-: This assumption is likely to produce a downward bias in cost estimates.

+/-: No direction of bias can be determined.

a/ This table summarizes general caveats and assumptions related to the approach of the analysis. Detailed caveats and assumptions are described under relevant sections for each analyzed activity.

Key economic and demographic information, including population characteristics and general economic activity, for the county containing essential habitat for the crownscale is presented in this section. The smallest area for which socioeconomic data are available most reliably is at the county level, so county data are presented in order to provide context for the discussion of potential economic impacts later in this report. The county data also might serve to illuminate trends within the essential habitat areas that could influence the potential economic impacts, and therefore aid in the analysis of those impacts. Although county level data may not precisely reflect the socioeconomic characteristics of the areas immediately surrounding the crownscale essential habitat, these data provide the best context for the broader analysis.

3.1 GEOGRAPHIC DESCRIPTION OF THE REGION

The crownscale is only known to occur within Riverside County, California, located in the southern region of the State. Covering more than 7,200 square miles, Riverside County is the fourth largest county in California, in terms of land area. The county has a very diverse geography, ranging from fertile river valleys and low deserts, to foothills and mountain ranges. Riverside County is bounded to the north by San Bernardino County, to the west by Orange County, and to the south by San Diego and Imperial counties. Riverside shares its eastern border with the State of Arizona. The climate of the region is characterized by a strong desert influence, moderated at times by marine air from the Pacific Ocean. Temperatures below freezing are rare, while hot weather with temperatures in excess of 90ºF are common in summer. In the winter months, the monthly average rainfall is just 1.5 inches.

3.2 POPULATION CHARACTERISTICS AND DEMOGRAPHICS

Essential habitat for the crownscale within Riverside County has been identified and excluded from proposed critical habitat. The essential lands excluded from critical habitat are described in Section 1.8. Because crownscale conservation efforts apply to all identified essential habitat whether proposed for critical habitat or excluded, socioeconomic data for Riverside County are presented here. Table 3 presents the population size, changes in population from 1990 to 2000 and 2000 to 2004, per capita income, and poverty rates for Riverside County and the State of California. The population of Riverside County in 2004 is estimated at nearly 1.9 million people, representing slightly over five percent of the State's total population. Riverside County is one of the most populated counties in the United States, ranking thirteenth in the nation in 2004.[49]

[49] U.S. Census Bureau, April 14, 2005 (Release Date), "Table CO-EST2004-08 - Population Estimates for the 100 Largest U.S. Counties Based on July 1, 2004 Population Estimates: April 1, 2000 to July 1, 2004," http://www.census.gov/popest/counties/CO-EST2004-08.html.

The population of Riverside County has grown significantly since 1990, increasing by nearly 60 percent from 1990 to 2004. In recent years (2000 to 2004), Riverside County's population increased by 21.1 percent, making it the second fastest growing county in the State.[50]

Table 3
Socioeconomic Profile of County Containing Crownscale Essential Habitat

County/State	Population (2004)	Percent of State (2004)	Percent Change (1990-2004)	Per Capita Income (2002)	Poverty Rate (2002)
Riverside County	1,871,950	5.2%	+59.9%	$24,814	12.9%
California State	**35,893,799**	**100.0%**	**+20.6%**	**$32,989**	**13.3%**

Sources:
2004 population estimates: U.S. Census Bureau, "Table 1: Annual Estimates of the Population for Counties of California: April 1, 2000 to July 1, 2004 (CO-EST2004-01-06)," downloaded from http://www.census.gov/popest/counties/CO-EST2004-01.html, April 15, 2005.
2002 poverty estimates: U.S. Census Bureau, December 2004, "Small Area Income and Poverty Estimates," accessed at http://www.census.gov/hhes/www/saipe/tables.html, April 15, 2005.
1990-2004 population change: U.S. Census Bureau, "Ranking Tables for Counties," downloaded from http://www.census.gov/population/www/cen2000/phc-t4.html, May 12, 2004; and U.S. Census Bureau, "Table 1: Annual Estimates of the Population for Counties of California: April 1, 2000 to July 1, 2004 (CO-EST2004-01-06)," downloaded from http://www.census.gov/popest/counties/CO-EST2004-01.html, April 15, 2005.
2002 per capita income: U.S. Department of Commerce, May 2004, Bureau of Economic Analysis, *Regional Economic Information System 1969-2002,* CD-ROM.

Per capita income for Riverside County is lower than that of the State, measuring $24,814 in 2002, compared to $32,989, respectively. The poverty rate for a region is the percentage of people who are estimated to live below the poverty level, which is based on national levels set for minimum income requirements for various sizes of households. The poverty rate in Riverside County is 12.9 percent, which is less than the State average of 13.3 percent.

3.3 EMPLOYMENT AND ECONOMIC ACTIVITY

Employment is a key economic indicator, as patterns of growth and decline in a region's employment are largely driven by economic cycles and local economic activity. Current employment figures can be examined to provide a "snapshot" of a region's economy, highlighting key industries. Earnings represent the sum of three components of personal income: wage and salary disbursements, other labor income (includes employer contribution to pension and profit-sharing, health and life insurance, and other non-cash compensation), and proprietors' income. Earnings reflect the amount of income that is derived

[50] U.S. Census Bureau, "Table 1: Annual Estimates of the Population for Counties of California: April 1, 2000 to July 1, 2004 (CO-EST2004-01-06)," downloaded from http://www.census.gov/popest/counties/CO-EST2004-01.html, April 15, 2005.

directly from work and work-related factors. Earnings can be used as a proxy for the income that is generated within a geographical area by industry sectors, and can be used to identify the significant income-producing industries of a region or to show trends in industry growth or decline.

Recent employment and earnings data for Riverside County are presented in Table 4. Employment is given for each industry group in terms of the number of jobs, which includes both full-time and part-time jobs, and as a percentage of the total jobs for each county. Earnings are presented in millions of dollars and percentage share of total for each of the same industry groups as employment.

Riverside County employment is 719,804 jobs, or about 3.6 percent of total employment in the State of California. About 17 percent of jobs and earnings in the county are found in trade, transportation, and utilities; retail trade represents over 70 percent of those jobs.[51] Government is also a significant employer, contributing nearly 15 percent of total county jobs, while the professional and business services sector provides nearly 12 percent of total county jobs. In terms of earnings, government is responsible for over 20 percent of the total earnings in Riverside County, the greatest share of any industry group. Construction and leisure and hospitality each provide more than ten percent of the total jobs in Riverside County; construction, however, contributes a greater share to earnings (over 13 percent of total) than leisure and hospitality (less than six percent of total). About two percent of Riverside County employment is related to agricultural production on farms, and another 1.5 percent is found in the forestry, hunting, fishing, and related activities sector, which includes agricultural services jobs.

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[51] California Employment Development Department, June 24, 2004, "Riverside County – Industry Employment and Labor Force by Annual Average," downloaded from http://www.calmis.cahwnet.gov/htmlfile/county/river.htm.

Table 4
2002 Employment and Earnings in Riverside County
Containing Essential Habitat for the Crownscale

		Employment (# of Jobs) *(% of Total)*	Earnings ($Millions) *(% of Total)*
	Total	**719,804**	**$24,015.2**
Goods Producing:	Agricultural Production (Farm)	13,909 *(1.9%)*	$251.6 *(1.0%)*
	Forestry, Hunting, Fishing, and Related Activities[a/]	10,566 *(1.5%)*	$225.5 *(0.9%)*
	Mining	1,057 *(0.1%)*	$41.5 *(0.2%)*
	Construction	72,830 *(10.1%)*	$3,151.7 *(13.1%)*
	Manufacturing	54,027 *(7.5%)*	$2,432.4 *(10.1%)*
Service Providing:	Trade, Transportation, and Utilities[b/]	124,923 *(17.4%)*	$4,053.0 *(16.9%)*
	Leisure and Hospitality[c/]	71,808 *(10.0%)*	$1,319.6 *(5.5%)*
	Financial Activities[d/]	60,086 *(8.3%)*	$1,605.4 *(6.7%)*
	Information	8,594 *(1.2%)*	$347.4 *(1.4%)*
	Professional and Business Services[e/]	84,098 *(11.7%)*	$2,286.0 *(9.5%)*
	Educational and Health Services[f/]	65,711 *(9.1%)*	$2,275.0 *(9.5%)*
	Other Services	45,081 *(6.3%)*	$1,081.9 *(4.5%)*
	Government	107,114 *(14.9%)*	$4,944.2 *(20.6%)*

a/ also includes Agricultural Services
b/ includes Utilities, Transportation and Warehousing, Retail Trade, and Wholesale Trade
c/ includes Accommodation and Food Services, and Arts, Entertainment, and Recreation
d/ includes Finance and Insurance, and Real Estate and Rental and Leasing
e/ includes Professional, Scientific, and Technical Services, Administrative Support, Waste Management, and Remediation Services, and Management of Companies and Enterprises
f/ includes Education Services and Heath Care and Social Assistance
Source: U.S. Department of Commerce, May 2004, Bureau of Economic Analysis, *Regional Economic Information System 1969-2002,* CD-ROM.

4.1 OTHER SPECIES LISTED UNDER THE ACT

The final rule listing crownscale as endangered also determined endangered status for *Allium munzii* (Munz's onion), as well as threatened status for *Brodiaea filifolia* (thread-leaved brodiaea) and *Navarretia fossalis* (navarretia).[52] These flowering plants occur in vernal pools and other wetlands or on clay soils and moist grasslands in the same region as the crownscale.

It is important to consider other species in the region listed under the Act, as protections for other threatened and endangered species and any of their designated critical habitats may also benefit the crownscale. When a consultation is triggered for any listed species, the Service will also take into account all other listed species known or thought to occupy areas on or near the project lands. Past section 7 consultations for the crownscale have included a number of listed species, as many as 25 in one case.[53] Moreover, all seven past section 7 consultations for the crownscale since listing have involved the navarretia. In its recent proposed designation of critical habitat for the navarretia, the Service identified 31,086 acres of essential habitat for the species. This navarretia essential habitat overlaps with all but 32 acres (Unit 3) of the essential habitat identified for crownscale.[54]

The Service maintains lists of threatened and endangered species, and organizes the list by State (http://ecos.fws.gov/tess_public). For California, there are 298 listed species, second among states only to Hawaii, including 119 animal species and 179 plant species.[55] Some conservation efforts may have been in place for many of these species that may provide incidental protection for the crownscale. The Western Riverside County MSHCP, discussed in Section 4.3 addresses conservation needs for 146 species, including the crownscale.

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52 U.S. Fish and Wildlife Service, October 13, 1998, "Determination of Endangered or Threatened Status for Four Southwestern California Plants from Vernal Wetlands and Clay Soils, Final Rule," *Federal Register*, Vol. 63, No. 197, pp. 52975-54994.

53 The 2004 conference opinion for the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) involved 25 Federally listed species, including the crownscale and navarretia. See U.S. Fish and Wildlife Service, July 22, 2004, Intra-Service Formal Section 7 Consultation/Conference for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit (TE-088609-0) for the Western Riverside County Multiple Species Habitat Conservation Plan, Riverside County, California (FWS-WRIV-870.19).

54 U.S. Fish and Wildlife Service, October 7, 2004, "Proposed Designation of Critical Habitat for *Navarretia fossalis* (spreading navarretia), Proposed Rule," *Federal Register,* Vol. 69, No. 194, pp. 60110-60134.

55 U.S. Fish and Wildlife Service, "Threatened and Endangered Species System (TESS), Listings by State and Territory as of 04/18/2005, California," http://ecos.fws.gov/tess_public/TESSWebpageUsaLists?state=CA, accessed April 18, 2005.

4.2 FEDERAL AND CALIFORNIA STATE STATUTES AND REGULATIONS

4.2.1 CLEAN WATER ACT

The purpose of the Clean Water Act (CWA) is to restore the physical, biological, and chemical integrity of the waters of the United States using two basic mechanisms: (1) direct regulation of discharges pursuant to permits issued under the National Pollutant Discharge Elimination System (NPDES) of section 402, as well as the discharge of dredge or fill materials under section 404; and (2) the Title III water quality program.[56]

Under the NPDES program, U.S Environmental Protection Agency (EPA) sets pollutant-specific limits on the point source discharges for major industries and provides permits to individual point sources that apply these limits. EPA has delegated responsibility for the NPDES permitting program to most states.[57] State-issued NPDES permits are treated as non-Federal actions. As such, the issuance of NPDES permits by states is not subject to the consultation requirements of the Act. The Service consults with the EPA on the triennial review to ensure that threatened and endangered species impacts are contemplated in the development of standards.

Under the water quality standards program, EPA has issued water quality criteria to establish limits on the ambient concentration of pollutants in surface waters that will still protect the health of the water body. States issue water quality standards that reflect the Federal water quality criteria and submit the standards to EPA for review. State water quality standards are subject to review every three years (triennial review). States apply the standards to NPDES discharge permits to ensure that discharges do not violate the water quality standards.[58]

Section 404 of the CWA prescribes a permit program for the discharge of dredged or fill material into navigable waters. Under section 404 of the CWA, all applicants for a Federal license or permit to conduct activity that may result in discharge to navigable waters of the United States are required to submit a State certification to the licensing or permitting agency. Specifically, pursuant to section 404, permit applicants are required to show that they have "taken steps to avoid wetland impacts, where practicable, minimized potential impacts to wetlands, and provided compensation for any remaining, unavoidable impacts through efforts to restore or recreate wetlands."[59]

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56 33 U.S.C. §1251 (1987).

57 33 U.S.C. §402.

58 33 U.S.C. §303, 305.

59 U.S. Environmental Protection Agency, September 26, 2003 (last updated), "Section 404 of the Clean Water Act: An Overview," http://www.epa.gov/owow/wetlands/facts/fact10.html.

4.2.2 PORTER-COLOGNE WATER QUALITY CONTROL ACT

The Porter-Cologne Act of 1969 is the organic act for the California State and Regional Water Quality Control Boards. The Act made the Regional Boards the "principal state agencies with primary responsibility for the coordination and control of water quality" with jurisdiction over the "waters of the state," defined as "any surface water or groundwater, including saline waters, within the boundaries of the state."[60] Regional Boards are the licensing and/or permitting agencies for any California State certification requisite under Section 401 of the CWA for activities requiring a Federal license or permit to conduct activities that may result in discharge into navigable waters.[61] Included as Federal licenses and permits subject to Section 401 are Sections 402 and 404 permits, Federal Energy Regulatory Commission (FERC) hydropower licenses, and Rivers and Harbors Act Sections 9 and 10 permits.[62]

As a result of a 2001 U.S. Supreme Court Decision in *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers* (USACE), USACE jurisdiction over wetlands has been redefined to exclude isolated vernal pools not adjacent to open waters.[63] However, the decision is not expected to have a significant effect on future USACE jurisdiction over vernal pools in Riverside County, as seasonally flooded alkali vernal playas are generally connected to USACE jurisdictional waters in the County.[64] For vernal pools where the USACE does not retain jurisdiction over an isolated wetland, the corresponding Regional Board could retain permitting authority through its permitting and licensing function under Section 401 of the CWA, and its jurisdiction over waters of the State. The relevant Regional Water Quality Control Board for the crownscale essential habitat is Region 8, the Santa Ana Region.

4.2.3 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA) (P.R.C. 21000 *et seq*.) establishes State policy to prevent actions or project modifications from causing significant, avoidable damage to the environment by requiring changes through the use of alternatives or mitigation measures. In a manner comparable to section 7 of the Act, CEQA applies to actions undertaken, financed, or permitted by State lead agencies.

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60 California Environmental Resources Evaluation System, "California Wetlands Information System (CWIS) Agency Roles and Responsibilities: State Water Resources Control Board," http://ceres.ca.gov/wetlands/agencies/swrcb.html, accessed April 2005; and California Water Code, § 13050(e).

61 Personal communication with David Acuff, Biologist, City of San Marcos, California, April 18, 2005.

62 U.S. Environmental Protection Agency, March 4, 2005 (last updated), "Section 401 of the Clean Water Act: An Overview," http://www.epa.gov/owow/wetlands/facts/fact24.html, accessed April 2005.

63 Schoenbaum, Thomas J., Ronald H. Rosenberg, and Holly D. Doremus, 2002, *Environmental Policy Law: Problems, Cases and Readings,* Fourth Edition, Foundation Press, New York, pp. 392-397.

64 U.S. Fish and Wildlife Service, 2003, "Final Economic Analysis of Critical Habitat Designation for Vernal Pool Species, Appendix E: Implementation of the Federal Clean Water Act and State Water Statutes," p. E-3; personal communication with Service Biologist, Carlsbad Fish and Wildlife Office, May 11, 2005.

Regulations for implementation are published in the State CEQA Guidelines, which establish an overall process for the environmental evaluation of projects that is similar to that promulgated under the National Environmental Policy Act (NEPA).

CEQA applies to certain activities of State and local public agencies. A public agency must comply with CEQA when it undertakes an activity defined by CEQA as a "project." A project is an activity undertaken by a public agency or a private activity which must receive some discretionary approval from a government agency which may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment. Most proposals for physical development in California are subject to the provisions of CEQA, as are many governmental decisions which do not immediately result in physical development (such as adoption of a general or community plan). Every development project that requires discretionary governmental approval will likely require at least some environmental review pursuant to CEQA.[65]

Article 14 of CEQA applies to projects that are subject to both CEQA and NEPA. NEPA applies to projects which are carried out, financed, or approved in whole or in part by Federal agencies. Accordingly, this article applies to projects which involve one or more State or local agencies *and* one or more Federal agencies.

An environmental impact report (EIR) is required to assess potential environmental impacts of a project, the components of which are detailed in Sections 15120 to 15132. In general, projects must identify potential environmental impacts and design alternatives where feasible for the project to avoid those impacts. If impacts are unavoidable, the project must provide a finding explaining why impacts are unavoidable, and subsequently design alternatives to minimize and mitigate environmental impacts.

CEQA provides protection for the crownscale by requiring project descriptions that identify the environmental setting of a project. Projects must design alternatives to avoid impacting vernal pools, and therefore crownscale habitat. If impacts are found to be unavoidable, alternatives to minimize impacts to crownscale habitat are required to be designed through the EIR process.

4.3 WESTERN RIVERSIDE COUNTY MULTIPLE SPECIES HABITAT CONSERVATION PLAN

Riverside County completed the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) in 2003. The MSHCP was completed in four years for a cost in excess of $11 million.[66] The MSHCP covers 146 species, including crownscale, 25 of which are Federally listed as threatened or

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65 California Resources Agency, "California Environmental Quality Act: Frequently Asked Questions," http://ceres.ca.gov/topic/env_law/ceqa/more/faq.html, accessed July 22, 2004.

66 Personal communication with Ellen Showalter Laney, Riverside County, July 2004.

endangered under the Act.[67] The MSHCP is designed to create, manage, and monitor a system of habitat preserves in Western Riverside County and provides a framework for complying with State and Federal endangered species regulations, while at the same time accommodating future growth.[68] The MSHCP was prepared pursuant to section 10 (a)(1)(b) of the Act, as well as the California's Natural Community Conservation Planning Act, passed in 1991.

The MSHCP "Plan Area" includes approximately 1.26 million acres, including the 15,232 acres of essential habitat, and encompasses 14 incorporated cities, as well as unincorporated portions of western Riverside County. Approximately 500,000 acres are included in the conservation areas.[69] The Plan Area is bounded on the west by Orange and San Bernardino counties, with San Bernardino County to the north and San Diego County to the south. The eastern boundary of the Plan Area is formed by Banning Pass and the crest of the San Jacinto Mountains.

Due to its limited geographic distribution because of its dependence on specialized habitat and floodplain management processes, the crownscale is identified in the MSHCP as a Group 3 species located in three "Core Areas." According to the MSHCP, the distribution of crownscale is generally restricted to the alkali floodplains of the San Jacinto River, Mystic Lake, Salt Creek, and Alberhill Creek in association with Willows, Domino, and Traver soils, and consists of 12 "loosely defined" populations.[70]

The MSHCP is a criteria-based plan, meaning a description of the conservation focus is provided for land units. Section 3.3 of the MSHCP identifies 16 area plans covered by the MSHCP with the criteria addressed by subunit. The crownscale is mentioned as a "planning species" in four MSHCP area plans and subunits therein, including: Lakeview/Nuevo, Mead Valley, Reche Canyon/Badlands; and San Jacinto Valley. Various "core" habitat linkages are found in these four MSHCP area plans. Subunits in each MSHCP area plan outline specific conservation efforts related to the planning species listed therein. Conservation efforts relevant to the crownscale for the MSHCP area plans in which it is listed include: conserving clay soils intermixed with or near vernal pools, conserving Willow-Domino-Travers soils supporting sensitive plants, conserving wetland habitats and floodplain along the San Jacinto River including existing vernal playas and vernal pools and associated watersheds, and conserving existing vernal pool complexes associated with the San Jacinto River floodplain.

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67 U.S. Fish and Wildlife Service, July 22, 2004, Intra-Service Formal Section 7 Consultation/Conference for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit (TE-088609-0) for the Western Riverside County Multiple Species Habitat Conservation Plan, Riverside County, California (FWS-WRIV-870.19).

68 Riverside County, 2003, *Riverside County Integrated Project Multiple Species Habitat Conservation Plan (MSHCP)*, *Volume 4 – Final EIR/EIS*, Section 2.3 "Proposed Action."

69 California Department of Fish and Game, Natural Community Conservation Planning, April 26, 2005 (last modified), "Status of NCCP Planning Efforts," http://www.dfg.ca.gov/nccp/status.htm.

70 Riverside County, 2003, *Riverside County Integrated Project Multiple Species Habitat Conservation Plan (MSHCP)*, *Volume 1 –The Plan*, Section 9.3 "Minimization and Mitigation."

Section 9 of Volume I, and Volume II-B of the MSHCP describes in detail the conservation objectives, and conservation efforts specifically related to the crownscale and its habitat. The crownscale is protected under the riparian and vernal pool species policies of Section 6.1.2 of Volume 1. Permittees are required to avoid riparian and vernal pool habitat, and if they cannot avoid such habitat, alternatives must be developed through the CEQA process to minimize any adverse impacts. Under the MSHCP, mitigation for impacts to riparian and vernal pool habitat must be biologically equivalent or superior to preservation "to ensure replacement of any lost functions and values of Habitat as it relates to covered species."[71] Specific measures to protect the crownscale are outlined by the following five objectives:

- **Objective 1:** Include within the MSHCP Conservation Area at least 6,900 acres of suitable habitat;

- **Objective 2:** Include within the MSHCP Conservation Area the Alberhill Creek locality as well as the three Core Areas located along the San Jacinto River from the vicinity of Mystic Lake southwest to the vicinity of Perris and in the upper Salt Creek drainage;

- **Objective 3:** Crownscale located as a result of survey efforts shall be conserved in accordance with procedures described within Section 6.3.2 of the MSHCP;

- **Objective 4:** Include within the MSHCP Conservation Area the floodplain along the San Jacinto River consistent with Objective 1. Floodplain processes will be maintained along the river in order to provide for the distribution of the species to shift over time as hydrologic conditions and seed bank sources change; and

- **Objective 5:** Include within the MSHCP Conservation Area the floodplain along Salt Creek generally in its existing condition from Warren Road to Newport Road and the vernal pools in Upper Salt Creek west of Hemet. Floodplain processes will be maintained in order to provide for the distribution of the species to shift over time as hydrologic conditions and seed bank sources change.

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71 Riverside County, 2003, *Riverside County Integrated Project Multiple Species Habitat Conservation Plan (MSHCP)*, *Volume 1 – The Plan*, Section 6.1.2 "Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools."

A general framework for estimating the costs of land use restrictions imposed on landowners and developers by conservation efforts associated with crownscale was described in Section 2.2.2.1 of this report. The framework lays out procedures for estimating two types of economic effects on development: those associated with reductions in the supply of developable land and those associated with added development costs (project modifications, habitat conservation plan-related mitigation fees and conservation activities). In this section, the cost of crownscale conservation to residential, commercial, and industrial development during the pre-designation period (1998-2005) is estimated, and then the framework is applied to estimate the conservation costs to residential, commercial, and industrial development forecast to occur during the post-designation period (2006-2025). These costs include both the administrative cost of the section 7 consultation process and the cost of crownscale habitat conservation plan-related mitigation fees and conservation efforts.

5.1 THE COSTS OF PRE-DESIGNATION ACTIVITIES

Three section 7 consultations involving crownscale and residential development projects have occurred since the crownscale listing in 1998, including two informal consultations and one formal consultation (see Table 5). These section 7 consultations required time and effort for the Service, action agencies (e.g., the USACE), and the developer and resulted in administrative costs to the various parties. The total pre-designation administrative costs are presented in Table 5 and were calculated by multiplying the average costs per type of consultation (see Table 1) by the number of section 7 consultations.

Table 5
Pre-Designation Administrative Cost of Section 7 Consultations to Development, by Habitat Unit (2005 dollars)

Habitat Unit	Informal Consultation	Formal Consultation	Pre-Designation (Total)
Unit 1 - San Jacinto River	0	0	$0
Unit 2 -Salt Creek	2	1	$50,900
Unit 3 - Alberhill Creek	0	0	$0
Total Essential Habitat	**2**	**1**	**$50,900**

Note: Numbers may not sum due to rounding.

Table 6
Pre-Designation Section 7 Consultations Related to Development and Crownscale Conservation

Year	Type	Project Description	Species and CHD Unit	Summary of Conservation/Mitigation	Conservation/Mitigation Activity Costs
2004	Informal	Corman Leigh Community, Inc., LLC - Tres Cerritos West, a 121.3 acre development project consisting of 178 residential units on 71.4 acres.	Crownscale and navarretia in Unit 2.	1. The project is expected to impact up to 0.38 acres of vernal pools (0.43 acres of vernal pool habitat is on-site). Deed restriction or conservation easement to protect 53.4 acres on-site, including conservation, enhancement, and restoration of 3.5 acres of vernal pool habitat (2.24 ac restored for this project and 1.26 ac restored to offset impacts to vernal pools resulting from the adjacent JP Ranch project described below). Mitigation will include the creation of vernal pools based on a 1:1 mitigation ratio and is in response to impacts to non-crownscale and non-navarretia vernal pool habitat (i.e., vernal pools that do not contain crownscale and navarretia).[72] 2. Install a drainage and spreader system to collect and distribute run-off to the vernal pools on-site (non-crownscale and non-navarretia habitat), and a system to collect, retain, and distribute street drainage from the development for release through the spreader system (non-crownscale and non-navarretia habitat). The water then is transferred to vernal pools south of the site (crownscale and navarretia habitat in Unit 2) through the transfer system constructed as part of the JP Ranch project (described below). 3. Other costs – Implement BMPs during construction, employ biological monitoring and flagging of vernal pools during construction, provide funding for the long-term management of the conservation-site, protect the site by fencing and signage, prohibit planting of invasive exotic plants, restrict the use of pesticides, and develop an educational program for owners and visitors.	1. Cost to restore 2.24 acres of on-site vernal pool habitat at Tres Cerritos West is $340,100 and includes 10 years of weed control and monitoring.[73] The cost to restore the on-site vernal pool habitat is not related to crownscale or navarretia conservation as the species are not present and none of the activities benefit the species or their habitats. 2. Cost of the on-site water collection and distribution system is not related to crownscale or navarretia conservation. Cost of the off-site water collection and distribution system to transfer water to vernal playa in Unit 2 is related to crownscale and navarretia conservation. The cost of this system is described in the discussion of the JP Ranch project below. 3. Other costs are not related to crownscale or navarretia conservation as the species are not present and none of the activities benefit the species or their habitats.

[72] U.S. Fish and Wildlife Service, December 17, 2004, Section 7 Consultation for Tres Cerritos West, Riverside County, California (FWS-WRIV-4202.2); LSA Associates, Inc., October 25, 2004, "Tres Cerritos West (BTTM 31513) Project Hemet, California, Determination of Biologically Equivalent or Superior Preservation;" L&L Environmental, Inc., July 2004, "Tres Cerritos West Specific Plan Amendment, Hemet, Riverside County, California, General Biological Survey Report 2003 and Biological Summary Report 2004 With an Environmental Assessment;" and personal communications with Sharon Lockhart, Lockhart and Associates, March 30, 2005, and Service Biologist, Carlsbad Fish and Wildlife Office, March 31, 2005.

[73] Personal communication with Robert MacAller, Senior Restoration Biologist, RECON, March 31, 2005.

Year	Type	Project Description	Species and CHD Unit	Summary of Conservation/Mitigation	Conservation/Mitigation Activity Costs
2004	Formal	Corman Leigh Community, Inc., LLC - JP Ranch, a 28 acre development project consisting of 85 single-family homes on 22 acres.	Crownscale and navarretia in Unit 2.	1. The project is expected to impact up to 0.48 acres (20,905 square feet (sf)) of vernal pools. Conservation easement to protect 2.6 acres on-site. Acquire (by December 2006) an additional 1.26 acres of off-site conservation land from the Tres Cerritos West project for vernal pool restoration/creation, which will include the introduction crownscale and navarretia seeds or seedlings into the area. Mitigation will include the creation/restoration of vernal pool surface area (30,000 sf) based on a 1.5:1 mitigation ratio. If the purchase from Tres Cerritos West does not occur, purchase 1.5 acres of vernal pool habitat within the Salt Creek Vernal Pool Complex. Mitigation is in response to impacts to non-crownscale and non-navarretia vernal pool habitat (i.e., vernal pools that do not contain crownscale and navarretia).[74] 2. Install and maintain a water collection and distribution system to capture and divert clean flows from the north of the project site, south to vernal playa habitat (crownscale and navarretia habitat in Unit 2) in perpetuity. 3. Other costs – Implement standard BMPs during construction, employ biological monitoring and flagging of vernal pools during construction, provide funding for the long-term management of the conservation-site, protect the site by fencing and signage, prohibit planting of invasive exotic plants, restrict the use of pesticides, and develop an educational/informational program.	1. Cost to restore 1.26 acres of off-site vernal pool habitat at Tres Cerritos West is $207,600, and includes 10 years of weed control, monitoring, and reporting.[75] The cost to restore the off-site vernal pool habitat is not related to crownscale or navarretia conservation as the species are not present and none of the activities benefit the species or their habitats. 2. Cost of the off-site water collection and distribution system ($264,000) to transfer water to vernal playa habitat in Unit 2 is related to crownscale and navarretia conservation. The bi-furcated storm-drain system will be constructed in 2005 at a cost of approximately $2,800 per developed acre (22 acres at JP Ranch and 71.4 acres at Tres Cerritos).[76] 3. Other costs are not related to crownscale or navarretia conservation as the species are not present and none of the activities benefit the species or their habitats.

74 U.S. Fish and Wildlife Service, July 2, 2004, Section 7 Consultation for JP Ranch, Riverside County, California (FWS-WRIV-3611.1); LSA Associates, Inc., July 28, 2004, "JP Ranch Project, Hemet, California, Determination of Biologically Equivalent or Superior Preservation;" and personal communications with Sharon Lockhart, Lockhart and Associates, March 30, 2005, and Service Biologist, Carlsbad Fish and Wildlife Office, March 31, 2005.

75 RECON, November 3, 2004, "Vernal Pool Habitat Restoration and Ten-Year Mitigation Monitoring Plan for the JP Ranch Specific Plan, City of Hemet, California."

76 Personal communication with Dan Beal, Senior Project Manager, Corman Leigh Communities, Inc., LLC, April 7, 2005.

Year	Type	Project Description	Species and CHD Unit	Summary of Conservation/Mitigation	Conservation/Mitigation Activity Costs
2000	Informal	Heartland / MSK Realty Ventures, LLC - Heartland Village, a 665-acre project consisting of golf course and 1,775 residential units.	Crownscale and navarretia in Unit 2	1. Revised project's drainage to provide historical flows to crownscale and navarretia habitat (Unit 2). Install a wet well and pumping system to supply storm flows diverted by the development to the crownscale and navarretia vernal playa habitat down slope. The pumping system, two 275 HP and two 150 HP pumps (designed rate of 125 cfs), will deliver a 2-year flood event (62 acre-feet of runoff) over a six hour duration, and a 10-year storm event (92 acre-feet) over approximately nine hours.[77] 2. The City of Hemet will be responsible for monitoring, maintaining, and operating the system. The annual costs will be provided through tax assessments levied against the Heartland Village property and administered through a landscape lighting maintenance district.	1. The capital costs of revising project's drainage are $624,000, including design ($60,000).[78] These costs are related to crownscale and navarretia conservation. No information is available on the timing of the capital costs, therefore, this analysis assumes the costs were uniformly distributed during the period 2001 through 2005. 2. Annual costs of operating the drainage system are related to crownscale and navarretia conservation. An annual repair and maintenance budget for a submersible pumping system should approximate one percent of capital costs, or $5,640.[79] While the system is designed to operate at a greater than 2-year flood event, annual operating costs are estimated at $2,000 (operating a full day).[80]

77 U.S. Fish and Wildlife Service, October 17, 2004, Section 7 Consultation for Heartland, Riverside County, California; and Heartland Village, July 12, 2000, "Project Description, Hydrology Analysis, and Proposed Drainage System Modification."

78 Heartland Village, July 12, 2000, "Project Description, Hydrology Analysis, and Proposed Drainage System Modification."

79 Personal communication with Dan Murdock, Irrigation Engineer, NRCE, Inc., April 11, 2005.

80 Personal communication with Richard Masyszek, Head of Planning, City of Hemet, March 30, 2005.

Conservation at Tres Cerritos West and JP Ranch involves the conservation, creation, and restoration of vernal pool habitat without crownscale (or navarretia) to offset impacts associated with construction. The restoration, enhancement, and creation occur at a ratio of 1:1 to 1.5:1. Conservation also includes ten years of monitoring, weed control, and reporting, the installation of on-site water collection and distribution systems to capture and divert clean flows from the north of the project sites, south to vernal playa habitat (crownscale and navarretia habitat in Unit 2) and numerous best management practices (BMPs) and project modifications (e.g., employ biological monitoring and flagging of vernal pools during construction, protect the site by fencing and signage, and prohibit planting of invasive exotic plants) to protect the plant during and after construction activities. The cost of the off-site water collection and distribution system to transfer water to vernal playa habitat in Unit 2 is related to crownscale and navarretia conservation (see Table 6 for more detail).

Heartland Village is located outside the boundaries of Unit 2; however, the project incorporates conservation efforts to protect crownscale (and navarretia) in Unit 2 (see Table 6 for more detail). Similar to Tres Cerritos West and JP Ranch, Heartland Village conservation included maintaining historical water flows to crownscale (and navarretia) habitat down slope (Unit 2). However, rather than the gravity system adopted at Tres Cerritos West and JP Ranch, this development installed a wet well and pumping system to supply storm flows diverted by the development to the crownscale and navarretia vernal playa habitat down slope. The developer paid $624,000 to revise, design, and install the pumping system and the City of Hemet is responsible for the annual monitoring, maintenance, and operation of the system. The annual monitoring, maintenance, and operating cost, estimated at $7,640, is provided through tax assessments levied against the Heartland Village property and administered through a landscape lighting maintenance district.

While these projects incurred a variety of vernal pool-related conservation efforts, only the water projects are related to crownscale. The remaining habitat restoration, enhancement, and creation, BMPs, and project modifications are related to non-crownscale vernal pool habitat conservation and protection. The estimated pre-designation cost of these conservation efforts for the crownscale are summarized in Table 7. Even though these projects began during the pre-designation period, certain conservation efforts are expected to occur in years following the final designation of critical habitat. The cost of these post-designation conservation efforts are presented in this discussion of pre-designation economic impacts as the conservation efforts are a result of section 7 consultations that occurred prior to the final designation of critical habitat. The first column of Table 7 reports the costs incurred during the pre-designation period (1998-2005) in 2005 dollars. The second column presents the total post-designation costs from 2006 to 2025 in undiscounted dollars, and the third and fourth columns report the total post-designation costs using discount rates of three percent and seven percent, respectively. The last two columns present the annualized costs, also using discount rates of three percent and seven percent, respectively.[81]

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[81] The annualized post-designation conservation costs discounted at three and seven percent are equal because the annual undiscounted dollar conservation costs are constant during the post-designation period (i.e., $7,640 in annual monitoring, maintenance, and operating costs at Heartland Village over the next 20 years).

Table 8 illustrates the total economic impacts attributable to development-related section 7 consultations that occurred during the pre-designation period (1998-2005). The table combines the administrative costs of the section 7 consultation process presented earlier in Table 5 with the cost of conservation efforts presented in Table 7.

Table 7
Pre-Designation Conservation Costs to Development, by Habitat Unit (2005 dollars)[82]

Habitat Unit	Pre-Designation (Total)	Post-Designation (Total)[a/]			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Unit 1 - San Jacinto River	$0	$0	$0	$0	$0	$0
Unit 2 -Salt Creek	$926,300	$152,800	$113,700	$80,900	$7,600	$7,600
Unit 3 - Alberhill Creek	$0	$0	$0	$0	$0	$0
Total Essential Habitat	**$926,300**	**$152,800**	**$113,700**	**$80,900**	**$7,600**	**$7,600**

a/ Costs in the post-designation period reflect future costs for projects initiated prior to the designation.

Note: Numbers may not sum due to rounding.

Table 8
Pre-Designation Total Economic Impacts to Development, by Habitat Unit (2005 dollars)

Habitat Unit	Pre-Designation (Total)	Post-Designation (Total)[a/]			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Unit 1 - San Jacinto River	$0	$0	$0	$0	$0	$0
Unit 2 -Salt Creek	$977,200	$152,800	$113,700	$80,900	$7,600	$7,600
Unit 3 - Alberhill Creek	$0	$0	$0	$0	$0	$0
Total Essential Habitat	**$977,200**	**$152,800**	**$113,700**	**$80,900**	**$7,600**	**$7,600**

a/ Costs in the post-designation period reflect future costs for projects initiated prior to the designation.

Note: Numbers may not sum due to rounding.

82 Table 7 and Table 8 present mitigation costs of projects begun in the pre-designation period, but include post-designation costs since projects from the pre-designation period often incur costs that continue into the post-designation period.

5.2 THE COSTS OF POST-DESIGNATION ACTIVITIES

5.2.1 MITIGATION FEES

Within the confines of the Western Riverside County MSHCP Plan Area, developers pay a fee for development. These mitigation fees vary by the type (e.g., commercial, residential, industrial) and density of proposed development projects and contribute to a fund used by the Regional Conservation Authority (RCA) to purchase valuable habitat for preservation in the MSHCP Conservation Area. The MSHCP established the following development mitigation fees: $1,651 per dwelling unit for residential development with density less than 8.0 dwelling units per acre; $1,057 per dwelling unit for residential development with density between 8.1 and 14.0 dwelling units per acre; $859 per dwelling unit for residential development with density greater than 14.0 dwelling units per acre; and $5,620 per acre for commercial and industrial development.[83] All new development within the bounds of the essential habitat must pay these fees, regardless of whether or not the development impacts the plant and/or its habitat.[84]

In addition to the mitigation fee, developers also incur other conservation activity costs. These additional conservation costs fall into three categories: (1) habitat restoration and enhancement or creation; (2) perpetual management of the restored and enhanced or created habitat; and (3) other project modifications and BMPs.

5.2.2 CONSERVATION ACTIVITIES

Although not explicitly written into the MSHCP, mitigation ratios for impacts to vernal pools typically range from one-to-one (1:1), to three-to-one (3:1).[85] Due to the regulatory measures of the CWA (see Section 4.2.1), development projects proposing to dredge or fill vernal pools require a section 404 permit from the USACE and are therefore required to consult with the Service under section 7 of the Act. Efforts to avoid, minimize, or offset adverse impacts to the habitat of listed vernal pool species is generally determined through biological opinions (BOs) written by the Service during section 7 consultations and embody both the conservation required by the USACE to achieve no net loss, as well as additional conservation efforts recommended by the Service to avoid, minimize, or offset the project's impacts to the habitat of listed species. The section 7 consultation records for the crownscale (summarized in Table 6) illustrate that development projects have offset impacts to vernal pool habitat at mitigation ratios ranging from 1:1 to 1.5:1.

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83 Riverside County Ordinance 810.2, http://www.tlma.co.riverside.ca.us/ordinances/ord810.2.html, accessed April 18, 2005.

84 Personal communication with Ken Graff, Administrative Services Officer, Regional Conservation Authority, Riverside County, April 18, 2005.

85 Personal communication with Ron Rempol, Regional Conservation Authority, Riverside County, April 6, 2005.

Assuming developers cannot avoid vernal pools altogether, several options exist for meeting USACE, MSHCP, and Service conservation requirements. Measures for achieving USACE no net loss can include: creating vernal pool habitat to support a wetted acre on-site; purchasing land off-site and creating vernal pool habitat sufficient to support a wetted acre; or restoring and enhancing a historic wetted acre to at least the functional value exhibited by the wetted acre lost.[86] Meeting required conservation over and above the USACE no net loss as determined by the Service or through MSHCP requirements can be accomplished by: restoration and enhancement; creation; purchasing preservation credits from a conservation bank; or purchasing vernal pool habitat from a private land owner and preserving wetted acreage.[87] The section 7 consultation records indicate that habitat restoration/enhancement and creation have been recommended by the Service as conservation for urban development within the crownscale essential habitat since the species was listed; however, the Service is not likely to recommend habitat creation unless the appropriate soils and hydrology are present.[88]

To account for the range of mitigation ratios and the variety of mitigation measures available to the developer for conservation, the analysis presents the costs incurred by development for crownscale conservation as a range. Other options are acknowledged to exist (e.g., purchasing credits from conservation banks); however, by applying the least costly measure to the low end of the range of mitigation ratios and the most costly measure to the high end of the range of mitigation ratios, the analysis captures and reports the costs associated with other combinations of mitigation ratios and conservation efforts used to offset impacts to the species and its habitat.

At the low-end of the range, the analysis uses the minimum mitigation ratio (1:1) that meets the Federal goal of no net loss of wetlands, and then applies the least costly of the conservation efforts (i.e., habitat restoration and enhancement) to mitigate impacts. The cost range for habitat restoration and enhancement is approximately $40,000 to $75,000 per acre; the analysis uses $40,000 as the low-end cost attributable to conservation.[89] Habitat restoration and enhancement of the wetted vernal playa habitat can occur either on- or off-site. For off-site habitat restoration and enhancement it is assumed the vernal playa habitat was either already owned by the developer, or that habitat can be restored and enhanced without requiring that the developer purchase land.

In addition to the $40,000 cost of habitat restoration and enhancement efforts, developers are increasingly being required at the time of permitting to also fund an endowment for the perpetual management of the

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86 Personal communication with Eric Nickell, Vice President, Economic and Planning Systems, Inc., Sacramento, California, April 12, 2005.

87 Ibid.

88 Personal communication with Service Biologist, Carlsbad Fish and Wildlife Office, May 11, 2005.

89 Personal communication with Robert MacAller, Senior Restoration Biologist, RECON, April 8, 2005; restoration and enhancement costs range typically range from $40,000 to $75,000 per acre and include restoration/enhancement of vernal pool habitat to a level of required functional value and the first five years of management costs for the restored vernal pool habitat.

vernal pool habitat they are restoring and enhancing. These management costs range from $550 to $750 per acre annually,[90] or approximately $18,000 per acre if paid by the developer as an endowment up front.[91] If restoration were to occur within the MSHCP Conservation Area, the RCA would assume perpetual management of the restored vernal pool habitat.[92] To avoid underestimating forecast impacts to developers, this analysis assumes that all habitat restoration occurs outside the bounds of the MSHCP Conservation Area and that developers pay the endowment to manage the restored habitat. This assumption is motivated by the ambiguous boundary of the MSHCP Conservation Area, and the uncertain spatial distribution of future restoration relative to the MSHCP Conservation Area.[93] Should the restoration take place within the bounds of the MSHCP Conservation Area, the management costs would simply transfer from the developer to the RCA.

As illustrated in the section 7 consultation history for crownscale, developers implement BMPs and other project modifications (e.g., employ biological monitoring and flagging of vernal pools during construction activities, protect the vernal pool site by fencing and signage, prohibit the planting of exotic plants, and restrict the use of pesticides) to protect the plant and/or its habitat during and after construction activities. This analysis estimates that the cost to developers of implementing these BMPs and project modifications is approximately $20,000 per acre.[94] In total, the low-end cost of conservation efforts, assuming habitat restoration and enhancement, is $78,000 per wetted acre of vernal playa habitat impacted.

At the high-end of the cost range, the analysis uses the highest mitigation ratio (3:1) and then applies the most costly conservation measure (i.e., habitat creation) to offset impacts.[95] The cost of creating vernal

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90 Personal communication with Robert MacAller, Senior Restoration Biologist, RECON, March 31, 2005.

91 Assuming the average annual per acre cost for management of restored vernal pool habitat, $650, and that the average capitalization rate used by public and private entities to calculate restoration management endowments in San Diego County, 3.625 percent, is comparable for Riverside County endowment calculations, the formula for the present value of a perpetuity, C/r, is used, where C is $650 per acre annually, and r is 0.03625, to arrive at an estimated endowment of $17,931 per acre. Source of capitalization rate is personal communication with Jeremy Buegge, Director of Planning and Land Use, MSCP Division of San Diego County, April 8, 2005.

92 Personal communication with Ron Rempol, Regional Conservation Authority, Riverside County, April 6, 2005.

93 The boundaries of the Reserve Area are uncertain and open to interpretation. The MSHCP plan area is divided into cells, and a range of percentages of proposed conserved habitat is identified for each cell. As described in the MSHCP, "[t]he conceptual designs for each Area Plan do not represent the only possible MSHCP Conservation Area that may be assembled within a particular Area Plan during the long-term MSHCP implementation process. Flexibility is incorporated in the target acreage ranges and the Area Plan Criteria to allow Reserve Assembly to be informed by project-specific data and planning as part of the MSHCP implementation process." Source: Riverside County, 2003, *Riverside County Integrated Project Multiple Species Habitat Conservation Plan (MSHCP), Volume 1 –The Plan*, pp. 3-115.

94 Personal communication with Randall R. Schroeder, Lennar – Corona, April 8, 2005.

95 The section 7 consultation records for the crownscale (summarized in Table 6) illustrate that development projects have mitigated at ratios ranging from 1:1 to 1.5:1. Although not explicitly written into the MSHCP,

playa habitat (i.e., enhancing a wetted acre to a typical measure of equivalent functional value) and managing the created habitat for five years following creation is approximately $75,000 per acre.[96] Thus, under this set of high cost assumptions, the cost of offsetting impacts to one acre of habitat is $225,000. Similar to habitat restoration and enhancement, habitat creation can occur either on- or off-site. For off-site habitat creation, it is assumed the vernal playa habitat was either already owned by the developer, or that habitat can be restored and enhanced without requiring that the developer purchase land. For on-site creation, it is also assumed that the creation of wetted acres of vernal playa habitat occurs on land that would have been unfit for development regardless of the existence of vernal pools.[97]

In addition to the $225,000 cost of habitat creation, developers will also fund the endowment for the perpetual management of the created vernal playa habitat at the time of permitting and implement BMPs and project modifications to protect the plant and/or its habitat during and after construction activities. As described previously, the estimated per acre cost of the endowment and BMPs/project modifications is $18,000 and $20,000, respectively, or $114,000 per acre for the three acres created under the high-end scenario.[98] In total, the high-end cost of conservation efforts, assuming habitat creation, is $339,000 per wetted acre of vernal playa habitat impacted.

The estimated post-designation costs are presented in the subsections below, as well as the assumptions, data, and methods used to arrive at the estimates of post-designation costs incurred by development for conserving the crownscale.

5.2.3 ASSUMPTIONS

A formal process exists to determine if a developer's property is needed for inclusion in the MSHCP Reserve Area. This process is called Habitat Evaluation and Acquisition Negotiation Strategy (HANS).

> "The HANS Process applies to property that may be needed for inclusion in the MSHCP Conservation Area or subjected to other MSHCP Criteria. Under the incentive-based MSHCP program, the County may obtain interests in property needed to implement the MSHCP (interest may be obtained in fee, conservation easement, deed restriction, land exchange, flood control easement or other type of interest acceptable to the County). If it is determined that all or a portion of property is needed for inclusion in the MSHCP Conservation Area, various incentives may be available to the property owner in lieu of

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mitigation ratios for impacts to vernal pools typically range from one-to-one (1:1), to three-to-one (3:1). Personal communication with Ron Rempol, Regional Conservation Authority, Riverside County, April 6, 2005.

96 Personal communication with Robert MacAller, Senior Restoration Biologist, RECON, March 31, 2005.

97 Land must have the requisite characteristics and soil composition in order to support the creation of vernal pool habitat. If a development project is required to mitigate on-site for vernal pool impacts, then implicit in that requirement is the fact that the land on which the development is planned either currently supports or at one time supported vernal pools.

98 3 acres x ($18,000 + $20,000) = $114,000.

> or in addition to monetary compensation in exchange for the conveyance of a property interest. Development of property outside of the MSHCP Conservation Area will receive Take Authorization provided payment of a mitigation fee is made (or any credit for land conveyed is obtained) and compliance with the MSHCP occurs. Payment of the mitigation fee and compliance with the requirements of the MSHCP are intended to provide full mitigation under the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), Federal Endangered Species Act, and California Endangered Species Act."[99]

As described above, HANS is a negotiation process that addresses each development project individually, and the negotiated terms and incentives for forecasted development within a unit are uncertain. Considering also the ambiguous boundaries of the Reserve Area and the unknown location of forecasted development within a unit, the extent to which forecasted development would be constrained by crownscale conservation is uncertain. Thus, a forecast of the number of acres of developable land removed from development and added to the MSHCP Reserve Area is speculative at best. Given these uncertainties, this analysis forecasts development within each unit of essential habitat as if the development were taking place outside of the Reserve Area, assuming the appropriate mitigation occurs and Local Development Mitigation Fees (LDMFs) paid. The LDMFs raised would then be used to purchase mitigation lands to add to the Reserve Area. To the extent that all or a portion of a landowner's developable land is needed for the Reserve Area, the land would be appraised and if required, purchased with funds raised through the payment of LDMF (if adequate funds are available).

All vernal playa in essential habitat are also assumed to fall under USACE jurisdiction and therefore, all development activity taking place within the bounds of essential habitat result in a section 7 consultation with the Service. Although a 2001 court decision issued in *Solid Waste Agency of Northern Cook County (SWANCC) v. United States Army Corps of Engineers* alters current USACE jurisdiction of isolated wetlands, the decision is not expected to have a significant effect on future USACE jurisdiction over vernal pools in Riverside County as seasonally flooded alkali vernal playas are generally connected to USACE jurisdictional waters in the County.[100] Moreover, the result of the SWANCC decision has not been formalized through any policy action. Should the nature of USACE jurisdiction over vernal pools change due to the SWANCC decision, the Service would likely continue to recommend mitigation ratios similar to those imposed prior to USACE jurisdictional restructuring, given a Federal nexus. In any event, the "biologically equivalent or superior" conservation required for development impacting vernal pool species in the MSHCP Plan Area is similar in language to that of current Federal regulations, and

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99 County of Riverside Transportation and Land Management Agency Planning Department, "Property Owner Initiated Habitat Acquisition and Negotiation Strategy (HANS) Application, Single Family Residence [Form 295-1042B (3/04)]."

100 U.S. Fish and Wildlife Service, 2003, "Final Economic Analysis of Critical Habitat Designation for Vernal Pool Species, Appendix E: Implementation of the Federal Clean Water Act and State Water Statutes," p. E-3; personal communication with Service Biologist, Carlsbad Fish and Wildlife Office, May 11, 2005.

therefore likely mimics the level of protection of existing conservation required under Federal regulations.

A uniform distribution of crownscale and vernal playa throughout the essential habitat is also assumed in this analysis. This assumption will clearly bias upward the estimate of post-designation impact incurred by development as it implies that every acre of future development within the bounds of the essential habitat will affect crownscale habitat and require conservation.

5.2.4 DEVELOPMENT PROJECTIONS

5.2.4.1 Methods

Projections on residential (low, medium and high densities), commercial, and industrial development in the essential habitat from 2006 to 2025 for use in the post-designation cost estimation are made for each habitat unit in Riverside County. For Riverside County, the projections are made for each habitat unit based on: 1) the detailed current land use as of 2000, and 2) annual county-level population projections. Specifically, acres of commercial, industrial and residential (low-, medium-, and high-density) development for each year from 2006 to 2025 are estimated for each essential habitat unit in Riverside County by assuming that commercial, industrial, and residential development will grow at the same rate as the population in Riverside County.

5.2.4.2 Data

Annual population projections for Riverside County were obtained from the California Department of Finance, Demographic Research Unit (see Table 9). Based on these population projections, the annual growth rates of population are calculated for Riverside County.

Table 9
Population Projections and Annual Growth, Riverside County

Year	Projected Population	Annual Growth Rate
1998	1,466,497	2.10%
1999	1,514,581	3.28%
2000	1,553,902	2.60%
2001	1,616,704	4.04%
2002	1,682,408	4.06%
2003	1,758,719	4.54%
2004	1,815,394	3.22%
2005	1,871,587	3.10%
2006	1,929,377	3.09%

Year	Projected Population	Annual Growth Rate
2007	1,986,790	2.98%
2008	2,045,620	2.96%
2009	2,105,041	2.90%
2010	2,165,148	2.86%
2011	2,214,692	2.29%
2012	2,264,798	2.26%
2013	2,315,369	2.23%
2014	2,366,327	2.20%
2015	2,417,508	2.16%
2016	2,468,892	2.13%
2017	2,520,404	2.09%
2018	2,572,090	2.05%
2019	2,623,874	2.01%
2020	2,675,648	1.97%
2021	2,724,967	1.84%
2022	2,774,280	1.81%
2023	2,823,839	1.79%
2024	2,873,652	1.76%
2025	2,923,758	1.74%

Source: California Department of Finance, Demographic Research Unit, http://www.dof.ca.gov/html/Demograp/DRU_datafiles/DRU_datafiles.htm.

Current acres of low-density residential (RL), medium-density residential (RM), high-density residential (RH), commercial (C), and industrial (I) development within each essential habitat unit is estimated based in the GIS analysis of land use data. The Southern California Association of Governments (SCAG) maintains GIS data describing land use in Riverside County for 2000.[101] These GIS data were intersected with the essential habitat to describe land use within the affected region. The SCAG land use categories were aggregated to the five categories mentioned above. Table 10 details the aggregation of the SCAG land use classes.

Acres of commercial, industrial, and residential (low-, medium-, and high-density) development within each essential habitat unit as of 2005 are then estimated by assuming that commercial, industrial, and

[101] Southern California Association of Governments, Region Land Use - 2000, www.scag.ca.gov.

residential development grew at the same annual rate as the population in Riverside County leading up to 2005. Table 11 presents the acreage by current land use category within each essential habitat unit.

Table 10
Aggregation of SCAG Land Use Data

SCAG Land Use Classification	C	I	RH	RM	RL	DV	UD
High-Density Single Family Residential			X				
Trailer Parks and Mobile Home Courts, High-Density	X						
Rural Residential, High-Density				X			
Rural Residential, Low-Density					X		
Regional Shopping Center	X						
Modern Strip Development	X						
Fire Stations		X					
Manufacturing, Assembly, and Industrial Services		X					
Open Storage	X						
Mineral Extraction - Other Than Oil and Gas		X					
Airports	X						
Freeways and Major Roads	X						
Water Storage Facilities	X						
Water Transfer Facilities	X						
Improved Flood Waterways and Structures							X
Maintenance Yards	X						
Mixed Transportation	X						
Mixed Transportation and Utility		X					
Under Construction			X				
Golf Courses	X						
Wildlife Preserves and Sanctuaries							X
Other Open Space and Recreation							X
Irrigated Cropland and Improved Pasture Land						X	
Non-Irrigated Cropland and Improved Pasture Land						X	
Orchards and Vineyards						X	
Nurseries						X	
Dairy, Intensive Livestock, and Associated Facilities						X	
Poultry Operations		X					
Other Agriculture						X	

SCAG Land Use Classification	C	I	RH	RM	RL	DV	UD
Horse Ranches						X	
Vacant Undifferentiated						X	
Water, Undifferentiated							X

Table Key:

RL	Residential, low density (<8 units/acre)	I	Industrial
RM	Residential, medium density (8.1-14 units/acre)	DV	Developable land
RH	Residential, high density (>14 units/acre)	UD	Undevelopable land
C	Commercial		

Table 11
Acreage by Current Land Use Category and Habitat Unit

Habitat Unit	Developed 2005						Developable (2005)
	RL	RM	RH	C	I	Total	
Unit 1	20.9	0.1	0.0	106.9	3.8	131.7	5,401.2
Unit 2	80.4	0.0	162.8	172.6	60.3	476.1	2,676.5
Unit 3	0.0	0.0	0.0	0.9	0.0	0.9	31.2
Total	**101.3**	**0.1**	**608.7**	**280.4**	**64.1**	**608.7**	**8,108.9**

Note: Numbers may not sum due to rounding.

5.2.4.3 Forecasted Acres of Land Development

Based on the methods and data discussed above, acres of commercial, industrial, and residential (low-, medium-, and high-density) development in each year from 2006 to 2025 are estimated for each essential habitat unit in Riverside County assuming that commercial, industrial, and residential development will grow at the same rate as the population in Riverside County. Table 12 presents the total number of acres that are forecasted to be developed during the post-designation period (2006-2025).

Table 12
Forecasted Acres of Land Developed Between 2006 and 2025 by Habitat Unit

Habitat Unit	Developed 2006-2025						
	RL	RM	RH	C	I	Total	Percent
Unit 1	11.8	0.1	0.0	60.1	2.1	74.1	21.6%
Unit 2	45.2	0.0	91.5	97.0	33.9	267.6	78.2%
Unit 3	0.0	0.0	0.0	0.5	0.0	0.5	0.1%
Total	**56.9**	**0.1**	**91.5**	**157.7**	**36.0**	**342.2**	**100.0%**

Note: Numbers may not sum due to rounding.

5.2.5 ESTIMATION RESULTS: COSTS OF MITIGATION FEES AND CONSERVATION ACTIVITIES

Post-designation costs incurred by developers and landowners resulting from crownscale-related conservation is estimated based on the projected acres of land development and costs associated with different conservation efforts. The estimation procedure is described below.

Step 1: Estimate the costs incurred by development for habitat conservation plan-related mitigation fees and conservation activities required to conserve the crownscale. As discussed previously, costs associated with different conservation efforts were obtained from the Western Riverside County MSHCP, a restoration biologist familiar with vernal pool restoration, creation, and enhancement in southern California, from developers impacted by vernal pool habitat at their project site, and from the historic section 7 consultation records obtained from the Service. The typical range of mitigation ratios was obtained from the RCA and corroborated with historic section 7 consultation records.

Table 13 provides a summary of the habitat conservation plan-related mitigation fees that developers pay for each acre of adversely modified habitat impacted on lands within the bounds of the Western Riverside County MSHCP. Total mitigation fees incurred by developers for the conservation of the crownscale range from $5,620 to $17,180 per acre impacted, depending on the type (e.g., commercial, residential, or industrial) of proposed development.

Table 13
Per Acre Mitigation Fee Costs by Land Use Category

	RL	RM	RH	C	I
One-time Mitigation Fee per Dwelling Unit	$1,651	$1,057	$859		
Average Dwelling Units per Acre	5	10	20		
One-time Mitigation Fee per Acre	$8,255	$10,570	$17,180	$5,620	$5,620

Source: Riverside County, 2003, *Riverside County Integrated Project Multiple Species Habitat Conservation Plan (MSHCP)*, *Volume 1 – The Plan*, http://www.rcip.org/mshcpdocs/vol1/mshcpvol1toc.htm; and Riverside County Ordinance 810.2, http://www.tlma.co.riverside.ca.us/ordinances/ord810.2.html, accessed April 2005.

In addition to habitat conservation plan-related mitigation fees paid by developers in western Riverside County, developers must also offset their activities if their development activities impact vernal pool habitat. Table 14 provides a summary of the conservation activity costs and corresponding mitigation ratios applied in this analysis. Total conservation activity costs incurred by developers for the conservation of the crownscale range from $78,000 to $339,000 per wetted acre of essential habitat impacted, depending on the measure of conservation negotiated and the mitigation ratio imposed.

This analysis focuses on developed acres, not wetted acres, and assumes that development on any portion of essential habitat will result in conservation activity. However, developers typically incur conservation

activity costs and no net loss obligations on impacts to only the wetted acreage.[102] Hence the need to adjust the acres of essential habitat used in the estimation of development costs to wetted acres by a scalar. In general, for every wetted acre, i.e., the vernal pool itself, there exists another eight to ten acres of upland habitat that surrounds the wetted acre. Therefore, implicit in the assumption of uniform distribution of vernal playa habitat is the assumption of nine acres of upland habitat for each wetted acre of vernal playa habitat. Based on this assumption, a scalar of 0.10 is applied to the conservation activity cost estimates in an effort to better represent the propensity for future development to impact vernal pools containing crownscale within the essential habitat and incur costs for conservation efforts determined through section 7 consultations. Furthermore, the limited section 7 consultation history indicates the development of upland acres has not required conservation. Therefore, this analysis assumes that development of upland acres requires only the payment of the MSHCP mitigation fees. This assumption may bias results downward if additional conservation efforts are required for development of upland acres.

Table 14
Per Acre Conservation Activity Costs

Components of Conservation	Restoration/ Enhancement	On-Site Creation of Vernal Playa Habitat
Vernal Playa Habitat Creation, Restoration, Enhancement[a/]	$40,000	$75,000
Endowment for Maintenance[a/]	$18,000	$18,000
Cost of Best Management Practice[b/]	$20,000	$20,000
Conservation Per Acre	$78,000	$113,000
Mitigation Ratio[c/]	1:1	3:1
Total Cost of Conservation	$78,000	$339,000
Scalar	0.10	0.10
Total Scaled Cost of Conservation	$7,800	$33,900

Sources:

a/ Based on personal communication with Robert MacAller, RECON, March 31, 2005, and Jeremy Buegge, Director of Planning and Land Use, MSCP Division of San Diego County, April 8, 2005.

b/ Personal communication with Randall R. Schroeder, Lennar – Corona, April 8, 2005.

c/ Personal communication with Ron Rempol, Regional Conservation Authority, Riverside County, April 6, 2005.

Step 2: Estimate the undiscounted conservation costs and present value of conservation costs from 2006 to 2025 in each habitat based on the projected acres of each type of development and the per-acre conservation costs. The annualized costs are discounted using discount rates of three and seven percent. The estimated costs of conservation efforts for the crownscale for residential, commercial, and industrial development are summarized in Table 15. The table combines the forecasted acres of development

[102] Personal communication with Robert MacAller, Senior Restoration Biologist, RECON, March 31, 2005.

presented earlier in Table 12 with the conservation costs presented in Table 13 and Table 14. The low-end cost assumes the payment of mitigation fees and habitat restoration and enhancement while the high-end cost range assumes the payment of the same mitigation fees, but conservation is through habitat creation. The first column of Table 15 presents the total post-designation costs from 2006 to 2025 in undiscounted dollars, and the second and third columns report the total post-designation costs using discount rates of three percent and seven percent, respectively. The last two columns present the annualized costs, also using discount rates of three percent and seven percent, respectively.[103]

Table 15
Post-Designation Conservation Cost to Development, by Habitat Unit (2005 dollars)[104]

Habitat Unit	Post-Designation (Total)			Post-Designation (Annualized)	
	Undiscounted	3%	7%	3%	7%
Unit 1 - San Jacinto River	$1,025,100 - $2,958,000	$769,400 - $2,220,200	$554,400 - $1,599,700	$52,300 - $149,200	$52,300 - $151,000
Unit 2 -Salt Creek	$4,768,800 - $11,754,100	$3,579,400 - $8,822,500	$2,579,100 - $6,356,900	$240,600 - $593,000	$243,400 - $600,000
Unit 3 - Alberhill Creek	$6,900 - $20,300	$5,200 - $15,200	$3,700 - $11,000	$300 - $1,000	$400 - $1,000
Total Essential Habitat	**$5,800,800 - $14,732,400**	**$4,354,000 - $11,057,900**	**$3,137,200 - $7,967,600**	**$292,700 – 743,300**	**$296,100 - $752,100**

Note: Numbers may not sum due to rounding.

5.2.6 Estimation Results: Administrative Cost of Section 7 Consultation

During the pre-designation (essentially 1999 through 2005) and post-designation (essentially 2006 through 2025) periods, the population of Riverside County is expected to grow 3.9 percent and 3.5 percent per year, on average, compared to base year 1998. While population growth during both periods is strong, the annual population growth during the post-designation period is 12 percent less than the annual growth during the pre-designation period. Considering the slower growth, this analysis expects that the rate of section 7 consultations during the post-designation period will not exceed the rate experienced during the pre-designation period. Hence, the analysis assumes that future consultations will occur at the same rate. As previously described, three development-related section 7 consultations took place during the seven year pre-designation period (1998-2005), two informal and one formal. Based on

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[103] The annual conservation costs, a function of the number of acres developed to low-, medium-, and high-density residential, commercial, and industrial land classes, vary with the forecasted annual population growth rate for the County during the post-designation period. The relative costs are close enough to result in similar annualized costs using discount rates of three and seven percent.

[104] Tables 15, 17, and 18 present post-designation costs of projects initiated in the post-designation period only; figures presented in these tables do not include the post-designation costs of projects initiated in the pre-designation period.

this rate of consultation activity, this analysis forecasts approximately six informal and three formal consultations during the post-designation period for residential, commercial, and industrial development (see Table 16). The analysis then allocates these post-designation section 7 consultations to each of the appropriate habitat units (see Table 16) based on the proportion of acres developed in each unit during the post-designation period (see Table 12).

Table 16
Post-Designation Section 7 Consultations to Development, by Habitat Unit

Habitat Unit	Informal Consultation	Formal Consultation
Unit 1 - San Jacinto River	1.2	0.6
Unit 2 -Salt Creek	4.5	2.2
Unit 3 - Alberhill Creek	<0.1	0.00
Total Essential Habitat	**5.7**	**2.9**

Note: Numbers may not sum due to rounding.

The estimated administrative cost of section 7 consultation for residential, commercial, and industrial development is summarized in Table 17. Total post-designation administrative costs are calculated by multiplying the average administrative section 7 cost by type of consultation (see Section 2.2.1 by the number of section 7 consultations forecast (see Table 16). The first column of Table 17 presents the total post-designation costs from 2006 to 2025 in undiscounted dollars, and the second and third columns report the total post-designation costs using discount rates of three percent and seven percent, respectively. The last two columns present the annualized costs, also using discount rates of three percent and seven percent, respectively.[105]

Table 17
Post-Designation Administrative Cost of Section 7 Consultation to Development, by Habitat Unit (2005 dollars)

Habitat Unit	Post-Designation (Total)			Post-Designation (Annualized)	
	Undiscounted	3%	7%	3%	7%
Unit 1 - San Jacinto River	$31,500	$23,400	$16,700	$1,600	$1,600
Unit 2 -Salt Creek	$113,700	$84,600	$60,200	$5,700	$5,700
Unit 3 - Alberhill Creek	$200	$200	$100	<$100	<$100
Total Essential Habitat	**$145,400**	**$108,200**	**$77,000**	**$7,300**	**$7,300**

Note: Numbers may not sum due to rounding.

[105] Because the time frame of the future section 7 consultations is unknown, the analysis assigns a uniform probability to administrative consultation costs being incurred in each year. As a result, the annualized post-designation administrative consultation costs are equal at three and seven percent discount rates.

5.2.7 ESTIMATION RESULTS: TOTAL POST-DESIGNATION ECONOMIC COSTS

Table 18 illustrates the post-designation total economic impacts attributable to residential, commercial, and industrial development forecast to occur during the post-designation period (2006-2025). The table combines the post-designation costs attributable to conservation and presented in Table 15 with the post-designation administrative cost of section 7 consultation provided in Table 17. Table 18 does not include the post designation costs presented in Table 7 that resulted from pre-designation development; these costs are included in Table 19, which presents total pre- and post-designation economic impacts.

Table 18
Post-Designation Total Economic Impacts to Development, by Habitat Unit (2005 dollars)

Habitat Unit	Post-Designation (Total)			Post-Designation (Annualized)	
	Undiscounted	3%	7%	3%	7%
Unit 1 - San Jacinto River	$1,056,600 - $2,989,500	$792,800 - $2,243,600	$571,100 - $1,616,400	$53,300 - $150,800	$53,900 - $152,600
Unit 2 -Salt Creek	$4,882,600 - $11,867,900	$3,664,000 - $8,907,100	$2,639,300 - $6,417,100	$246,300 - $598,700	$249,100 - $605,700
Unit 3 - Alberhill Creek	$7,100 - $20,500	$5,300 - $15,400	$3,800 - $11,100	$400 - $1,000	$400 - $1,000
Total Essential Habitat	**$5,946,200 - $14,877,800**	**$4,462,100 - $11,166,000**	**$3,214,200 - $8,044,600**	**$303,400 - $750,500**	**$303,400 - $759,400**

Note: Numbers may not sum due to rounding.

5.3 TOTAL ECONOMIC COST OF DEVELOPMENT ACTIVITIES

Table 19 presents the total economic impacts attributable to residential, commercial, and industrial development. Total economic impacts are calculated by summing the economic impacts for development activity during the period 1998 to 2005 (see Table 8) with the economic impacts for development activity during the period 2006 to 2025 (see Table 18). The first column of Table 19 presents the total pre-designation (1998-2005) costs in 2005 dollars. The second column reports the total pre- and post-designation costs from 1998 to 2025 in undiscounted dollars, and the third and fourth columns report the total pre- and post-designation costs using discount rates of three percent and seven percent, respectively. The last two columns present the annualized costs, also using discount rates of three percent and seven percent, respectively. More than 99 percent of these costs will be borne by developers.

Table 19
Total Economic Impacts to Development, by Habitat Unit (2005 dollars)

Habitat Unit	Pre-Designation (Total)	Post-Designation (Total)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Unit 1 - San Jacinto River	$0	$1,056,600 - $2,989,500	$792,800 - $2,243,600	$571,100 - $1,616,400	$53,300 - $150,800	$53,900 - $152,600
Unit 2 -Salt Creek	$977,200	$5,035,400 - $12,020,700	$3,777,700 - $9,020,700	$2,720,300 - $6,498,000	$253,900 - $606,300	$256,800 - $613,400
Unit 3 - Alberhill Creek	$0	$7,100 - $20,500	$5,300 - $15,400	$3,800 - $11,100	$400 - $1,000	$400 - $1,000
Total Essential Habitat	**$977,200**	**$6,099,000 - $15,030,600**	**$4,575,800 - $11,279,700**	**$3,295,100 - $8,125,500**	**$307,600 - $758,200**	**$311,000 - $767,000**

Note: Numbers may not sum due to rounding.

Among the habitat units, Unit 2 has the largest post-designation costs. Unit 2 currently contains the largest amount of developed land among the three habitat units and is projected to experience the largest amount of development in the next 20 years. Conversely, Unit 3 is mostly undeveloped (less than one acre of commercial development) and is forecast to have only 0.5 acres of new commercial development during the next 20 years.

6.1 EFFECTS ON ROAD PROJECTS

This section examines the costs of conservation efforts associated with past and future road projects in essential habitat for the crownscale. To date, other than the ongoing section 7 consultation for the State Route 79 realignment project near Hemet (Unit 2), there is no consultation history regarding transportation projects and the crownscale.

According to the California Department of Transportation (Cal Trans), no protective measures are put in place for work performed in the existing roadway, as habitat is not likely to be disturbed.[106] Therefore, this analysis focuses on road projects that may occur outside of the existing easement in crownscale essential habitat.

6.1.1 POST-DESIGNATION PROJECTS

6.1.1.1 Post-Designation Projects, 2006–2009

Cal Trans has six road projects planned in or around the essential habitat areas near the east-west Route 74, the north- south Route 215, and Route 79 during 2006–2009. However, only four of these projects will occur outside of the existing road easement (see Table 20).[107] A description of these projects is as follows:

Route 215 – Installing exit numbering signs between milepost 8.4 and 45.3.[108] Activities will not occur outside of the easement; therefore, crownscale-related conservation efforts are not expected.

Route 74 – Four projects are planned on Route 74, including:[109]

- Construction of a two-way left turn lane, curve realignment, and pavement widening between milepost 35 and 36, which is in Unit 2. Activities will take place outside of the easement;

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106 Personal communication with Quyen Tang, Biologist, District 8 (Riverside) Cal Trans Office, March 24, 2005.

107 As identified by Cal Trans Office; personal communication with Gary Green, Senior Transportation Planner, Regional Planning and Special Studies, Cal Trans, March 25, 2005.

108 Personal communication with Gary Green, Senior Transportation Planner, Regional Planning and Special Studies, Cal Trans, March 25, 2005.

109 Ibid.

therefore, crownscale-related conservation efforts are anticipated.[110] Riverside County Transportation Commission is the lead agency on this project and project funding is expected in June of 2007.

- Rubberized asphalt concrete resurfacing between mileposts 28 and 38. Activities will not occur outside of the easement; therefore, crownscale-related conservation efforts are not expected.

- Install traffic signals/safety lighting and curb ramps at Route 74 and Cawston Avenue at milepost 37.9, which is in Unit 2. Activities will likely occur outside of the easement; therefore, crownscale-related conservation efforts are anticipated. No estimate is available as to when construction will begin on this project.

- Construct curb ramps and sidewalks between mileposts 14 and 45, in Units 1 and 2. Activities are expected to occur outside of the easement; therefore, crownscale-related conservation efforts are anticipated. Costs associated with this project will be divided equally between habitat Units 1and 2. No estimate is available as to when construction will begin on this project.

Route 79 – Realignment of Route 79 between Domenigoni Parkway and Gilman Springs Road, which is in Unit 2. Consultation between the Service and Cal Trans has commenced, and it is likely that there will be project modifications as well as conservation efforts implemented specifically for the crownscale. However, consultants hired by Cal Trans indicate that it is too early to estimate what these protective measures may entail.[111]

Table 20
Planned Road Projects in Essential Habitat, 2006–2009

Habitat Unit	2006	2007	2008	2009	Undetermined	Total
Unit 1 - San Jacinto River	0.0	0.0	0.0	0.0	0.5	0.5
Unit 2 -Salt Creek	0.0	1.0	0.0	0.0	2.5	3.5
Unit 3 - Alberhill Creek	0.0	0.0	0.0	0.0	0.0	0.0
Average Annual Number of Projects			**1.0**			

Source: Planning Department, Cal Trans Riverside County Offices.

6.1.1.2 Post-Designation Projects, 2010–2025

Cal Trans transportation project projections only extend to 2009. To estimate post-designation costs associated with road projects beyond 2009, this analysis assumes that future Cal Trans projects during the

110 Personal communication with Tim Merdey, Project Manager, Cal Trans, March 25, 2005.

111 Personal communication with Carolyn Washburn, consultant, CH2M Hill, April 4, 2005.

period 2010–2025 will occur at the same rate as projects planned during the period 2006–2009 (see Table 20 above). Therefore, this analysis estimates 16 road projects will occur during 2010–2025.

Furthermore, at the County level, the crownscale has not been identified in any of the County road projects that have progressed through the environmental planning and design stages, and there is no indication that crownscale will be impacted by planned roads identified in the MSHCP that are currently in the environmental planning phase.[112] The environmental documentation for these projects has not progressed to a point where a forecast can be made as to whether the crownscale will be impacted. Similarly, many projects identified in the MSHCP have not received funding and consequently, the environmental planning and design stages have not been initiated.[113] While crownscale-related impacts and conservation specific to each of the planned road projects identified in the MSHCP cannot be determined at this time, this analysis assumes any road project affected by crownscale conservation is captured in the 16 road projects forecasted during the period 2010 through 2025 as described above.

Table 21 shows the number of forecasted road projects during the period 2010–2025, by unit. The analysis allocates the forecasted road projects to units based on the proportion of forecasted acres of land developed between 2006 and 2025 (see Table 12). Considering Cal Trans' forecast of planned projects does not extend beyond 2009, forecasted acres of future development are used as a proxy for the location of future road work, as future residential, commercial, and industrial development will require a road infrastructure. Due to the low proportion of development that is forecasted to occur in Unit 3 (0.1 percent), no projects are allocated to this unit.

Table 21
Forecasted Road Projects in Essential Habitat, 2010–2025

Habitat Unit	Forecasted Projects
Unit 1 - San Jacinto River	4
Unit 2 -Salt Creek	12
Unit 3 - Alberhill Creek	0
Total	**16**

6.1.2 CONSERVATION EFFORTS AND COSTS

Cal Trans departments of Riverside and San Diego counties have experience in performing construction activities in the vicinity of listed species.[114] The typical conservation efforts for plant species

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[112] Personal communication with Mary Zan Bon, Riverside County Department of Transportation, May 20, and May 23, 2005.

[113] Ibid.

[114] The navarretia and crownscale have overlapping habitat in Riverside County. The conservation activities and associated costs were developed through joint research efforts using Riverside and San Diego sources.

implemented on past transportation projects in these counties form the foundation for the assumptions made in this analysis about future conservation efforts and costs specific to the crownscale. Based on the past experience at Cal Trans, a suite of conservation efforts, which are similar to the construction guidelines described in the MSHCP, and costs for a representative road project are developed for protecting a listed plant during construction activities.[115] This representative project's conservation efforts and costs are then applied to each of the planned (2006–2009) and forecasted (2010–2025) road projects to estimate future crownscale-related conservation costs for road projects. The various cost components that comprise the representative project's conservation efforts are described below.

Before a project begins, a survey of the area is done to identify the plant species in the proposed project area. The cost for surveying depends on several factors including the size of the project area, as well as type and number of plants in the project area. The cost of surveying is generally less than $30,000,[116] however, crownscale-specific costs are estimated at $10,000 per project.[117] In this analysis, surveying efforts for the crownscale in or around the essential habitat are assumed to cost $10,000 per project.

If crownscale are identified through the surveys, several measures are available to avoid the plant species in order to minimize the disturbance. One method is altering the design of the project to avoid the essential habitat. The cost of re-aligning projects, especially transportation projects, can be considerable. However, it is not possible to anticipate if any of the planned and forecasted transportation projects will select this method of avoidance.

Fencing off areas that include listed plant species, or flagging sensitive plants are also avoidance tactics that will likely be used for the crownscale. Fencing or flagging generally costs a few thousand dollars to implement.[118] In this analysis, it is assumed that fencing or flagging tactics will be implemented in the planned project areas in or around the essential habitat at a cost of $3,000 per project.

A qualified biologist may be required to monitor activities in the project area during construction in order to avoid disturbing the crownscale and/or its habitat. The cost of having a qualified biologist on-site during construction activity is estimated at $25,000 per year.[119] It is further estimated by Cal Trans that the projects listed above will take one to three years to complete.[120] Because only portions of the above

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115 See Volume I, Section 6, Section 6.1.3, and Section 7.5.1 of the Western Riverside MSHCP.

116 Personal communication with Susan Scatolini, Biologist, District 11 (San Diego) Cal Trans Office, April 5, 2005.

117 Personal communication with Quyen Tang, Biologist, District 8 (Riverside) Cal Trans Office, March 24, 2005.

118 Ibid.

119 Personal communication with Susan Scatolini, Biologist, District 11 (San Diego) Cal Trans Office, April 5, 2005.

120 Personal communication with Quyen Tang, Biologist, District 8 (Riverside) Cal Trans Office, April 27, 2005.

projects will impact crownscale essential habitat, this analysis assumes that a biologist will be required to monitor activity in the planned projects in or near essential habitat for one year at cost of $25,000 per project.

In order to preserve habitat for the crownscale, it is likely that seed collection in the project area will be required. The cost of seed collection activities is dependent on the species and the size of the project. For sensitive, but not endangered, species on less than ten acres, Cal Trans has collected the seed, stored it in an office, and redistributed it on-site, an inexpensive process. For other more sensitive species, Cal Trans has hired a consultant to collect, store, and redistribute the seed, and/or propagate the seed and transplant the plants on-site, which has cost as much as $100,000. The crownscale is an annual plant, and hence propagation and transplanting is not appropriate. However, Cal Trans was unable to provide a cost estimate without these activities. To avoid underestimating forecast impacts, this analysis assumes that crownscale-related seed collection activities will cost $100,000 per project.[121]

Following construction activity, it is likely that monitoring will occur in the project area and/or in the mitigation area. Five years of monitoring is a standard practice for listed species. The cost for this type of monitoring is typically $25,000 per year, or $125,000 over the course of five years.[122] This analysis assumes that monitoring will be required for each project in or around crownscale essential habitat.

A summary of the estimated crownscale-related conservation efforts and costs for a representative road project is detailed in Table 22.

Table 22
Cost of Crownscale Conservation Efforts for Representative Project

Conservation Activity	Total Project Costs
Surveying	$10,000
Avoidance (Fence/Flag)	$3,000
Construction Monitoring	$25,000
Restoration	$100,000
Monitoring	$125,000[a/]
Total Cost	**$263,000**

a/ $125,000 = $5,000 x 5 years.

Note: Numbers may not sum due to rounding.

[121] Personal communication with Susan Scatolini, Biologist, District 11 (San Diego) Cal Trans Office, April 5, and May 11, 2005.

[122] Ibid., April 5, 2005.

The estimated costs of conservation efforts for the crownscale for road projects are summarized in Table 23. The table combines the forecasted number of projects in Table 20 (2006–2009) and Table 21 (2010–2025) with the conservation costs presented in Table 22. Post-designation (2006-2025) costs reported in Table 23 are presented in undiscounted dollars and 2005 dollars discounted at three percent and seven percent, respectively. Annualized costs for each habitat unit are presented using three percent and seven percent discount rates.[123] As previously described, there are no pre-designation costs for road transportation activities.

Table 23
Summary of Crownscale Conservation Efforts for Road Projects

Habitat Unit	Pre-Designation (Total)	Post-Designation (Total)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Unit 1 - San Jacinto River	$0	$1,121,000	$800,300	$537,000	$53,800	$50,700
Unit 2 -Salt Creek	$0	$3,889,000	$2,880,100	$2,037,000	$193,600	$192,300
Unit 3 - Alberhill Creek	$0	$0	$0	$0	$0	$0
Total Essential Habitat	**$0**	**$5,010,000**	**$3,680,400**	**$2,574,000**	**$247,400**	**$243,000**

Note: Numbers may not sum due to rounding.

6.2 ADMINISTRATIVE COSTS

The Federal Highway Administration or USACE will likely be the action agencies involved in a road-related section 7 consultations with the Service, with Cal Trans or the Riverside County Transportation Commission as the third party. In this analysis, it is assumed that all future projects will require a formal consultation to avoid underestimating administrative costs. The estimated administrative cost of section 7 consultation for transportation-related projects is summarized in Table 24. Total post-designation administrative costs are calculated by multiplying the average administrative section 7 consultation cost for a formal consultation (see Section 2.2.1) by the number of section 7 consultations forecast (see Table 20 (2006–2009) and Table 21 (2010–2025)). Post-designation (2006-2025) costs are presented in Table 24 in undiscounted dollars, as well as using discount rates of three percent and seven percent, respectively. Annualized costs for each habitat unit are also presented using three percent and seven

[123] Four projects are expected during the 2006 to 2009 period; the timing for one project is known and the timing of the remaining three projects is unknown. Likewise, the timing of the 16 projects forecast during the 2010-2025 period is also unknown. The analysis assigns an equal probability of occurrence to conservation costs being incurred in each year within respective timeframes (i.e., 2006-2009 or 2010-2025) for those projects with unknown timing.

percent discount rates.[124] As previously described, there are no pre-designation costs for road transportation activities.

Table 24
Summary of Administrative Costs to Road Projects Consultation

Habitat Unit	Pre-Designation (Total)	Post-Designation (Total)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Unit 1 - San Jacinto River	$0	$145,500	$105,200	$71,9000	$7,100	$6,800
Unit 2 -Salt Creek	$0	$501,100	$376,200	$271,400	$25,300	$25,600
Unit 3 - Alberhill Creek	$0	$0	$0	$0	$0	$0
Total Essential Habitat	**$0**	**$646,500**	**$481,400**	**$343,300**	**$32,400**	**$32,400**

Note: Numbers may not sum due to rounding.

6.3 TOTAL COST SUMMARY

Table 25 illustrates the total costs that will be incurred for project modifications, conservation efforts, and administrative costs associated with transportation projects in crownscale critical habitat units. Post-designation (2006-2025) costs are presented in Table 25 in terms of undiscounted dollars and present values using a discount rate of three and seven percent, respectively. Total undiscounted costs for road projects in essential habitat are $5,656,500, which is equivalent to present values of $4,161,800 with a three percent discount rate and $2,917,300 with a seven percent discount rate. Table 25 also reports the annualized cost for each habitat unit using three and seven percent discount rates. Total annualized costs to essential habitat are $279,800 and $275,400 at three and seven percent, respectively. As previously described, there are no pre-designation costs for road transportation activities.

[124] Considering the time frame of the future section 7 consultations is unknown, the analysis assigns an equal probability to administrative consultation costs being incurred in each year across the 20 year time frame of the analysis. Because the annual consultation costs are spread across the future years evenly, the annualized post-designation administrative consultation costs are equal at three and seven percent discount rates.

Table 25
Cost Summary for Road Projects

Habitat Unit	Pre-Designation (Total)	Post-Designation (Total)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Unit 1 - San Jacinto River	$0	$1,266,500	$905,500	$608,900	$60,900	$57,500
Unit 2 -Salt Creek	$0	$4,390,100	$3,256,300	$2,308,400	$218,900	$217,900
Unit 3 - Alberhill Creek	$0	$0	$0	$0	$0	$0
Total Essential Habitat	**$0**	**$5,656,500**	**$4,161,800**	**$2,917,300**	**$279,800**	**$275,400**

Note: Numbers may not sum due to rounding.

6.4 EFFECTS ON THE SAN JACINTO RIVER FLOOD CONTROL PROJECT

This section examines the cost of conservation efforts associated with the San Jacinto River Flood Control Project in essential habitat for the crownscale. The purpose of the San Jacinto River Flood Control Project is to channelize the San Jacinto River between Ramona Expressway and Railroad Canyon (Reach 3), which is near Unit 1. This is a large floodplain area, and the community would like to reclaim portions of it for development. The applicants in this project will likely be the County of Riverside, the Riverside County Flood Control and Water Conservation District, the City of Perris, and the CDFG.

6.4.1 HISTORY OF THE PROJECT

This project has an extensive history, which dates back to the 1972 when a master plan was drawn up. In the 1980s, a design was formed and the property owners collected enough funding for the project. The initial plan called for channelizing the entire San Jacinto River. Before the project was implemented, the economy took a downturn and the property owners lost the necessary funding. In the late 1990s, the property owners again collected enough funding to pursue an USACE 404 permit, the permit was granted by USACE contingent on the project receiving approval from the Service.[125] Informal consultation between the Service and USACE was initiated in 2001, with the County of Riverside, the Riverside Flood Control and Water Conservation District, the City of Perris, and the CDFG. The engineers hired by the applicants and the Service could not come to agreement on certain fundamental issues and the consultation process was stopped. The project never received approval, as the Service indicated that the end result would likely be a "jeopardy finding." The property owners ultimately terminated the project and a 404 permit was never granted.[126]

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[125] Personal communication with Joseph Caldwell, Engineer, Web Associates, April 1, 2005.

[126] Personal communication with Tony Bomkamp, Consultant, Glenn Lukos Associates, April 1, 2005.

When the MSHCP was developed, specific conditions were included within the conservation plan for this project. These project specific measures are addressed in Section 7.5.3 – Construction Guidelines of MSHCP and Appendix C, Best Management Practices. However, the property owners will still require a 404 permit and therefore, will need to go through a section 7 consultation with the Service. The property owners have spoken with USACE to determine the level of USACE jurisdiction in the matter, but the consultation with the Service has not begun.[127]

6.4.2 PROJECT MODIFICATIONS

Initially the project was to extend over the entire river, but to avoid sensitive habitat, the size of the project was reduced to just Reach 3 of the river. Six alternatives are currently being considered, including the no project alternative. The five feasible project alternatives range in cost from $80 million to $150 million. These alternatives consider partial channelization, conserving more lands, and altering the project so that crownscale sensitive areas still receive water during flood times. Even though no final cost estimates have been made, the alternatives are expected to cost $20 to $90 million more than the original project; these additional costs represent the post-designation cost due to project modifications that protect the crownscale.[128] Since it is unknown when the project costs will be incurred, this analysis assumes equal probability of the project occurring over the next 20 years. The $20 to $90 million cost range is equivalent to a present value of $10.6 to $47.7 million, or an annualized cost of $1.0 to $4.5 million at both three and seven percent discount rates.[129]

6.4.3 CONSERVATION EFFORTS

6.4.3.1 Past Conservation Efforts

Glenn Lukos and Associates performed crownscale surveys for the project in the late 1990s. The surveys were part of a broader effort to prepare a BA and conservation plan for the County of Riverside, Riverside County Flood Control and Water Conservation District, the City of Perris, and the CDFG. The preparation of the BA and conservation plan also included attorney effort from Shepard Mullan. The survey and attorney cost approximately $115,000 and $75,000, respectively.[130] While work on the BA and conservation plan terminated with the project prior to the Service's "jeopardy" opinion, this analysis

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[127] Personal communication with Ed Saul, Consultant, The Sauls Consulting Company, April 1, 2005.

[128] Personal communication with Joseph Caldwell, Engineer, Web Associates, April 1, 2005. Web Associate's role in this project is to develop alternatives for CEQA certification.

[129] Considering the timing of the project is unknown, the analysis assigns an equal probability to project modification costs being incurred in each year across the 20 year time frame of the analysis. Because the project modification costs are spread across the future years evenly, the annualized post-designation project modification costs are equal at three and seven percent discount rates.

[130] Personal communication with Tony Bomkamp, Consultant, Glenn Lukos Associates, April 1, 2005.

attributes the costs for this past work as pre-designation costs of species conservation ($190,000). Total pre-designation costs of the flood control project equal $213,200 after updating 1999 values to 2005 values.

6.4.3.2 Future Conservation Efforts

A consultant working for the applicants speculated that there are two ways that the crownscale could be impacted by this project. First, grading and construction work in the floodplain can potentially disturb the habitat. Second, channel widening will remove water from the floodplain, altering the plant's habitat.[131]

The MSHCP details construction guidelines for this project in Section 7.5.3 – Construction Guidelines. Appendix C also outlines best management practices to follow during construction. While it is likely that these post-designation measures will be implemented to protect the crownscale, the costs of performing these efforts have not been estimated by the project's engineers or consultants, and are therefore not included in this analysis.[132] Table 26 presents the estimated pre- and post-designation costs of project modification and conservation efforts associated with the San Jacinto Valley Flood Control Project.

Table 26
Summary of Cost Estimates for San Jacinto Valley Flood Control Project

Habitat Unit	Pre-Designation (Total)	Post-Designation (Total)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Unit 1 – San Jacinto River	$213,200	$20,000,000 - $90,000,000	$14,878,000 - $66,949,000	$10,594,000 - $47,673,000	$1,000,000 - $4,500,000	$1,000,000 - $4,500,000
Unit 2 – Salt Creek	$0	$0	$0	$0	$0	$0
Unit 3 – Alberhill Creek	$0	$0	$0	$0	$0	$0
Total Essential Habitat	**$213,200**	**$20,000,000 - $90,000,000**	**$14,878,000 - $66,949,000**	**$10,594,000 - $47,673,000**	**$1,000,000 - $4,500,000**	**$1,000,000 - $4,500,000**

Note: Numbers may not sum due to rounding.

6.4.4 ADMINISTRATIVE COSTS

As stated above, an informal consultation process was initiated between the Service, USACE, and private landowners in 2001. However, the process terminated prior to completion. Currently, there are plans to re-initiate the consultation process with the Service. In this analysis, it is assumed that a post-designation formal consultation will take place between the Service and the USACE with County of Riverside,

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131 Ibid.

132 Personal communication with Ed Saul, Consultant, The Sauls Consulting Company, April 1, 2005.

Riverside Flood Control and Water Conservation District, the City of Perris, and the CDFG. Table 27 summarizes the administrative costs associated with this projected future consultation.[133] No other consultations are expected with regards to flood control activities in crownscale essential habitat.

Table 27
Administrative Costs Regarding the San Jacinto Valley Flood Control Project

Habitat Unit	Pre-Designation (Total)	Post-Designation (Total)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Unit 1 – San Jacinto River	$0	$32,300	$24,000	$17,100	$1,600	$1,600
Unit 2 – Salt Creek	$0	$0	$0	$0	$0	$0
Unit 3 – Alberhill Creek	$0	$0	$0	$0	$0	$0
Total Essential Habitat	**$0**	**$32,300**	**$24,000**	**$17,100**	**$1,600**	**$1,600**

Note: Numbers may not sum due to rounding.

6.4.5 TOTAL COSTS

Table 28 reports the total expected cost of crownscale-related project modifications, conservation efforts, and administrative section 7 consultation for the San Jacinto Valley Flood Control Project. The largest portion of costs is associated with the proposed channelization project modifications to avoid harming sensitive crownscale habitat. Total undiscounted post designation costs range from $20,032,300 to $90,032,300, or $14,902,000 to $66,973,000 and $10,611,100 to $47,690,100 using three and seven percent discount rates, respectively.

Table 28
Summary of Costs to the San Jacinto Valley Flood Control Project

Habitat Unit	Pre-Designation (Total)	Post-Designation (Total)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Unit 1 - San Jacinto River	$213,200	$20,032,300 - $90,032,300	$14,902,000 - $66,973,000	$10,611,100 - $47,690,100	$1,001,600 - $4,501,600	$1,001,600 - $4,501,600
Unit 2 -Salt Creek	$0	$0	$0	$0	$0	$0
Unit 3 - Alberhill Creek	$0	$0	$0	$0	$0	$0
Total Essential Habitat	**$213,200**	**$20,032,300 - $90,032,300**	**$14,902,000 - $66,973,000**	**$10,611,100 - $47,690,100**	**$1,001,600 - $4,501,600**	**$1,001,600 - $4,501,600**

Note: Numbers may not sum due to rounding.

[133] Because the time frame of the future section 7 consultations is unknown, the analysis assigns a uniform probability to administrative consultation costs being incurred in each year. As a result, the annualized post-designation administrative consultation costs are equal at three and seven percent discount rates.

6.5 EFFECTS ON PIPELINE PROJECTS

This section examines the cost of conservation efforts associated with past and future water pipeline projects in essential habitat for the crownscale.

6.5.1 METROPOLITAN WATER DISTRICT

The Metropolitan Water District of Southern California (MWD) is a consortium of 26 cities and water districts that provide drinking water to nearly 18 million people throughout Los Angeles, Orange, San Diego, Riverside, San Bernardino, and Ventura counties. MWD's total service area is approximately 5,200 square miles. The mission of MWD is to "provide its service area with adequate and reliable supplies of high-quality water to meet present and future needs in an environmentally and economically responsible way."[134]

6.5.2 PRE-DESIGNATION

Three MWD projects have occurred or are planned to occur in essential habitat for the crownscale. These projects include: Inland Feeder Project, San Diego Pipeline Number 6 Project, and the Eastside Pipeline Project.

6.5.2.1 Inland Feeder Project

The Inland Feeder Project involved the construction of a 3.7-meter diameter water pipeline that extended for 43.3 miles through western San Bernardino and Riverside counties.[135] The project provided a high-capacity gravity-fed water delivery system designed to increase Southern California's water supply reliability while minimizing the impact on the San Francisco Bay/Sacramento–San Joaquin Delta environment in northern California. The water project was built to use large volumes of water, when available, from northern California, storing it in surface reservoirs, such as Diamond Valley Lake, and local groundwater basins for use during dry periods and emergencies. The project was also built to improve the quality of the Southland's drinking water by blending water from the State project with Colorado River supplies, which have a higher mineral content.[136] Portions of the Inland Feeder Project pass through the Units 1 and 2.

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[134] Metropolitan Water District of Southern California, "About Us," http://www.mwdh2o.com/mwdh2o/pages/about/about01.html, accessed April 12, 2005.

[135] U.S. Fish and Wildlife Service, April 14, 1999, "Biological Opinion for Metropolitan Water District of Southern California's Inland Feeder Project," Ecological Services, 1-6-99-F-18.

[136] Metropolitan Water District of Southern California, "Inland Feeder Project at a Glance," http://www.mwdh2o.com/mwdh2o/pdf/at%20a%20glance/if_project.pdf, accessed April 12, 2005.

The environmental review process for this project commenced in 1990, but was not completed until April of 1999. The Service transmitted a final BO to the USACE on behalf of MWD for the Inland Feeder Project at that time.

Conservation Efforts and Mitigation Requirements

The construction of the Inland Feeder Project directly impacted approximately 49 hectares (120 acres) of Riversidean alluvial sage scrub, 5 hectares (11 acres) of chaparral, 37 hectares (91 acres) of chaparral/sage scrub, 4 hectares (9 acres) of riparian scrub, 2 hectares (6 acres) of alkaline scrub, 0.8 hectare (2 acres) of unvegetated alluvial wash, and less than one hectare (2 acres) of freshwater marsh/vernal pools.[137] Due to this anticipated disturbance, the Service suggested certain conservation efforts through the BO that resulted from formal section 7 consultation for the MWD's Inland Feeder Project. Avoidance and restoration strategies for plant communities and listed plant species included measures for the woolly star, spineflower, crownscale, navarretia, and thread-leaved brodiaea. Specific measures for the crownscale included the following:

- "Minimize direct impacts to individual crownscale plants, and avoid direct impacts to spreading navarretia plants, by exchanging their 43-meter (140 feet) temporary construction easement on the east side of Davis Road for a similar width easement of the west side of Davis Road, and reducing the construction limit to 13.7 meters (45 feet) along a section of Davis Road where these listed species are prevalent.

- MWD will deliver sufficient funds of not less than $187,500 to the Foundation for the acquisition, restoration, and management of at least 3.0 hectares (7.5 acres) of lands suitable for crownscale, as directed by us in accordance with the provisions of the Cooperative Agreement dated April 14, 1999. This conservation measure represents mitigation for approximately 0.98 hectares (2.41 acres) of temporary impacts (i.e., areas will be revegetated) mitigated at a ratio of greater than 3:1. These funds will be restricted to the acquisition, restoration, and interest to be acquired will be solely at [Service] discretion.

- [MWD] will implement an upland revegetation program for areas disturbed by Inland Feeder Project construction activities... Immediately following the construction of each reach, [MWD] will implement Mitigation Measure B-1 in the Final EIR/EA and the "Inland Feeder Project Conceptual Plan for San Bernardino Kangaroo Rats and San Jacinto Valley Crownscale Habitat," subject to the Service's approval.

- Revegetated areas within the property rights acquired for the project will be monitored for up to 5 years by [MWD] or their agent. Monitoring will be conducted at least monthly for one year and

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[137] U.S. Fish and Wildlife Service, April 14, 1999, "Biological Opinion for Metropolitan Water District of Southern California's Inland Feeder Project," Ecological Services, 1-6-99-F-18.

quarterly thereafter. The emphasis of the monitoring effort will be to assess and report on the status of target weed species and native cover….

- [MWD] partially compensated for biological impacts to listed plants on the San Jacinto Wildlife Area by purchasing a 74 acre parcel located adjacent to the wildlife area. This parcel was conferred to the CDFG for inclusion into the San Jacinto Wildlife Area…

- Areas containing listed plants that [MWD] has agreed to avoid will be fenced or cordoned off to provide as much buffer as possible from construction activities and prevent the inadvertent disturbance of these sites. In areas adjacent to vernal basins k-rails, sandbags, and/or silt fencing will be installed along the construction trench to minimize erosion and siltation."[138]

The effort and cost involved with moving and narrowing the easement are likely minimal and have not been developed. Costs have, however, been estimated for the remaining conservation efforts described in the BO. MWD delivered the $187,500 to the Foundation for the mitigation and restoration of 7.5 acres of crownscale habitat and purchased the 74 acres for inclusion into the Wildlife Area at a cost of approximately $15,000 per acre, or $1.1 million in total.[139] Updating these costs to 2005 values results in total costs of $1,267,300 for acquisition of 74 acres in the San Jacinto Wildlife Area, and $216,000 for restoring and managing crownscale habitat. While this land was purchased as habitat for the crownscale, spreading navarretia, and thread-leaved brodiaea, this analysis assumes that 100 percent of the costs are attributable to the crownscale.

The revegetation program cost approximately $4 million, and the monitoring portion of the program continues in mid-2005. MWD estimates that most of the revegetation cost is associated directly with the San Bernardino Kangaroo Rat with only $125,000 attributable to revegetation of habitat associated with the crownscale, or $144,000 in 2005 dollars.[140]

Under normal conditions, MWD installs a chain link fence around the construction limits. However, due to the presence of sensitive plant species in the construction area, MWD installed special silt fencing to protect plants. MWD estimates that silt fencing cost an additional $40,000 over the course of the Inland Feeder Project in 1999 dollars, or $46,100 in 2005 dollars.[141]

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[138] U.S. Fish and Wildlife Service, April 14, 1999, "Biological Opinion for Metropolitan Water District of Southern California's Inland Feeder Project," Ecological Services, 1-6-99-F-18.

[139] Personal communication with Wendy Picht, Environmental Planner, Municipal Water District of Southern California, April 11, 2005.

[140] Ibid.

[141] Ibid.

Total pre-designation costs of these conservation efforts are $1,452,500 in nominal terms or $1,673,400 in 2005 dollars. These conservation costs are entirely attributed to the crownscale, although the mitigation was also spurred by the presence of other Federally listed plant species, including the spreading navarretia and thread-leaved brodiaea. Thus, this cost analysis method likely results in an overstatement of crownscale costs incurred by MWD in Units 1 and 2. Total pre-designation costs related to crownscale conservation for the Inland Feeder Project updated to 2005 dollars are presented in Table 29.

Table 29
Inland Feeder Project Conservation Efforts

Protective Measure	Cost (2005 dollars)
Restoration and Management of Crownscale Habitat	$216,000
Revegetation Program and Post Construction Monitoring	$144,000
74 Acres for San Jacinto Wildlife Area	$1,267,300
Silt Fencing	$46,100
Total	**$1,673,400**

Note: Numbers may not sum due to rounding.

6.5.2.2 Eastside Pipeline Project

MWD owns part of the land in proposed excluded essential habitat Unit 2. The Eastside Pipeline Project is approximately 9 miles of 12-foot diameter water conveyance pipeline. The pipeline brings untreated State Water Project water from the Inland Feeder Project to Diamond Valley Lake. This project was completed in conjunction with the construction for the reservoir project in 1999.[142]

Project Modifications

Construction methods related to the Eastside Pipeline project were altered to minimize construction disturbance within the essential habitat areas. The specific alterations included vertical excavation trenches, relocation of construction lay down and storage areas, stockpiling and reapplication of topsoil.[143] Cost estimates for these project modifications were not made by MWD, and therefore have not been included in this analysis. It is likely that these cost estimates are minimal in comparison to the costs incurred from implementing the conservation efforts.

[142] Ibid.

[143] Ibid.

Conservation Efforts

MWD purchased 40 acres of land and established the Upper Salt Creek Wetland Preserve. The preserve was purchased and permanently conserved to mitigate impacts to the crownscale (and other sensitive species) sustained during the construction of the Eastside Pipeline. MWD estimated the land acquisition cost to be approximately $15,000 per acre, or $600,000 in total.[144]

Construction activities took place in a sensitive area approximately three miles long. Construction monitoring was required in this stretch of the construction area. MWD estimated that it incurred $35,000 in construction monitoring costs annually during two years of construction, for a total cost of $70,000.[145]

Within the impacted areas MWD also re-contoured and re-seeded temporary construction easements and permanent rights-of-way. The Service suggested a four-year post construction period to monitor and re-establish the permanent right-of-way. MWD estimated this post construction monitoring and re-establishment cost approximately $20,000 per year, for a total cost of $80,000 over four years.[146]

Since all costs were incurred prior to 2006, all costs associated with the Preserve are classified as pre-designation costs. Total pre-designation costs equal $750,000 in nominal dollars, or $864,000 in 2005 dollars. These conservation costs are entirely attributed to the crownscale, although the mitigation was also spurred by habitat damage to other Federally listed plant species, including the spreading navarretia (*Navarretia fossalis)*. Thus, this cost analysis method likely results in an overstatement of crownscale costs incurred by MWD in Unit 2. Total pre-designation costs related to crownscale conservation for the Eastside Pipeline Project updated to 2005 dollars are presented in Table 30.

Table 30
Eastside Pipeline Project Conservation Efforts

Protective Measure	Cost (2005 dollars)
Acquisition of 40 acres	$691,000
Monitoring During Construction	$81,000
Four-Year Post-Construction Monitoring	$92,000
Total	**$864,000**

Note: Numbers may not sum due to rounding.

144 Ibid.

145 Ibid.

146 Ibid.

6.5.2.3 San Diego Pipeline Number 6

The San Diego Pipeline Number 6 project is a 7-mile, 10-foot diameter water pipeline. The pipeline will originate at MWD's Lake Skinner facility and extend south to the intersection of Anza and De Portola roads, in unincorporated Riverside County. As part of the project, MWD will connect the San Diego 6 pipeline to the existing Lake Skinner outlet conduit; located approximately 400 feet southwest of the intersection of Borel and Auld roads within MWD-owned property. The project will also include a service connection to the Rancho California Water District, a sub-agency of the Eastern Municipal Water District and Western Municipal Water District. The service connection will occur near the northeast corner of the intersection of Anza and De Portola roads. This section of San Diego 6 pipeline is being constructed to accommodate current demand projects for Ranch California Water District.

Surveys for this project are currently being performed to determine what species are in the project area. MWD does not expect to find crownscale. Thus, this analysis, assumes that no costs will be incurred by MWD for protecting the crownscale during the San Diego Pipeline Number 6 project.

6.5.3 TOTAL PROTECTION COSTS TO PIPELINE PROJECTS

Table 31 presents the estimated costs of crownscale-related conservation efforts associated with the three pipeline projects described above. By far, the largest portion of the pre-designation costs is the $1.1 million to purchase 74 acres for inclusion into the Wildlife Area in 1999.

Table 31
Estimated Costs of Project Modification and Conservation Efforts Allocated to MWD Projects

Habitat Unit	Pre-Designation (Total)	Post-Designation (Total)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Unit 1 - San Jacinto River	$869,800	$0	$0	$0	$0	$0
Unit 2 -Salt Creek	$1,767,900	$0	$0	$0	$0	$0
Unit 3 - Alberhill Creek	$0	$0	$0	$0	$0	$0
Total Essential Habitat	**$2,637,700**	**$0**	**$0**	**$0**	**$0**	**$0**

Note: Numbers may not sum due to rounding.

6.5.4 ADMINISTRATIVE COSTS

As described above, there have been two formal consultations for pipeline projects between the Service, USACE, and MWD. The administrative costs to all agencies involved in the consultation process are reported in Table 32 according to the administrative costs presented in Section 2.2.1.

6.5.5 TOTAL COSTS TO PIPELINE PROJECTS

Table 33 summarizes the costs of crownscale-related conservation efforts and administrative costs associated with pipeline projects. The largest portion of the costs presented below is due to the purchase of 74 acres for inclusion into the Wildlife Area that was done to protect sensitive plants, including the crownscale, during the Inland Feeder Project. MWD did not identify any pipeline projects in the vicinity of proposed critical habitat, therefore this analysis assumes that MWD will not bear any costs of protecting the crownscale during future pipeline projects.

Table 32
Administrative Costs Associated with Pipeline Project Consultations

Habitat Unit	Pre-Designation (Total)	Post-Designation (Total)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Unit 1 - San Jacinto River	$16,200	$0	$0	$0	$0	$0
Unit 2 -Salt Creek	$48,500	$0	$0	$0	$0	$0
Unit 3 - Alberhill Creek	$0	$0	$0	$0	$0	$0
Total Essential Habitat	**$64,700**	**$0**	**$0**	**$0**	**$0**	**$0**

Note: Numbers may not sum due to rounding.

Table 33
Total Costs Associated with Pipeline Projects

Habitat Unit	Pre-Designation (Total)	Post-Designation (Total)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Unit 1 - San Jacinto River	$886,000	$0	$0	$0	$0	$0
Unit 2 -Salt Creek	$1,816,400	$0	$0	$0	$0	$0
Unit 3 - Alberhill Creek	$0	$0	$0	$0	$0	$0
Total Essential Habitat	**$2,702,400**	**$0**	**$0**	**$0**	**$0**	**$0**

Note: Numbers may not sum due to rounding.

6.6 EFFECTS ON CALIFORNIA DEPARTMENT OF FISH AND GAME, SAN JACINTO WILDLIFE AREA

The CDFG owns and manages land in the San Jacinto Wildlife Area, which comprises part of proposed excluded essential habitat Unit 1. Approximately 5,500 acres of the Wildlife Area's 10,000 acres are located in the proposed excluded Unit 1. According to the Wildlife Area manager, the Wildlife Area was

established in the early 1980s as mitigation for the State Water Project. At this time, the Wildlife Area consisted of about 4,800 acres.[147]

In the early 1990s, the CDFG acquired several more parcels of land, including the wildlife area lying in the floodplain of the San Jacinto River. The area proposed for exclusion was primarily acquired during this time at a cost of approximately $8,000 per acre. The primary objective of these acquisitions was to conserve the floodplain ecosystem and species habitat. Protecting habitat for vernal pool species was one of many conservation priorities. The floodplain area of the San Jacinto Wildlife Area provides habitat for three Federally listed plant species: the thread-leaved brodiaea, the San Jacinto crownscale, and the spreading navarretia.[148] Since the land was acquired prior to Federal listing of the crownscale in 1998, these land acquisition costs are not included in this analysis.

In the late 1990s, MWD purchased and restored a 74-acre parcel adjacent to the Wildlife Area to mitigate for habitat impacts of its inland feeder pipeline project. The crownscale was one of the species that was impacted by the project. This land was later granted to CDFG and incorporated into the San Jacinto Wildlife Area. The costs of land acquisition and restoration of this parcel are attributed to MWD and are further discussed in Section 6.5.

The general management budget for the 10,000 acres at the San Jacinto Wildlife Area is approximately $350,000 ($35 per acre). This management budget includes costs for all recreational use support (e.g., hunting, bird-watching, and hiking) and all species, including employee salaries, water costs, materials, operation and maintenance, interpretative materials, and trail building. The $350,000 annual management budget also includes costs specifically associated with protecting the vernal playa in the Wildlife Area. These costs, which amount to approximately $5,000 every third year ($1,667 per year), are incurred to avoid impacts to the species during development of recreation projects in the vernal playa areas, and include such conservation costs as hiring consultants, conducting surveys, and building fences.[149] Since the Wildlife Area examines impacts and avoids sensitive habitat areas, the program manager believes that there are no conflicts between the vernal playa preservation and recreational use in the Wildlife Area.

In addition to providing habitat for the crownscale and other species, the Wildlife Area provides recreational benefits to hunters and wildlife viewers. It is estimated that 20,000 wildlife viewer days and 5,000 hunting days are enjoyed at the Wildlife Area annually.[150] According to a Service study of net economic values for wildlife-related recreation, a conservative estimate of benefits to California wildlife

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147 Personal communication with Tom Paulek, San Jacinto Wildlife Area, Manager, April 5, 2005.

148 Ibid.

149 Personal communication with Tom Paulek, San Jacinto Wildlife Area, Manager, April 5, 2005.

150 Ibid.

viewers is $26 per user day.[151] Furthermore, a separate study of outdoor recreation values found that a conservative estimate of net economic value to migratory waterfowl hunters is $37 per day.[152] Applying these values, respectively, to the 20,000 wildlife viewer days and the 5,000 hunting days enjoyed annually by the public at the San Jacinto Wildlife Area results in an estimated annual recreation benefit of $705,000 (approximately $71 per acre).

Per acre recreational benefits ($71) exceed annual per acre management costs ($35). This analysis therefore attributes no general management costs of the Wildlife Area to the crownscale. However, it is unknown whether vernal playa conservation increases recreational value at the Wildlife Area. If the vernal playa conservation efforts result in offsetting recreational benefits, then there are no net costs attributable to the crownscale; if there is no recreational benefit from vernal playa conservation efforts, then the cost of these efforts can not be offset by recreational benefits. The annual cost of crownscale management at the Wildlfe Area is therefore presented as a range from $0 to $1,667 ($5,000 in vernal playa conservation efforts every third year).[153]

CDFG may acquire 2,000 additional acres in the San Jacinto floodplain near or adjacent to the Wildlife Area. The Wildlife Area manager estimates that the cost of the floodplain land is $7,000 to $8,000 per acre.[154] Although no plans exist to purchase specific floodplain parcels, in the event of acquisition CDFG would purchase lands from willing sellers. The purpose of the planned acquisition is to preserve habitat for multiple species, including the crownscale. The acquisition of additional land in Unit 1 by CDFG would likely result in increased management costs and either increased visitor days to the Wildlife Area or increased benefit per visitor day. However, the magnitude of increased management costs and recreational benefit due to the prospective land purchase is unknown and is not captured in this analysis.

The possible CDFG acquisition of 2,000 acres may be located within Unit 1. Unit 1 of crownscale essential habitat currently contains 5,511 acres owned and managed by CDFG as part of the San Jacinto

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151 U.S. Fish and Wildlife Service, 2001, *Net Economic Values for Wildlife-Related Recreation in 2001: Addendum to the 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*, Report 2001-3. The report estimates with a 95 percent certainty that benefit per visitor day for wildlife-viewing is between $26 and $59 (2005 dollars). The study was based on contingent valuation and travel cost questions from the 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

152 Walsh, R.G., D.M. Johnson, and J.R. McKean, 1989, "Issues in Nonmarket Valuation and Policy Application: A Retrospective Glance," *Western Journal of Agricultural Economics,* Vol. 14, No. 1, pp. 178-188. The paper estimates with a 95 percent certainty that benefit per visitor day for migratory waterfowl hunting is between $37 and $73 (2005 dollars). This paper is a meta-analysis of numerous peer-reviewed publications on the value of outdoor recreation that used a variety of methods, including the travel cost method and the contingent valuation method.

153 Considering the timing of conservation costs (i.e., approximately $5,000 every third year) are unknown, the analysis assigns an equal probability to conservation costs being incurred in each year across the 20 year time frame of the analysis. Because the conservation costs are spread across the future years evenly, the annualized post-designation conservation costs are equal at three and seven percent discount rates.

154 Personal communication with Tom Paulek, San Jacinto Wildlife Area, Manager, May 24, 2005.

Wildlife Area. The unit contains an additional 6,535 acres of private land primarily dedicated to agriculture. Because these acres include San Jacinto floodplain lands, it is possible CDFG could purchase the additional 2,000 acres from private landowners in Unit 1. Whether such prospective land purchases may impact social welfare is uncertain. Considering CDFG would be willingly paying market price for the land, and the landowner would be willingly accepting, CDFG would be valuing the land as Wildlife Area as highly as its potential future alternative uses. Implicit in the market price of a property is the value of the potential future uses of that land. As such, the purchase of land by the CDFG at market price could be characterized as an "arms length" purchase, or a transfer not resulting in welfare impacts.

On the other hand, welfare impacts may result from any private land sale (to CDFG or other entities) in the essential habitat unit if the market price of the land decreases due to critical habitat designation. Lower land values may result from regulatory uncertainty associated with the presence of the crownscale. In this case, the landowner may sell the land to CDFG at a lower price than (s)he would be willing to accept absent the presence of the crownscale, therefore generating some level of consumer surplus loss associated with the land acquisition. The presence and level of effect of regulatory uncertainty, or "stigma," are difficult to predict; if the landowner is selling the land at a less than desirable price, the difference between the sales price and the value to the landowner of the land is uncertain.

Weighing these factors and the related uncertainty, this analysis does not anticipate or quantify economic efficiency losses associated with CDFG's future land acquisition. In the case that the lands acquired for the Wildlife Area contain crownscale habitat, and the presence of the species and/or habitat causes the landowners to accept a lower price for their land than otherwise, the potential associated consumer surplus losses are not captured in this analysis.

As no section 7 consultations due to the crownscale are anticipated, there are no administrative costs associated with the Wildlife Area. Thus, the total estimated costs to CDFG of crownscale conservation in Unit 1 ranges from zero to the cost of targeted vernal playa conservation efforts.

6.7 COST OF HABITAT CONSERVATION PLANS

As described in Section 1.2.1, HCPs do not grant incidental take permits for plant species; however, if a listed plant occurs in an area subject to the HCP, the Service must consider whether the proposed activities may adversely affect or jeopardize the continued existence of the plant. Planning for the subregional MSHCP began in 1999 and the plan was adopted in 2003. As described in the Biological and Conference Opinion, the MSHCP provides conservation for 146 species, including 25 Federally listed species.[155] According to Ellen Showalter Laney, Riverside County, the MSHCP was developed at a cost

[155] U.S. Fish and Wildlife Service, July 22, 2004, Intra-Service Formal Section 7 Consultation/Conference for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit (TE-088609-0) for the Western Riverside County Multiple Species Habitat Conservation Plan, Riverside County, California (FWS-WRIV-870.19).

in excess of $11 million.[156] All of the development costs were incurred during the pre-designation period (1998-2005).

While the crownscale will benefit from protective measures provided by the approved Western Riverside County MSHCP (see Section 4.3), no information is available to allocate costs among all the covered species. Therefore, this analysis does not allocate the costs of developing the MSHCP to the crownscale. While there is no clearly defined basis for allocating the costs, it is noted that the crownscale essential habitat (15,232 acres) comprises only 1.2 percent of the MSHCP Plan Area (1.26 million acres) and 3 percent of the MSHCP conservation area (approximately 500,000 acres). Crownscale-related MSHCP development efforts were likely a relatively minor component of the overall MSHCP development efforts, and thus a minor component of the total MSHCP development costs. Nevertheless, attributing no HCP development costs to the crownscale will understate the overall costs of crownscale conservation efforts.

6.8 EFFECTS ON AGRICULTURE

Agricultural lands currently comprise almost one-half of all crownscale essential habitat; of 15,232 acres of essential habitat, 6,900 acres are currently classified agricultural. However, the cost of crownscale conservation on agriculture producers is expected to be minimal as the Western Riverside County MSHCP overlaps with most of the crownscale essential habitat, and the MSHCP does not impose new restrictions on agricultural operations over and above those already in place under existing regulations.[157] The MSHCP indicates that regulations pertaining to agricultural pesticide use will continue to be regulated by the Federal and State Environmental Protection Agencies, and enforced by local agricultural commissioners. Additionally, runoff from existing agricultural lands is not likely to result in substantial adverse impacts to crownscale habitat since agricultural operations are required to have in place a Best Management Plan to manage and control the amount and concentration of runoff.

Future agricultural development through expansion or conversion of vacant land into agricultural production is unlikely within the essential habitat area. While agricultural land in Riverside County increased by 16 percent from 1987 to 2002,[158] it is expected that development pressure and the rising opportunity cost of land will preclude further agricultural expansion within the essential habitat. Furthermore, based on existing land use data, it appears that the land suitable for agriculture within the essential habitat is already under agricultural production.[159] Thus, although county-level agricultural

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156 Personal communication with Ellen Showalter Laney, Riverside County, July 2004.

157 Riverside County, 2003, *Riverside County Integrated Project Multiple Species Habitat Conservation Plan (MSHCP), Volume 1 – The Plan*, p. 6-56.

158 USDA National Agricultural Statistics Service (NASS), "2002 Census of Agriculture," http://www.nass.usda.gov/census/census02/volume1/ca/st06_2_008_008.pdf, accessed March 2005; USDA NASS, "1997 Census of Agriculture: Farms and Land in Farms," http://www.nass.usda.gov/census/census97/county/farms/cafarms.xls, accessed March 2005.

159 Southern California Association of Governments, Region Land Use - 2000, www.scag.ca.gov.

indicators do not allow for a clear assumption about future agricultural development in Riverside County, existing land use and economic conditions indicate that it is unlikely that agricultural acreage will expand within the essential habitat in the future.

6.9 EFFECTS ON FIRE MANAGEMENT

Fire management activities were identified by the Service in the proposed rule as potentially threatening to crownscale. Clearing brush and flammable vegetation within prescribed distances of homes is vital for reducing risks to human safety and property in California, but is not necessarily conducive to the protection of endangered plant species.

California State Assembly Bill 337, the Bates Bill of 1992, requires that all new development "address fire protection issues within the footprint of the development."[160] Section 51182 of AB 337 requires a minimum fire break of 30 feet away from structures (not property lines) and as wide as 100 feet if the 30 feet break is not deemed sufficient by local fire departments, although the habitat of endangered or threatened species is exempt from such requirements under Section 51184.[161] The MSHCP provides direction on fire management activities in essential habitat, stating "the risks of uncontrolled wildfire in proximity to developed areas must be a primary consideration" and any activities undertaken "must consider both biological resource needs and public health and safety considerations."[162]

Seasonally flooded alkali vernal playa does not generally present a fire hazard as it is very low growing and wet.[163] Therefore, it is unlikely that development will be adversely impacted by increased restrictions on fire breaks to protect crownscale over and above the requirements of Assembly Bill 337 regarding addressing fire protection within the footprint of the development (i.e., that fire breaks begin from the building and not the property line). This analysis assumes that developers can alter or cluster the units of proposed development around any required break or set back such that they do not lose units and revenues. However, direct and opportunity costs associated with alteration of fire management methods such that they aptly consider biological resources as outlined in Section 5.0 of the MSHCP may exist. For example, developers may have to resort to hand clearing in the areas of sensitive vegetation, as opposed to discing, slashing, burning, crushing, or plowing, or avoid fire management activities altogether (to the extent that County regulations allow). While the no action alternative would result in cost savings, hand clearing is more time and labor intensive and higher costs may be borne by developers.

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160 U.S. Fish and Wildlife Service, 1996, "Intra-Service Section 7 Consultation on Fish and Wildlife Service Participation in a Memorandum of Understanding with the San Diego County Fire Chief's Association Addressing Flammable Vegetation Abatement in San Diego County."

161 Ibid.

162 Riverside County, 2003, *Riverside County Integrated Project Multiple Species Habitat Conservation Plan (MSHCP) Volume 1 – The Plan,* Section 5.0, "Management & Monitoring."

163 Personal communication with Service Biologist, Carlsbad Fish and Wildlife Office, May 11, 2005.

However, these types of fire management activities are not evident in the historic section 7 consultation record. The effort and cost involved with hand clearing areas of sensitive habitat are likely minimal and have not been developed for this report.

7.1 SUMMARY OF FINDINGS

This section provides a summary of the economic effects associated with conservation efforts for the crownscale for each of the activities considered in this analysis. The analysis measures effects on residential, commercial, and industrial development, flood control facilities, pipelines, public lands management, and transportation. Table 34 provides a summary of the economic impacts due to crownscale conservation efforts in essential habitat by activity. The first column of Table 34 presents the total pre-designation (1998-2005) costs in 2005 dollars. The second column reports the total post-designation costs from 1998 to 2025 in undiscounted dollars, and the third and fourth columns report the total post-designation costs using discount rates of three percent and seven percent, respectively. The last two columns present the annualized costs, also using discount rates of three percent and seven percent, respectively.

Table 34
Summary of Administrative and Conservation Costs for Crownscale, by Activity

Category of Impact	Pre-Designation (Total) (1998-2005)	Post-Designation (Total) (2006-2025)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Development	$977,200	$6,099,000 - $15,030,600	$4,575,800 - $11,279,700	$3,295,100 - $8,125,500	$307,600 - $758,200	$311,000 - $767,000
Flood Control	$213,200	$20,000,000 - $90,000,000	$14,902,000 - $66,973,000	$10,611,100 - $47,690,100	$1,001,600 - $4,501,600	$1,001,600 - $4,501,600
Pipelines	$2,702,400	$0	$0	$0	$0	$0
Public Lands	$0 - $13,300	$0 - $46,700	$0 - $24,800	$0 - $17,700	$0 - $1,700	$0 - $1,700
Transportation	$0	$5,656,500	$4,161,800	$2,917,300	$279,800	$275,400
Total Essential Habitat	**$3,892,700 - $3,906,100**	**$31,787,800 - $110,766,100**	**$23,639,500 - $82,439,200**	**$16,823,600 - $58,750,600**	**$1,589,000 - $5,541,300**	**$1,588,100 - $5,545,700**

Note: Numbers may not sum due to rounding.

Pre-designation costs total $3.9 million, with water pipelines bearing $2.7 million of the costs. The pipeline costs are associated with the Inland Pipeline Project and the Eastside Pipeline Project. The remainder of the pre-designation costs is split among public lands, development, and flood control. Post-designation costs are estimated to total $31.8 to $110.8 million in undiscounted dollars, or $23.6 to $82.4 million and $16.8 to $58.8 million in present value terms using a discount rate of three percent and seven

percent, respectively. Annualized costs are estimated to range from $1,589,000 to $5,541,300 and $1,588,100 to $5,545,700, also at three and seven percent, respectively.

The annualized costs at discount rates of three and seven percent are similar, and the similarity is a function of (1) the unknown timing of many of the projects or activities, and (2) recurring equal undiscounted dollar costs for projects or activities during the post-designation period. When the timing of a project or activity is unknown or uncertain, the costs are assumed to have a uniform probability of occurrence across the future years. As such, the annualized post-designation costs at three and seven percent discount rates are equal for that particular project or activity. Similarly, with an undiscounted recurring cost during the forecast period, the annualized post-designation costs for that particular project or activity is equal regardless of discount rate. In this analysis, many of the conservation costs consist primarily of projects and activities of unknown timing, or with recurring undiscounted dollar costs during the post-designation period. Thus, the annualized costs at three and seven percent discount rates are similar. Costs and timing for each project and activity analyzed in this report are discussed in Sections 5.0 and 6.0, and are summarized below:

- Pre-Designation Development Projects: The annual conservation costs are equal during the post-designation period (i.e., $7,640 in annual monitoring, maintenance, and operating costs during the post-designation period).

- Post-Designation Development Projects: The annual conservation costs, a function of the number of acres developed to low-, medium-, and high-density residential, commercial, and industrial land classes, vary with the forecasted annual population growth rate for the county during the post-designation period. The forecasted development and conservation costs vary by year, but not significantly, resulting in similar annualized costs when discounted at three and seven percent.

- Transportation Projects: Four transportation projects are expected during the 2006 to 2009 period; the timing for one project is known and the timing of the remaining three projects is unknown. Likewise, the timing of the 16 projects forecast during the 2010-2025 period is also unknown. The analysis assigns an equal probability of occurrence to conservation costs being incurred in each year within respective timeframes (i.e., 2006-2009 or 2010-2025) for those projects with unknown timing.

- San Jacinto Valley Flood Control Project: The timing of the project is unknown, and the analysis assigns an equal probability of occurrence across the 20 year time frame to project modification costs.

- San Jacinto Valley Wildlife Area: The timing of conservation costs (i.e., approximately $5,000 in vernal playa conservation efforts every third year) are unknown, and the analysis assigns an equal probability of occurrence to conservation costs being incurred in each year across the 20 year time frame of the analysis.

Administrative Cost of Section 7 Consultation: The timing of section 7 consultations is unknown and the analysis assigns a uniform probability across the 20 year time frame to administrative consultation costs being incurred.

Table 35 provides a summary of the economic impacts due to crownscale conservation efforts by habitat unit. The costs include all of the categories of impacts shown in Table 34. Pre-designation costs range from $0 in Unit 3, Alberhill Creek, to $2.8 million in Unit 2, Salt Creek. Both Unit 1, San Jacinto River, and Unit 2, Salt Creek, have costs associated with water pipeline projects. Total post-designation costs are also concentrated in Units 1 and 2, 70 to 85 percent and 15 to 30 percent, respectively. Estimated post-designation costs in Unit 1 are associated primarily with flood control, transportation, and development, while post-designation costs in Unit 2 are associated with development and transportation.

Table 35
Summary of Administrative and Conservation Costs by Unit

Habitat Unit	Pre-Designation (Total) (1998-2005)	Post-Designation (Total) (2006-2025)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Unit 1 - San Jacinto River	$1,099,200 - $1,112,500	$22,355,300 - $94,334,900	$16,600,300 - $70,146,900	$11,791,100 - $49,933,100	$1,115,700 - $4,714,900	$1,113,000 - $4,713,400
Unit 2 -Salt Creek	$2,793,700	$9,425,400 - $16,410,700	$7,034,000 - $12,277,000	$5,028,600 - $8,806,400	$472,800 - $825,200	$474,700 - $831,300
Unit 3 - Alberhill Creek	$0	$7,100 - $20,500	$5,400 - $15,400	$3,800 - $11,100	$300 - $1,000	$400 - $1,000
Total Essential Habitat	**$3,892,700 - $3,906,100**	**$31,787,800 - $110,766,100**	**$23,639,500 - $82,439,200**	**$16,823,600 - $58,750,600**	**$1,588,900 - $5,541,200**	**$1,588,100 - $5,545,700**

Note: Numbers may not sum due to rounding.

7.1.1 LANDOWNER AND AGENCY COSTS

Table 36 provides a summary of conservation costs by category of landowner. The landowner types that are relevant in this analysis include private, State of California, and local government (cities and Riverside County). Total pre-designation conservation costs of $3.8 million are concentrated among local governments; in particular, conservation costs associated with the water pipelines were borne by the Metropolitan Water District and its customers. Local government also incurred costs for flood control activities. In addition, the State bore costs associated with transportation projects and management of its lands.

Post-designation costs are concentrated on local government owned lands, which account for 65 to 82 percent of the costs. Local government costs are associated entirely with expected flood control efforts in Unit 1. Private landowners account for another 14 to 20 percent of the costs, primarily through

conservation activities imposed on land development. The remaining costs, 4 to 16 percent, are borne by the State. These costs relate primarily to conservation efforts associated with transportation projects.

Table 36
Summary of Conservation Costs by Landowner

Landowner	Pre-Designation (Total) (1998-2005)	Post-Designation (Total) (2006-2025)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Local Government	$2,850,900	$20,000,000 - $90,000,000	$14,878,000 - $66,949,000	$10,594,000 - $47,673,000	$1,000,000 - $4,500,000	$1,000,000 - $4,500,000
Private	$926,300	$5,953,600 - $14,885,200	$4,467,600 - $11,171,500	$3,218,100 - $8,048,500	$300,300 - $750,900	$303,800 - $759,700
State Government	$0 - $13,300	$5,010,000 - $5,056,700	$3,680,400 - $3,705,200	$2,574,000 - $2,591,700	$247,400 - $249,100	$243,000 - $244,700
Total Essential Habitat	**$3,777,200 - $3,790,600**	**$30,963,600 - $109,941,900**	**$23,026,000 - $81,825,700**	**$16,386,100 - $58,313,100**	**$1,547,700 - $5,500,000**	**$1,546,800 - $5,504,400**

Note: Numbers may not sum due to rounding.

Table 37 provides a summary of administrative costs that have occurred (pre-designation) or are anticipated to occur (post-designation) associated with section 7 consultations and CHD. An estimated cost of about $115,500 has occurred prior to the designation, with about 70 percent incurred by action agencies. After designation, an additional $800,000 in post-designation administrative costs are forecast (i.e., undiscounted dollars), or $613,500 and $437,500 in present value terms using a discount rate of three percent and seven percent, respectively. Annualized costs are estimated at approximately $41,300 (at both three and seven percent discount rates), and it is anticipated that action agencies will incur about 72 percent of these costs.[164]

[164] Because the time frame of the future section 7 consultations is unknown, the analysis assigns a uniform probability to administrative consultation costs being incurred in each year. As a result, the annualized post-designation administrative consultation costs are equal at three and seven percent discount rates.

Table 37
Summary of Administrative Costs by Agency

Agency	Pre-Designation (Total) (1998-2005)	Post-Designation (Total) (2006-2025)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Action Agency	$80,900	$593,100	$441,400	$314,800	$29,700	$29,700
Service	$19,100	$129,600	$96,400	$68,800	$6,400	$6,400
Third Party	$15,600	$101,500	$75,700	$53,900	$5,100	$5,100
Total Essential Habitat	**$115,500**	**$824,200**	**$613,500**	**$437,500**	**$41,300**	**$41,300**

Note: Numbers may not sum due to rounding.

5 U.S.C. § 601 *et seq.*

5 U.S.C. § 605(b).

16 U.S.C. § 1532.

16 U.S.C. § 1533.

33 U.S.C. §303, 305.

33 U.S.C. §402.

33 U.S.C. §1251 (1987).

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APPENDIX A:
ECONOMIC EFFECTS TO SMALL ENTITIES AND ENERGY

This appendix contains an examination of the extent to which the analytic results presented in the main report reflect impacts to small entities. The analysis of the effect on small entities is conducted pursuant to the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996. The appendix also contains an analysis of the effects of the rulemaking on energy markets, as required by Executive Order No. 13211.

POTENTIAL EFFECTS ON SMALL ENTITIES

Under the RFA (as amended by SBREFA), whenever a Federal agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities. However, no regulatory flexibility analysis is required if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities.[165] SBREFA amended the RFA to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have a significant economic impact on a substantial number of small entities. To assist in this process, the following represents a screening level analysis of the potential effects of conservation efforts for the crownscale on small entities due to the rulemaking. This analysis is intended to facilitate determination of (1) whether this CHD potentially affects a "substantial number" of small entities in counties and/or supporting critical habitat areas; and (2) the probable number of small entities that are likely to experience a "significant effect." While all essential habitat is excluded from the proposed designation of critical habitat for the crownscale, the small business analysis presents the results for the excluded areas.

DEFINITION OF SMALL ENTITIES

Small entities include small businesses, small governments, or small organizations, as defined by the U.S. Small Business Administration (SBA). Size standards for small businesses are established for different types of economic activity or industry within the North American Industry Classification System (NAICS), and are commonly expressed in terms of the number of employees or annual receipts. For most industries, the size standard is based upon annual revenue for the business. The revenue standard varies from $750,000 for agriculture to $28.5 million for general and heavy construction. The size standard is based on number of employees for two industry types: manufacturing (500 employees) and wholesale trade (100 employees). The SBA publishes a table of current small business size standards on their

[165] Thus, for a regulatory flexibility analysis to be required, impacts must exceed a threshold for "significant impact" *and* a threshold for a "substantial number of small entities." See 5 U.S.C. § 605(b).

website (www.sba.gov/size).[166] These size standards were most recently published by the SBA in "Table of Small Business Size Standards Matched to North American Industry Classification System Codes," effective January 28, 2004.[167] Small organizations are defined as "any non-profit enterprise … which is independently owned and operated and not dominant in its field."[168] These may include organizations such as irrigation districts, water associations, public utilities, or agricultural co-ops. A small government is defined as any government serving populations of 50,000 or less, and might include county, city, town, or school district governments.

Federal courts have held that an RFA analysis should be limited to impacts on entities subject to the requirements of the regulation (i.e., participants in the section 7 consultation process).[169] These entities include participants in the section 7 consultation process, but not entities suffering the downstream effects of consultation outcomes. In spite of these rulings, in its guidance to Federal agencies on conducting screening analyses, the SBA recommends considering impacts to entities that may be indirectly affected by the proposed regulation.[170]

IDENTIFICATION OF ACTIVITIES THAT MAY INVOLVE SMALL ENTITIES

The analysis in the main report determined that costs involving conservation efforts for the crownscale would be incurred for activities involving residential, industrial, and commercial development (land subdivision companies), water supply (Metropolitan Water District (MWD)), flood control (Riverside County Flood Control Agency (RCFC)), and transportation (Cal Trans or Riverside County Transportation Commission). This section considers the extent to which the costs presented in the main report reflect impacts to small entities.

Residential, Commercial, and Industrial Development

CHD is expected to result in additional costs to real estate development projects due to conservation that may be required. The affected land is located within Riverside County and under private ownership by individuals who will either undertake a development project on their own or sell the land to developers for development. For businesses that are involved with land development, the relevant threshold for

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166 U.S. Small Business Administration, "Table of Small Business Size Standards Matched to North American Industry Classification System Codes," January 28, 2004, http:// www.sba.gov/size/indextableofsize.html.

167 This table and other information on size standards are available from http://www.sba.gov/size.

168 5 U.S.C. § 601 *et seq*.

169 U.S. Small Business Administration, Office of Advocacy, May 2003, "A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act," pp. 69-70.

170 U.S. Small Business Administration, Office of Advocacy, May 2003, "A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act."

small businesses is an annual revenue of $6 million or less.[171] The North American Industry Classification System (NAICS) code 237210 is comprised of establishments primarily engaged in servicing land (e.g., excavation, installing roads and utilities) and subdividing real property into lots for subsequent sale to builders. Land subdivision precedes actual construction, and typically includes residential but may also include industrial and commercial properties.

It is likely that development companies, the entities directly impacted by the regulation, would not bear the additional cost of crownscale conservation (approximately $300,000 to $760,000 annually), but pass the cost to the landowners through a lower land purchase price. Considering approximately 60 percent of the developable land within the essential habitat is classified as agriculture land, it is likely that farmers will bear some of the costs. The remaining 40 percent of the potentially developable land is privately owned and classified as vacant. To comply with the SBA recommendation that Federal agencies consider impacts to entities that may be indirectly affected by the proposed regulation, this screening level analysis presents information on land subdivision and farming businesses for Riverside County as these are the businesses that would likely be impacted directly or indirectly by the regulation (See Table A-1). As highlighted in Table A-1, the majority of the land subdivision and farming businesses within Riverside County are considered small businesses.

Table A-1
Profile of Potentially Affected Land Subdivision and Farming Businesses in Riverside County

Business Type	Land Subdivision Businesses NAICS 237210	Farming Businesses NAICS 111 (Crops) & NAICS 112 (Animals)
Total number of businesses	475 [a/]	3,186 [b/]
Threshold for small [c/]	< $6 million in sales	< $750,000 in sales
Number of small businesses	441 [a/]	2,896 [d/]

a/ Dun and Bradstreet, March 2005, accessed through a Dialog search of File 516, Dun and Bradstreet, "Dun's Market Identifiers."

b/ U.S. Department of Agriculture, National Agriculture Statistics Service, Table 2. Market Value of Agricultural Products Sold Including Direct and Organic: 2002 and 1997, "2002 Census of Agriculture, June 2004."

c/ U.S. Small Business Administration, "Table of Small Business Size Standards Matched to North American Industry Classification System Codes, January 28, 2004."

d/ The 2002 Agriculture Census reports the number of farms at the county level by categories of income. While the largest income category for which data is reported, sales of "$500,000 or more," exceeds the SBA threshold for a small business (i.e., $750,000), the number of farms at the county level with annual income less than $500,000 is presented as the number of "small businesses" in this analysis as this data is the most accurate information available.

[171] U.S. Small Business Administration, "Table of Small Business Size Standards Matched to North American Industry Classification System Codes," January 28, 2004, http:// www.sba.gov/size/indextableofsize.html.

It is important to note that the identity and number of land subdivision and farming business impacted by the CHD is not known. In addition, the identity and number of affected businesses classified as "small" is also not known. Nevertheless, the county-level information provided in Table A-1 reflects the smallest region for which data relevant to this analysis exist. This county-level information clearly over represents the potential number of small businesses impacted by development-related crownscale conservation efforts as the privately owned developable land within the essential habitat (approximately 8,100 acres) comprises less than one-half of one percent of the land area in the County (1,780,220 acres),[172] and only 342 acres of this private land is forecasted to be developed between 2006 and 2025.

While the identity and number of land subdivision and farming business impacted by the CHD is not known, this analysis relates the economic impacts to real estate prices in the County (see Table A-2). Crownscale-related conservation efforts are expected to cost between $1,249 and $8,431 per residential dwelling unit developed, $1.40 to $4.12 per square foot of commercial property developed, and $0.91 to $2.67 per square foot of industrial property developed, depending on residential dwelling unit density, lot coverage (i.e., the percent of the lot developed), and conservation activities required. The median sales price for single family residences in the County was $315,000 in 2004,[173] and the sales price of commercial and industrial property in the County in 2004 ranged from $145 to $185 and $50 to $100 per square foot, respectively. Thus, the economic impacts of crownscale conservation to the development industry are equal to 0.4 percent to 2.7 percent of the 2004 median price of a single family residency, 0.8 percent to 2.8 percent of the 2004 sales price of commercial property, and 0.9 percent to 5.3 percent of the 2004 sales price of industrial property in Riverside County. These costs may be borne by the developer or passed on to the landowner through a lower land purchase price.

Flood Control Agencies and Water Districts

It is expected that the RCFC will re-initiate the San Jacinto River Flood Control Project, along with the County of Riverside, the California Department of Fish and Game (CDFG), and the City of Perris. In addition, MWD is expected to construct a new water pipeline (i.e., San Diego Pipeline Number 6) in Riverside County. Both the County flood control district and MWD serve a large population and are not considered further in this analysis.

Transportation

Effects on transportation include costs of conservation efforts associated with road projects, railway projects, and airports. The conservation costs would likely be incurred by Cal Trans or the Riverside

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[172] State of California, Employment Development Department, available at: http://www.soicc.ca.gov/ctep/GeoCountyList.asp?County=Riverside, viewed on June 16, 2005.

[173] "SOUTHERN CALIFORNIA HOME SALE ACTIVITY, L.A. Times Sunday Edition Charts – Data for the Year 2004." Available at DataQuick Real Estate News, http://www.dqnews.com/ZIPLAT2004.shtm

County Transportation Commission. These public entities exceed the criteria (fewer than 50,000 residents) for "small entities" and are not considered further in this analysis.

Table A-2
Economic Impacts in Terms of Real Estate Prices in Riverside County

Development Type	RL	RM	RH	C	I
Forecast acres of development	56.9	0	91.5	157.7	36.0
Dwelling units (du)/acre	5	10	20		
Square feet (sf)/acre				9,583 a/	14,810 a/
Conservation $/acre – low	$16,055	$18,370	$24,980	$13,420	$13,420
Conservation $/acre – high	$42,155	$44,470	$51,080	$39,520	$39,520
Conservation $/unit – low	$3,211/du	$1,837/du	$1,249/du	$1.40/sf	$0.91/sf
Conservation $/unit – high	$8,431/du	$4,447/du	$2,554/du	$4.12/sf	$2.67/sf
Unit sales price, 2004 – low	$315,000/du b/	$315,000/du b/	$315,000/du b/	$145/sf c/	$50/sf c/
Unit sales price, 2004 – high	$315,000/du b/	$315,000/du b/	$315,000/du b/	$185/sf c/	$100/sf c/
Conservation cost as a percent of unit sales price, 2004 - low	1.0%	0.6%	0.4%	0.8%	0.9%
Conservation cost as a percent of unit sales price, 2004 - high	2.7%	1.4%	0.8%	2.8%	5.3%

a/ Assumes 22 percent lot coverage for commercial development and 34 percent lot coverage for industrial development. This coverage represents standard single-story development as described in the "City of Cathedral [Riverside County] City Comprehensive General Plan," July 31, 2003.

b/ Median residential sales price for Riverside County, 2004, "SOUTHERN CALIFORNIA HOME SALE ACTIVITY, L.A. Times Sunday Edition Charts – Data for the Year 2004." Available at DataQuick Real Estate News, http://www.dqnews.com/ZIPLAT2004.shtm.

c/ Society of Industrial and Office Realtors, 2005, "Comparative Statistics of Industrial & Office Real Estate Markets." Sales price ($/square foot) for industrial and office property for the Inland Empire (San Bernardino and Riverside counties).

Other Small Entities

Five small local government, the City of Perris (population 36,189), Lake Elsinore (population 28,928), Lakeview (population 1,619), Nuevo (population 4,135), and Winchester (population 2,155), are located adjacent to the essential habitat.[174] There is no record of consultations between the Service and these

[174] The boundaries of seven city governments are either adjacent to or bisect the essential habitat: Moreno Valley (population 142,381), Perris (population 36,189), Lake Elsinore (population 28,928), Lakeview (population 1,619), Nuevo (population 4,135), Winchester (population 2,155), and Hemet (population 58,812). Only Moreno Valley and Hemet exceed the criteria (fewer than 50,000 residents) for "small entity." Source: Geographic Data Technology, Inc. (GDT), Department of Commerce, Census Bureau, Geography Division,

cities since the crownscale was listed in 1998. Indeed, it is not likely that these cities would be involved in a land development project involving a section 7 consultation, although a city may be involved in land use planning or permitting, and may play a role as an interested party in infrastructure projects (such as the City of Perris with the San Jacinto River Flood Control Project). Any cost associated with this activity/involvement is anticipated to be a very small portion of the city's budget.

POTENTIAL EFFECTS ON ENERGY SUPPLY

Executive Order (EO) No. 13211, "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use," issued May 18, 2001 requires Federal agencies to submit a "Statement of Energy Effects" for all "significant energy actions" in order to present consideration of the impacts of a regulation on the supply, distribution, and use of energy.[175] Significant adverse effects are defined in the EO by the OMB according to the following criteria:

1. Reductions in crude oil supply in excess of 10,000 barrels per day;

2. Reductions in fuel production in excess of 4,000 barrels per day;

3. Reductions in coal production in excess of five million tons per year;

4. Reductions in natural gas production in excess of 25 million mcf (one-thousand cubic feet) per year;

5. Reductions in electricity production in excess of one billion kilowatt-hours (kWh) per year or in excess of 500 megawatts of installed capacity;

6. Increases in energy use required by the regulatory action that exceed any of the thresholds above;

7. Increases in the cost of energy production in excess of one percent;

8. Increases in the cost of energy distribution in excess of one percent; or

9. Other similarly adverse outcomes.

The CHD is expected to have minimal impacts on the energy industry. There is a very small likelihood of energy-related impacts occurring in essential habitat of the size established by the criteria. Utility

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and ESRI, 20040301, U.S. Populated Place Areas: ESRI ® Data & Maps 2004, ESRI, Redlands, California, USA.

[175] Daniels, Mitchel E., July 13, 2001, "Memorandum for Heads of Executive Departments and Agencies, and Independent Regulatory Agencies," M-01-27, http://www.whitehouse.gov/omb/memoranda/m01-27.html.

corridors already exist in the essential habitat, and regulatory cost evidence does not exist to suggest that any project modifications were part of section 7 consultations.

COSTS OF DEVELOPMENT RESTRICTIONS

When development is prohibited in certain areas as a result of species conservation, it may reduce the value of the affected land. This reduction in property value represents a cost to landowners. There are two classes of models that economists use to evaluate such costs. One is the "closed city model" and the other is the "open city model." The closed city model assumes that the number of households in a city is fixed and migration does not occur when economic conditions change in the city. The open city model assumes that the number of households in a city is determined in a multi-city equilibrium. Therefore, households are free to move from one city to another, and will choose their residential place to maximize their utility. Given that housing markets in U.S. cities feature a large volume of in- and out-migration, the open city model seems to provide a more accurate and realistic description of the development process in the southern California counties examined in this analysis. Based on this premise and technical reviewers' comments on previous analyses of CHD, the open city model is judged to be appropriate to measure the cost associated with land use restrictions, should such restrictions arise with conservation efforts for the species. In these assessments of CHD, household and landowner decisions are modeled by expanding the stochastic city model developed by Capazza and Helsley (1990). To provide an overview of how this type of model can be implemented in the case of an effect on land values, the following description of key relationships is provided. As in Capazza and Helsley (1990), it is assumed that there is an identifiable Central Business District (CBD), to which all households commute daily. Locations are indexed by their distance from the CBD (*z)*.

In a competitive market, the price of land equals the expected present value of future land rents. Specifically, the price of agricultural land at a given location equals the present value of agricultural rent up to the time of conversion plus the present value of urban rent from the time of conversion onward. Assuming that landowners choose the conversion time to maximize the expected value of land, the price of agricultural land can be derived as (Capozza and Helsley 1990):

$$\text{(A1)} \qquad P^a(t,z) = \frac{R_a}{r} + \frac{g}{r^2} e^{-\alpha(z^*-z)} + \frac{r-\alpha g}{\alpha r^2} e^{-\alpha(z^*-z)}$$

R_a = the rent of agricultural land

r = the discount rate

g = income growth rate

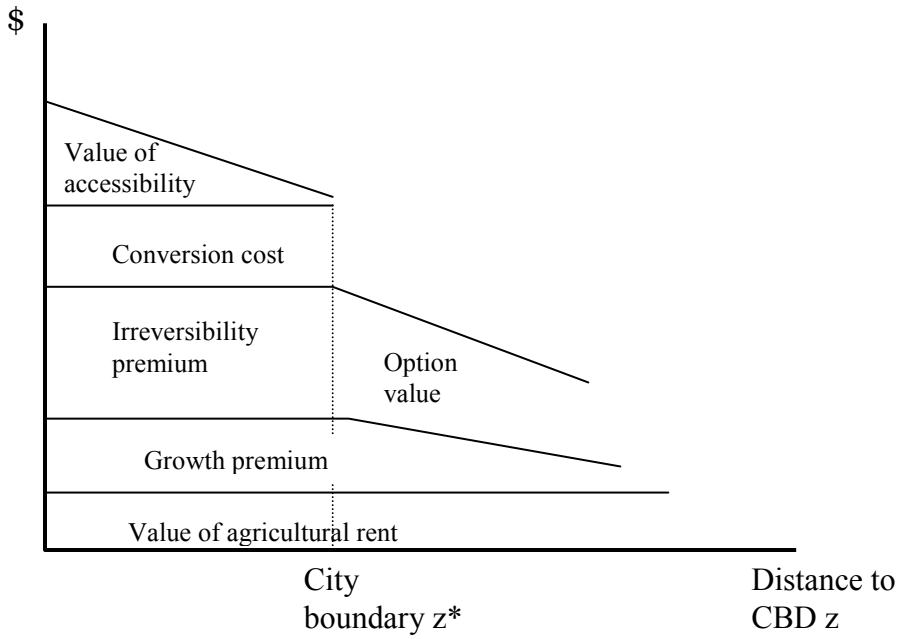
z^* = the distance from the city boundary to the city center

The price of agricultural land has three components: (1) the value of agricultural rents, (2) growth premium, and (3) option value of potential development. Both the growth premium and the option value decrease as the distance from the boundary of the urban area increases and the time of development moves further into the future. The price of urban land can be derived as:

$$\text{(A2)} \qquad P^u(t,z) = \frac{1}{r}\left\{ R_a + rC + \frac{g}{r} + \frac{r-\alpha g}{\alpha r} + \frac{z^*(t)-z}{(1+\tau_{t\_})} \right\}$$

In this formula, C is the capital cost of converting a unit of land to urban use. The price of urban land consists of the value of agricultural rents, the cost of conversion, the growth premium, the irreversibility premium, and the value of accessibility. Graphically, the prices of urban and agricultural land are illustrated as follows in Figure B-1:

Figure B-1
Graphical Representation of the Components of Land Price (Value)



Consider the cost of land use restrictions due to a CHD to landowners in the following scenarios:

a) A piece of agricultural land is prohibited from being farmed or developed in the future. The cost to the landowner is given by (A1).

b) A piece of agricultural land is prohibited from being developed in the future, but can be farmed. The cost to landowner in this case is given by:

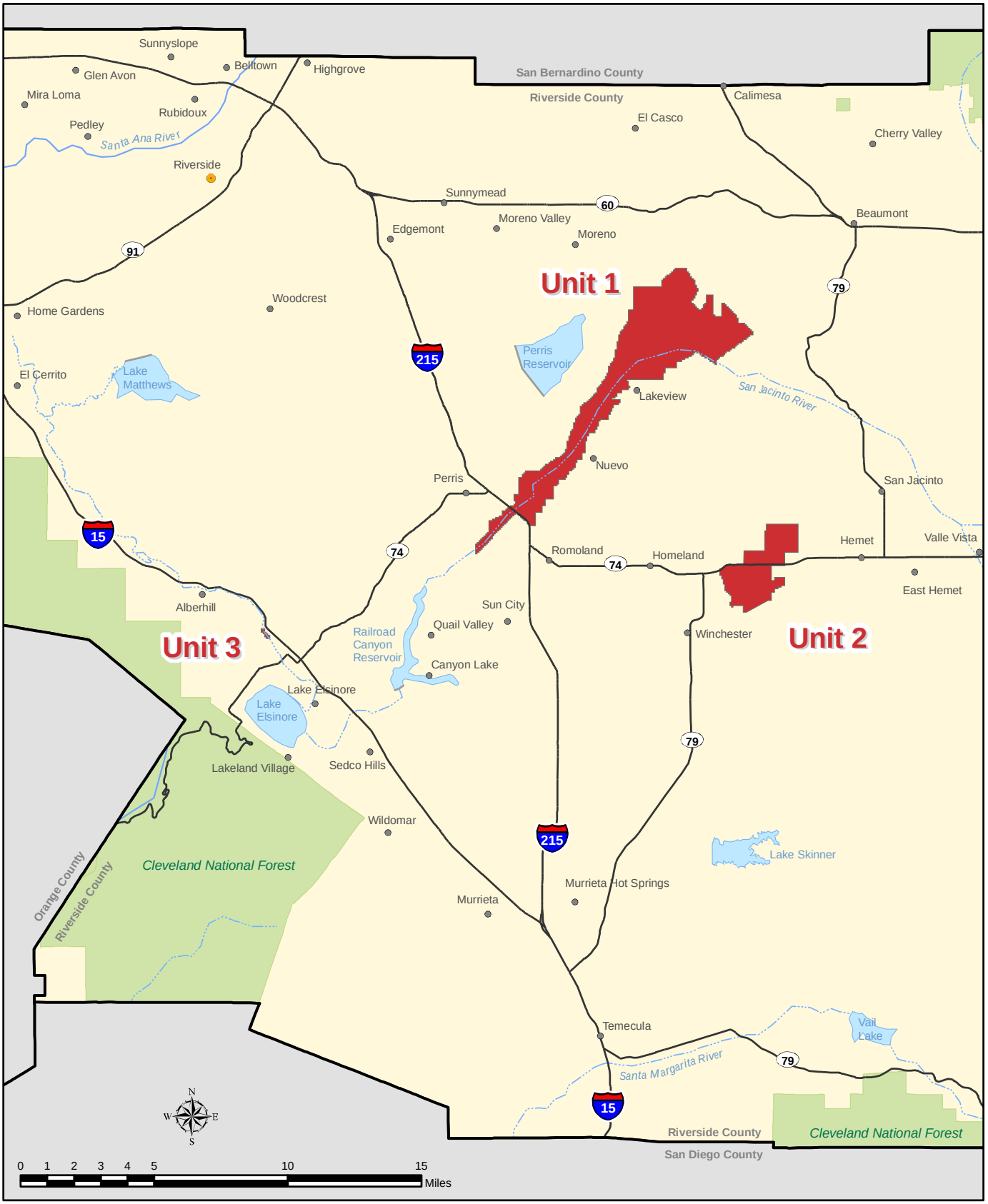
$$\left[P^a(t,z) - \frac{A}{r} \right] = \frac{g}{r^2} e^{-\alpha(z^*-z)} + \frac{r-\alpha g}{\alpha r^2} e^{-\alpha(z^*-z)}$$

c) A piece of urban land is prohibited from being farmed or developed. The cost to landowner is given by (A2).

APPENDIX C:
LIST OF ACRONYMS

BA	Biological Assessment
BMP	Best Management Plan
BO	Biological Opinion
C	Commercial
CBD	Central Business District
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
cfs	Cubic Feet Per Second
CHD	Critical Habitat Designation
CWA	Clean Water Act
du	Dwelling Unit
EIR	Environmental Impact Report
EO	Executive Order
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
GIS	Geographic Information Systems
HANS	Habitat Evaluation and Acquisition Negotiation Strategy
HCP	Habitat Conservation Plan
I	Industrial
kWh	Kilowatt-hour
LDMF	Local Development Mitigation Fee
mcf	One-Thousand Cubic Feet
MSCP	Multiple Species Conservation Program
MSHCP	Multiple Species Habitat Conservation Plan
MWD	Metropolitan Water District of Southern California
NAICS	North American Industry Classification System
NEPA	National Environmental Policy Act

NPDES	National Pollutant Discharge Elimination System
OMB	Office of Management and Budget
RCA	Regional Conservation Authority
RCFC	Riverside County Flood Control and Water Conservation District
RFA	Regulatory Flexibility Act
RH	High-Density Residential
RL	Low-Density Residential
RM	Medium-Density Residential
SBA	Small Business Administration
SBREFA	Small Business Regulatory Enforcement Fairness Act
SCAG	Southern California Association of Governments
sf	Square Feet
SWANCC	Solid Waste Agency of Northern Cook County
USACE	U.S. Army Corps of Engineers



San Jacinto Valley Crownscale Essential Habitat Units

Habitat Units

September 2005

Data Sources: U.S. Fish and Wildlife Service and ESRI

ENTRIX