
DRAFT

**ECONOMIC EFFECTS OF CRITICAL HABITAT
DESIGNATION FOR BRAUNTON'S MILK VETCH
IN THREE CALIFORNIA COUNTIES**

Prepared For

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I BACKGROUND

On November 10, 2005, the U.S. Fish & Wildlife Service (Service) proposed critical habitat for Braunton's milk-vetch, *Astragalus brauntonii*, pursuant to the Endangered Species Act of 1973.¹ For this economic analysis, a total of 3,638 proposed acres in Ventura, Los Angeles and Orange Counties are examined. This report quantifies the economic effects associated with the proposed designation of critical habitat. It does so 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 study also accounts for past costs of conservation.

This information is intended to assist the Secretary in determining whether the benefits of excluding particular areas from the designation outweigh the biological benefits of including them.² 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).³ 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.⁴

I.1 IDENTIFIED HABITAT

The Service identified six habitat units and ten subunits with known occurrences of milk-vetch. In identifying areas as critical habitat, the Service considered those physical and biological habitat features that are essential to the conservation of the species. These essential features are referred to as the species' primary constituent elements (PCEs). Areas that do not contain any PCEs at the time of critical habitat designation are not considered critical habitat, whether or not they occur within a mapped critical habitat unit. The primary constituent elements for milk-vetch are as follows:

1. Carbonate limestone soils derived from marine sediment;
2. Low proportion (<10%) of shrub cover directly around the plant; and
3. Periodic disturbances that stimulate seed germination (e.g., fire, flooding) and reduce vegetative cover.

¹ 70 FR 68982

² 16 U.S.C. §1533(b)(2).

³ Executive Order 12866, "Regulatory Planning and Review," September 30, 1993; Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," May 18, 2001; 5 U.S.C. §§601 *et seq*; and Pub Law No. 104-121.

⁴ 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 v. U.S.F.W.S.*, 248 F.3d 1277 (10th Cir. 2001)).

I.2 THREATS

In the proposed rule, the Service identified the following threats to milk-vetch:

- Land use activities that result in frequent disturbance;
- Fire suppression activities;
- Cattle grazing;
- Equestrian and foot traffic; and, most significantly
- Urban development.

I.3 CONSULTATION HISTORY

Through the Section 7 process, the Service has consulted six times on actions affecting milk-vetch. The consultation history includes:

- One consultation with the Army Corps of Engineers for a proposed dam at Lang Ranch in Thousand Oaks;
- One consultation with the Department of Energy concerning Boeing Company's plans to excavate and remove contaminated soil at its Santa Susana Field Laboratory;
- One consultation with the California Department of Health Services regarding a proposal by the Los Angeles Department of Water and Power to construct water treatment facilities in Stone Canyon and Encino;
- One consultation with the Federal Communications Commission regarding the installation of a telecommunications tower in Ventura County;
- One consultation with the National Park Service concerning a fire management plan for the Santa Monica Mountains National Recreation Area; and
- One consultation with the Natural Resources Conservation Service concerning the Calleguas Creek Watershed Management Program.

I.4 PRESERVED OPEN SPACE

Several of the areas proposed for critical habitat are already designated as open space or parkland. For each of the open space preserves affected by the proposed rule, management personnel were interviewed to determine potential economic effects of the proposed rule on the activities listed in section I.2, and to assess whether preservation of the open space could be attributed to conservation of milk-vetch.

I.4.1 Conejo Open Space Agency

A portion of Unit 2A is managed by the Conejo Open Space Agency (COSCA). COSCA is the entity charged with preserving, protecting and managing open space resources in the Conejo Valley. It was created in 1977 by a joint powers agreement between the City of Thousand Oaks and the Conejo Recreation and Park District. COSCA has managed

these lands as open space since before the listing of milk-vetch, and city personnel stated that no incremental costs attributable to the Act have occurred or are anticipated.⁵

I.4.2 Santa Monica Mountains National Recreation Area

Unit 2D and portions of Units 2E and 3 are in the Santa Monica Mountains National Recreation Area (NRA), which is managed by the National Park Service. The Park Service stated that, although it does manage for milk-vetch within the NRA, these activities are due to the NPS mandate to protect and conserve sensitive species and would occur even if milk-vetch had not been listed under the Act. Therefore, there are no incremental costs attributable to the listing or the proposed rule.⁶

I.4.3 Santa Monica Mountains Conservancy

Unit 2E contains land owned and managed by the Santa Monica Mountains Conservancy. According to conservancy personnel, no past costs have been borne due to the listing of milk-vetch, and no future management costs or development impacts are anticipated.⁷

I.4.4 Rancho Simi Recreation and Park District

Portions of Units 1A and 2C are within lands owned and managed by the Rancho Simi Recreation and Park District. According to district personnel, the district incurred past costs from a lawsuit by the California Native Plant Society. The result of the litigation is a study of milk-vetch on an adjacent plot that is ongoing and administered by Ventura County. Park personnel believe future activities in units 1A and 2C could be affected by the designation of habitat as some improvements to the parks have not been made at this time. Furthermore, the parks have heavily traveled trails. The district did not provide estimates for these costs⁸.

I.4.5 Bridle Path Homeowner's Association

The land in Unit 1C is owned and managed by the Bridle Path Homeowner's Association. According to the association's board, past management activities have consisted of fencing off the identified populations of milk-vetch, resulting in negligible costs. No future management costs are anticipated, and no further residential development is allowed based on the approved permit for the Bridle Path project.⁹

⁵ Personal communication with Rick Burgess, senior planner, city of Thousand Oaks, February 28, 2006.

⁶ Personal communication with Christy Brigham, restoration ecologist, Santa Monica Mountains National Recreation Area, March 2, 2006.

⁷ Personal communication with Paul Edelman, chief of natural resources and planning, March 3, 2006.

⁸ Personal communication with Ed Hayduk, Assistant General Manager, Rancho Simi Recreation and Park District, March 8, 2006.

⁹ Personal communication with Julie Weltsch, board member, Bridle Path Homeowner's Association, March 6, 2006.

I.4.6 Topanga State Park

A portion of Unit 4 is within Topanga State Park. Park personnel were interviewed and stated that no additional costs have been incurred due to the listing of milk-vetch. All management activities that are performed would have occurred absent the listing of the species.¹⁰

I.4.7 Monrovia Hills Wilderness Preserve

A portion of Unit 5 is in the Monrovia Hills Wilderness Preserve. This preserve is managed by the City of Monrovia and is dedicated to

“preserving open space land left in its natural state including preservation of endangered habitats and species, wildlife habitats, and wildlife corridors, open space for passive recreation uses such as hiking and nature studies, utility easements, and reservoirs, and nature centers and educational facilities.”¹¹

City personnel were interviewed about the costs of acquiring and managing the preserved lands. They are discussed in detail in section IV.5.

I.4.8 Coal Canyon Ecological Reserve

A portion of Unit 6 is within the Coal Canyon Ecological Reserve, owned by the California Department of Fish & Game (DFG). DFG personnel were interviewed and stated that no additional costs for monitoring or management have been incurred or are foreseeable due to the listing of milk-vetch.¹²

I.4.9 Chino Hills State Park

A portion of Unit 6 is within Chino Hills State Park. Park personnel were interviewed and stated that no additional costs have been incurred due to the listing of milk-vetch. All management activities that are performed would have occurred absent the listing of the species.¹³

¹⁰ Personal communication with Nat Cox, environmental scientist, California State Parks, March 8, 2006.

¹¹ “Frequently Asked Questions Re: Hillside Wilderness Preserve & Hillside Recreation Areas,” March, 2005.
http://www.ci.monrovia.ca.us/city_hall/boards_committees/Trails%20Committee%20Frequently%20Asked%20Questions.pdf

¹² Personal communication with Randy Botta, biologist, California Department of Fish & Game, March 6, 2006.

¹³ Personal communication with Alissa Ing, environmental scientist, Chino Hills State Park, March 2, 2006.

II ANALYTICAL FRAMEWORK

This economic analysis considers both the economic efficiency and distributional effects 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 conservation. Efficiency losses also include reductions in surplus levels resulting from economic activities such as land development. Similarly, the costs incurred by a Federal action agency to consult with the Service under section 7 represent opportunity costs of habitat conservation.

This analysis also addresses the distribution of impacts associated with the designation, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation activities on small entities and the energy industry. This information may be used to determine whether the effects of the designation unduly burden a particular group or economic sector. For example, while habitat conservation activities 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 distributional effects, as well as their application in this analysis, are discussed in greater detail below.

II.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 AWS, 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

In some instances, compliance costs may provide a reasonable approximation of the efficiency effects associated with a regulatory action. For example, a lead Federal agency may enter into a consultation with the Service to ensure that a particular activity will not adversely modify critical habitat. The end result of the consultation may be a small amount of additional mitigation for on-site impacts of the proposed activity. The cost of the additional mitigation would have been spent on alternative activities if the proposed project 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.

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., *A Guide to Benefit-Cost Analysis* (2nd Ed.), Prospect Heights, Illinois: Waveland Press, Inc., 1990; and U.S. 240-R-00-003, September 2000, available at <http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html>.

More generally, 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.

II.2 DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

Measurements of changes in economic efficiency focus on the net impact of conservation activities, without consideration of how certain economic sectors or groups of people are affected. Thus, a discussion of efficiency effects alone may miss important distributional considerations. OMB encourages Federal agencies to consider distributional effects separately from efficiency effects.¹⁵ This analysis considers several types of distributional effects, including impacts on small entities and impacts on energy supply, distribution, and use.

II.3 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 proposed critical habitat. 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 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 coextensive with the designation.^{16,17}

Coextensive 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. We note 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 critical habitat designation, the impacts of these actions are considered relevant for understanding the full effect of the proposed

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

¹⁶ 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 Assn v. U.S.F.W.S.*, 248 F.3d 1277 (10th Cir. 2001)).

¹⁷ 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.

designation. Enforcement actions taken in response to violations of the Act, however, are not included.

II.3.1 Sections of the Act Relevant To the 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 critical habitat designation. According to section 4, the Secretary is required to list species as endangered or threatened “solely on the basis of the best available scientific and commercial data.”¹⁸

The protections afforded to threatened and endangered species and their habitat are described in sections 7, 9, and 10 of the Act, and economic impacts resulting from these protections are the focus of this analysis:

Section 7 of the Act requires Federal agencies to consult with the Service to ensure that any action they authorize, fund, or carry 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.¹⁹

Section 9 defines the actions that are prohibited by the Act. In particular, it prohibits the “take” of endangered wildlife, where “take” means to “harass, harm, pursue, or collect, or to attempt to engage in any such conduct.”²⁰ The economic impacts associated with this section manifest themselves in sections 7 and 10. While incidental take permits are not issued for plant species, the Service is obligated to ensure that proposed activities adequately minimize impact to species.

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 an endangered animal species in order to meet the conditions for issuance of an incidental take permit in connection with the development and management of a property.²¹ 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 measures 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

¹⁸ 16 U.S.C. §1533.

¹⁹ 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.

²⁰ 16 U.S.C. §1538 and 16 U.S.C. §1532.

²¹ U.S. Fish and Wildlife Service, “Endangered Species and Habitat Conservation Planning,” <http://endangered.fws.gov/hcp/>.

consider whether the proposed activities adversely affect or jeopardize the continued existence of the plant species.

II.3.2 Other Relevant Protection Efforts

The protection of listed species and habitat is not limited to the Act. Other Federal agencies, such as the Army Corps of Engineers, as well as State and local governments, may also seek to protect the natural resources under their jurisdiction.²²

In general, economic impacts will be evaluated regardless of whether or not species protection measures required by the Act are also required by other Federal agencies or State and local governments. The impacts of these protection measures are “co-extensive” with or attributable to the species’ listing and critical habitat designation. Examples of the type of regulations that fall into this category include but are not limited to the California Environmental Quality Act (CEQA) and Section 404 of the Clean Water Act.

II.3.3 Time Frame

The analysis examines activities taking place both within and adjacent to the proposed designation. It estimates impacts 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. Accordingly, the analysis bases estimates on activities that are likely to occur within a 20-year time frame, beginning on the day that the current proposed rule becomes available to the public. In addition, past impacts are measured starting at the listing of the species in 1997.

II.3.4 Benefits

Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.²³ 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.²⁴

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

²² For example, the Sikes Act Improvement Act (Sikes Act) of 1997 requires Department of Defense (DOD) military installations to develop Integrated Natural Resources Management Plans (INRMPs) that provide for the conservation, protection, and management of wildlife resources (16 U.S.C. §§ 670a - 670o). These plans must integrate natural resource management with the other activities, such as training exercises, taking place at the facility.

²³ Executive Order 12866, *Regulatory Planning and Review*, September 30, 1993.

²⁴ U.S. Office of Management and Budget, “Circular A-4,” September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

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.²⁵ *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.*

Critical habitat designation 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, critical habitat designation 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 critical habitat designation. To the extent that the ancillary benefits of the rulemaking may be captured by the market through 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.

II.4 INFORMATION SOURCES

The primary sources of information for this report were communications with and data provided by the Service. In addition, the analysis relies on information from the following entities:

- UC Berkeley Department of City and Regional Planning, for the CURBA urban planning model;
- DataQuick Information Systems, for data on new home sales;
- Marshall & Swift, for data on building costs;
- Environmental Systems Research Institute (ESRI), for geographic data;
- The Southern California Association of Governments (SCAG), for socioeconomic forecasting.

²⁵ U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

III METHODOLOGY

The Service identified urban development as the most significant threat to milk-vetch; however, since urban development typically occurs on private lands, these activities do not come under the purview of the section 7 consultation process unless there is a federal nexus. Most of the consultations that have occurred for this species have been for projects associated with urban development within the region, such as water retention facilities, water treatment facilities, and construction of communication sites (see Section 1.3).

Consequently, the methodology of this analysis is threefold. First, it quantifies past costs that have resulted from efforts to conserve the species within areas of critical habitat. Second, it quantifies future costs when it is possible to isolate and measure them. Finally, it calculates the economic surplus resulting from future activities that may take place within proposed critical habitat. This approach is preferable in many cases because it avoids speculation about regulatory impacts; the lack of past examples of how the presence of milk-vetch has affected development projects often precludes meaningful analysis of what those incremental effects will be in the future. It is, however, possible to calculate the value added from development activities within areas of critical habitat.

III.1 PAST COSTS

This analysis defines past costs as costs that occurred between when milk-vetch was listed under the Act (January 29, 1997) and the present. Past costs were calculated by interviewing the affected entities within critical habitat—typically landowners—to determine if any resources had been expended on management, consultation with the Service, or other activities intended to conserve the species. Past costs also include the value of any lost economic opportunities attributable to listing. For example, a housing development that reconfigured to avoid development on areas containing milk-vetch would incur an economic loss if those actions were required to conserve the species or its habitat.

III.2 FUTURE COSTS

Future costs are costs attributable to the conservation of milk-vetch that will occur between the present and 2025. These costs vary based on the reasonably-foreseeable highest and best economic uses for each individual designated parcel of land. For example, land owned by a public entity and designated as open space typically has little potential to be used for residential or commercial development purposes over the relevant time frame. In these cases, the future costs of critical habitat designation are calculated as the sum of the management and other burdens imposed on the landowner, discounted to present value. (Section I.4 contains a summary of the past and future effects of the listing on the open space entities affected by the designation.)

Several of the proposed critical habitat units contain privately-owned land that may accommodate residential development in the future. Here, the analysis synthesizes available data on residential development patterns and intensity to estimate development pressure on these areas. Since the effects of designation on the development industry are unclear from the consultation history, it calculates the overall surplus accruing to

developers and landowners as a measure of the economic potential of each unit of critical habitat. These numbers can aid Service personnel in gauging the potential economic impact of decisions to conserve the species and its habitat.

III.2.1 Conceptual Model

This analysis adopts a partial equilibrium approach to estimate the effects of critical habitat designation on the markets for land and new housing.²⁶ This is justified in light of the designation's small size. Habitat units for milk-vetch typically comprise a small portion of the relevant market for housing. Market effects of the designation, if any, will be small, and do not warrant a general equilibrium analysis.²⁷

Instead, the analysis provides a measure of the total surplus or quasi-rent that will accrue from permitted housing development within the area of proposed critical habitat. The amount of surplus generated per housing unit is calculated as the market price of the new housing minus the variable costs of development and construction: total expected surplus within the unit is calculated by multiplying this expression by the expected number of housing units.

III.2.2 Empirical Estimation

Measurement of surplus is conducted using data obtained from DataQuick, which maintains a database of new home transactions for the state of California. This analysis uses data on all new homes bought or sold in counties containing critical habitat after 1998, totaling approximately 100,000 observations.

For each unit of critical habitat, DataQuick observations within a radius of one mile of the habitat unit were sampled to obtain representative housing characteristics for the local market. This resulted in a sample size of between 200 and 600 new home sales per unit. Since California home prices have exhibited considerable volatility in recent years, it is necessary to inflate all home prices to present value. This was accomplished using the Freddie Mac Conventional Mortgage Home Pricing Index.²⁸

Marshall and Swift's Residential Cost Handbook provides detailed estimates of construction costs per square foot for houses of various size, material (e.g., stud framed, masonry), and quality. DataQuick data provides mean square footage estimates per census tract. By using a "very good" quality, two-story, stucco house as the basic house profile, building costs estimates were then generated in each habitat unit.

In addition to these "vertical" costs of homebuilding, it is also necessary to include development costs (not counting the developer's profit or returns to the landowner).

²⁶ See, for example, "Economic Effects Of Critical Habitat Designation For The Red-Legged Frog In 23 California Counties," <http://www.fws.gov/sacramento/ea/Documents/Red-Legged%20Frog%20DEA%2010-19-05.pdf>

²⁷ In a partial equilibrium analysis, changes within an individual market are studied while holding other markets constant. A general equilibrium analysis would also consider the response of other relevant markets to those changes.

²⁸ <http://www.freddiemac.com/finance/cmhpi/>

There are two types of development costs that should be considered: “soft” costs and “hard” costs. Soft costs include the cost of design, permitting, marketing and sales. Hard costs of development include costs of grading, construction of local roads, installation of water collection systems, construction of parks, clubhouses and other amenities within the development, bringing utilities to the project, installation of streetlights, and other physical costs. Based on interviews with housing developers, total development costs are assumed equal to 17% of the cost of homebuilding. The sum of the building and development cost is the variable cost of new housing.

Determination of the expected quantity of new homes built within each unit of critical habitat requires a combination of forecasting data from the Southern California Association of Governments (SCAG), and other modeling. SCAG creates growth forecasts for housing and population at the census tract level, a standard unit of analysis in economics, for the entire Southern California region. Development is allocated probabilistically within the census tract using the CURBA model, an urban growth forecasting tool developed at the UC Berkeley Department of City and Regional Planning.²⁹

²⁹ For a description of the CURBA model, see Landis, John. CUF, CUF II, and CURBA: A Family of Spatially-Explicit Urban Growth and Land Use Policy Simulation Models. 2001. Richard Brail and Richard Klosterman, eds., Planning Support Systems. Redlands: ESRI Press.

IV RESULTS OF THE ANALYSIS

The results of the analysis are discussed on a unit-by-unit basis below. Table 1: Results of Modeling Analysis gives the results of the modeling framework discussed in section III.2 for the relevant subunits. Table 2: Annualized Results of Modeling Analysis presents these results annualized at 3% and 7% discount rates.

IV.1 UNIT 1

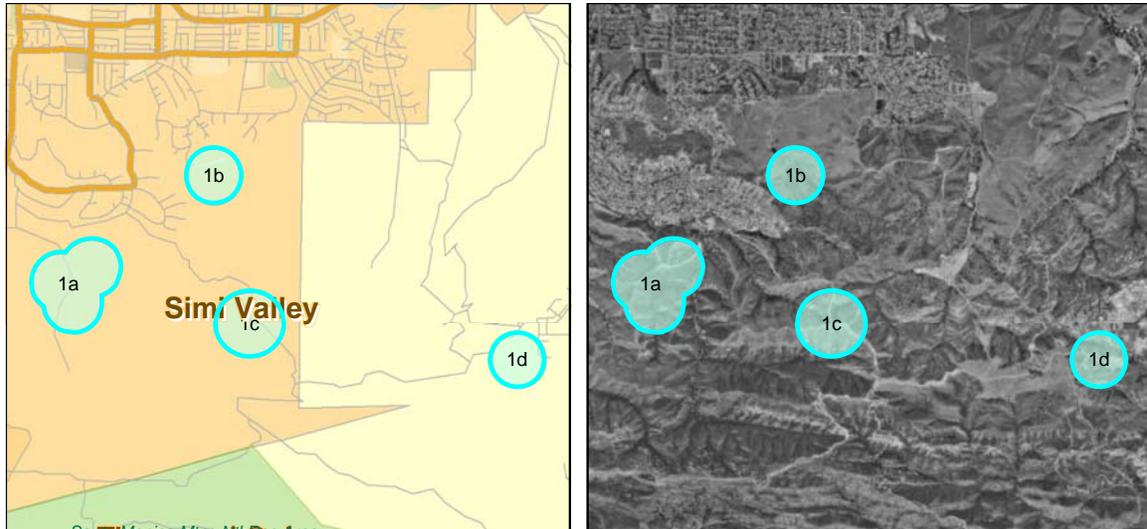


Figure 1: Unit 1

IV.1.1 Unit 1A

This subunit consists of 10 acres of local agency land in Challenger Park owned by Rancho Simi Parks and Recreation Department and 186 acres of private land. It occurs along Bus Canyon. Modeling analysis predicts 26 new homes to be built within this subunit over the next 20 years. Total expected surplus from housing development within this subunit of critical habitat is \$12,429,963 or \$1,202,207 per developed acre.

IV.1.2 Unit 1B

This subunit consists of 80 acres of private land that may be threatened by urban development. It occurs near the end of Peter Place Road in Simi Valley, which is north of Bus Canyon at the edge of an urban development. According to the Simi Valley planning department, this area is designated as Low Density Residential (0-3.25 units / acre) and Open Space. The area is part of a larger residential subdivision approved in this neighborhood. Four of the five phases of the tract (north of the designated area) have been built. The last phase consists of approximately 10 recorded, but undeveloped, lots ranging in size from 6.5 - 40+ acres. The property owner has proposed to amend the General Plan and re-subdivide this area for approximately 50 single-family homes,

however, the proposal is not being actively pursued at this time.³⁰ Modeling analysis predicts 10 homes will be built within critical habitat over the next 20 years. Total expected surplus from housing development within this subunit of critical habitat is \$4,150,432, or \$679,745 per developed acre.

IV.1.3 Unit 1C

This subunit consists of 118 acres of private land within dedicated open space managed by the Bridle Path Homeowner’s Association. As discussed in section I.4.5, no costs have flowed from the listing for this unit.

IV.1.4 Unit 1D

This subunit consists of 77 acres of unincorporated land in Ventura County owned by Boeing as part of its Santa Susana Research Laboratory. Boeing was unable to offer estimate past or future effects of the listing on its operations in time for this draft.³¹

IV.2 UNIT 2

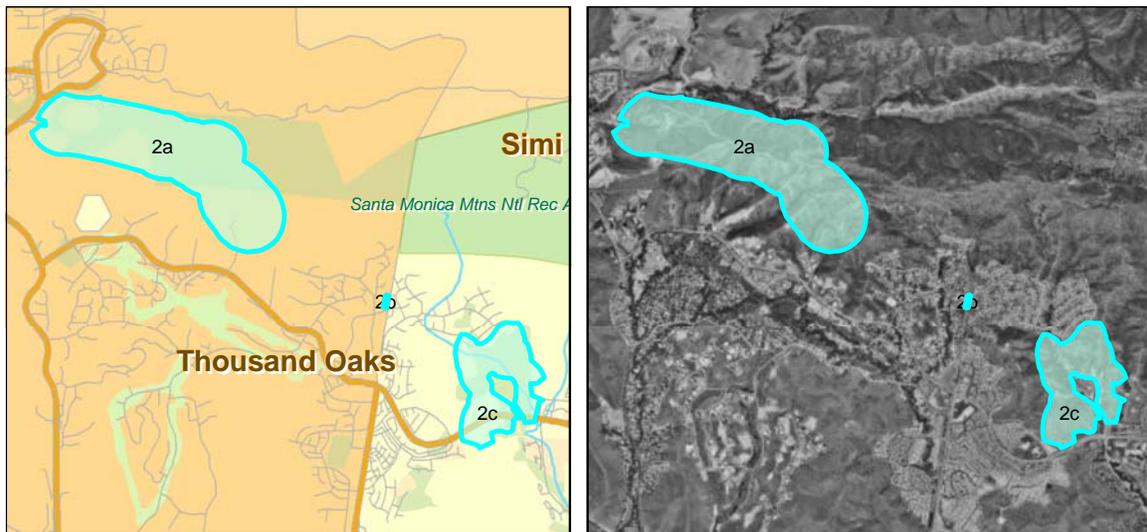


Figure 2: Units 2A, 2B, and 2C

³⁰ Personal communication with Sam Freed, senior planner, Simi Valley Department of Environmental Services, March 6, 2006.

³¹ Personal communication with Inger M. Hodgson, environmental communications manager, Boeing Santa Susana Field Laboratory, March 7, 2006.

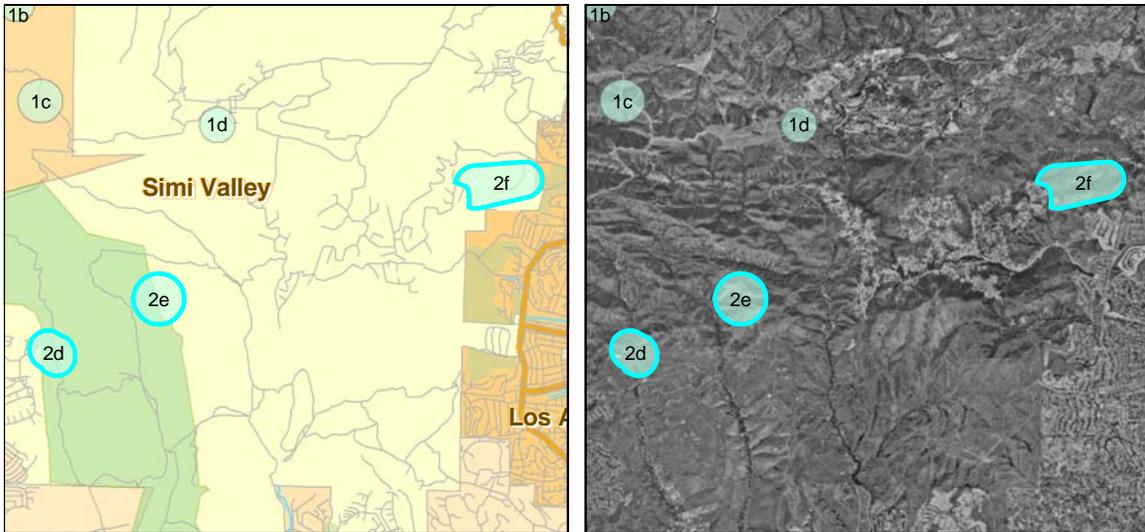


Figure 3: Units 2D, 2E, and 2F

IV.2.1 Unit 2A

This subunit consists of 450 acres of local agency lands designated as open space and owned by the Conejo Recreation and Park District and managed by COSCA. As discussed in I.4.1, there are no foreseeable costs flowing from listing for this subunit.

IV.2.2 Unit 2B

This subunit consists of one acre owned by the city of Thousand Oaks and within a Southern California Edison conservation easement. According to the city, it contains power transmission lines and there are no plans to use the land for other purposes.³²

IV.2.3 Unit 2C

This subunit consists of 150 acres of local agency land in Oak Park Community Park owned and managed by Rancho Simi Parks and Recreation Department, and 23 acres of private land. The census tract which contains this subunit is over 10,000 acres large but is projected by SCAG to grow by just 25 households over the next 20 years. SCAG forecasts and urban growth modeling similarly predict that milk-vetch will not constrain land-use activities; only two homes are projected within critical habitat over the next 20 years.

IV.2.4 Unit 2D

This subunit consists of 121 acres of Federal land within the Santa Monica Mountains National Recreation Area. As discussed in section I.4.2, there are no foreseeable costs flowing from listing for this subunit.

³² Personal communication with Tony Mallard, planner, City of Thousand Oaks, February 10, 2006.

IV.2.5 Unit 2E

This subunit consists of 90 acres of Federal land within the Santa Monica Mountains National Recreation Area, and 67 acres of private land owned and managed as open space by Santa Monica Mountains Conservancy. As discussed in sections I.4.2 and I.4.3, there are no foreseeable costs flowing from listing for this subunit.

IV.2.6 Unit 2F

This subunit consists of 224 acres of private land located east of the City of Chatsworth along Dayton Canyon in the eastern Simi Hills. Based on SCAG projections and urban growth modeling, approximately 95 new homes are projected to be built within this subunit over the next 20 years. Total expected surplus from housing development within this subunit of critical habitat is \$64,227,493 or \$2,714,359 per developed acre.

IV.3 UNIT 3

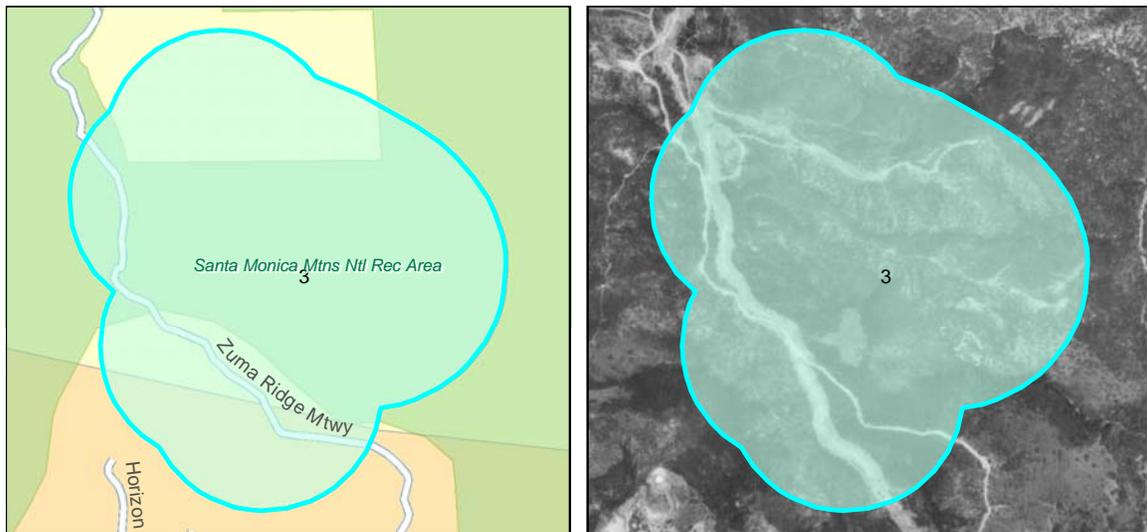


Figure 4: Unit 3

This unit is located in the eastern Santa Monica Mountains in upper Zuma Canyon, north of Point Dume in Los Angeles County. It consists of 183 acres of Federal land within the Santa Monica Mountains National Recreation Area, and 60 acres of private land. Modeling analysis projected fewer than two homes would be built within critical habitat over the next 20 years, so there are no expected impacts of the development. SCAG projections confirm that negligible development is expected in the census tract containing this subunit.

IV.4 UNIT 4

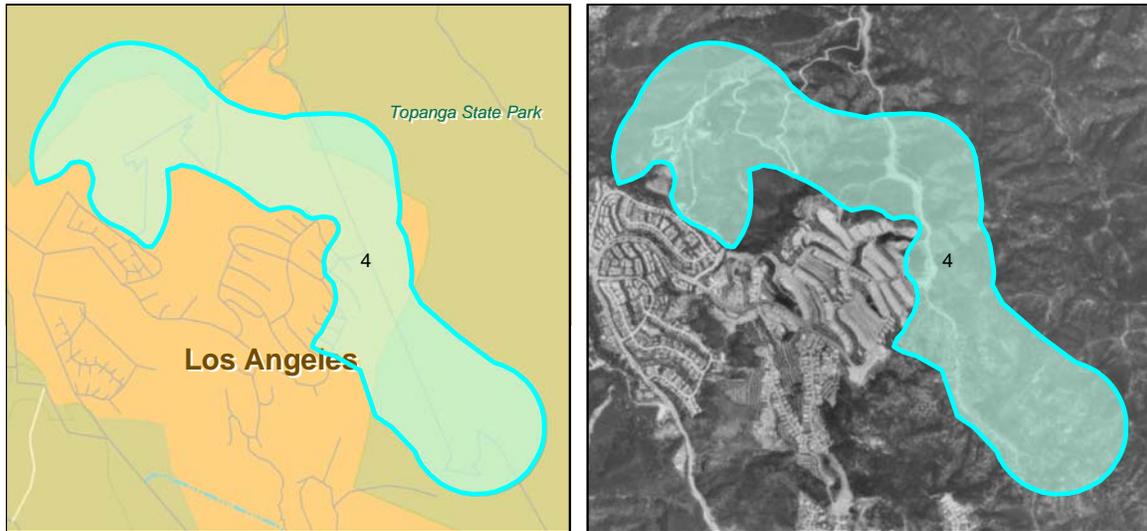


Figure 5: Unit 4

This unit is located in the Santa Ynez Canyon north of Pacific Palisades in Los Angeles County and consists of 485 acres of State lands within Topanga State Park, and 92 acres of private land. No known management activities are occurring on the privately-owned land, and it is zoned as open space in the Los Angeles city general plan. There are no past or expected costs of the proposal for this subunit.

IV.5 UNIT 5

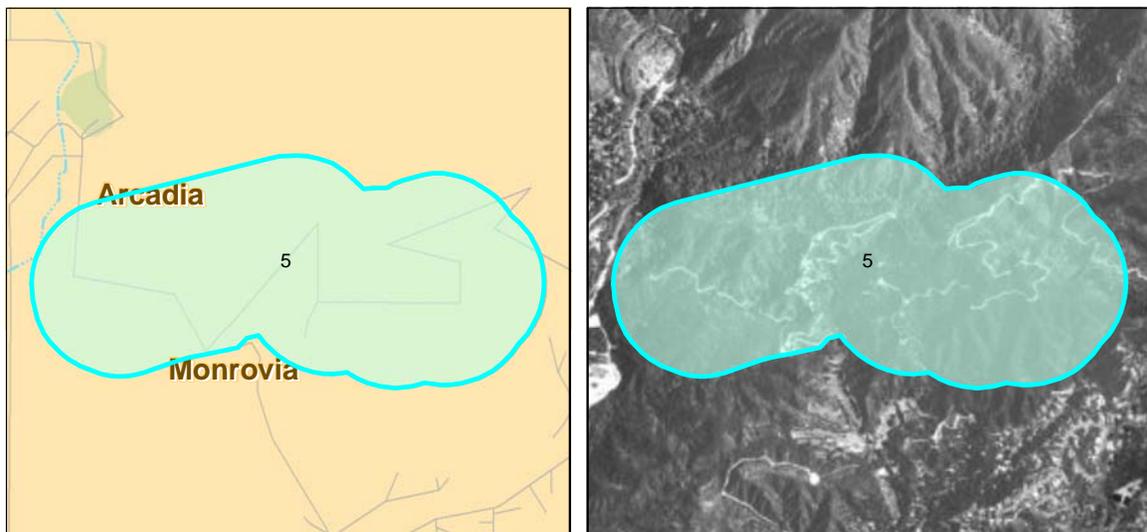


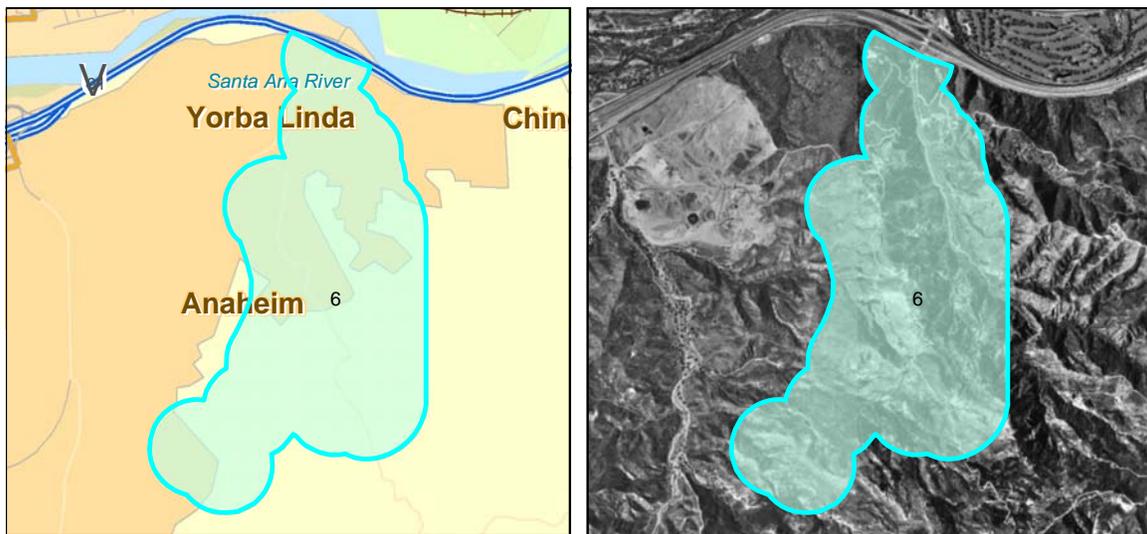
Figure 6: Unit 5

This unit is located in the City of Monrovia in Los Angeles County and consists of 267 acres of local agency land owned by the City of Monrovia and managed as open space (Monrovia Wilderness Preserve), and 64 acres of private land. The Monrovia Wilderness Preserve was acquired by the City at a total cost of \$17.4 million and was funded by the California State Habitat Conservation Fund, the State Resource Agency, statewide park

bonds (Propositions 12 and 40), the Rivers and Mountains Conservancy, and city bond measures.³³

The city has been unable to acquire the privately-owned land within the subunit and believes it may be a site for future development.³⁴ Based on SCAG data and urban growth modeling, 24 new homes are predicted within this subunit. Total expected surplus from housing development within this subunit of critical habitat is \$11,064,666 or \$1,809,743 per developed acre. Additionally, the City of Monrovia estimates that it has incurred \$25,000 costs for milk-vetch in 2003, and an additional \$75,000 in annual future costs for management of the species. These were voluntary actions which were not mandated through the section 7 or section 10 processes.

IV.6 UNIT 6



This unit is located south of the City of Yorba Linda in Coal Canyon in Orange County and consists of 632 acres of State land (Chino Hills State Park and California Department of Fish and Game-Coal Canyon Ecological Reserve) and 257 acres of private land. The private land is part of the 50,000 acre Irvine Ranch Land Reserve.

³³ Personal communication with Fely del Rosario, administrative secretary, Community Development Department, City of Monrovia, April 10, 2006.

³⁴ Personal communication with Alice Griselle, planner, Community Development Department, City of Monrovia, February 28, 2006.

V REGIONAL ECONOMIC IMPACTS

The distributional effects of critical habitat designation are examined using IMPLAN Economic Modeling Software.³⁵ The IMPLAN Model is a widely used tool for analysis of economic events such as a change in industrial output. IMPLAN was developed by the U.S. Forest Service, which continues to use it today, and is now also used by 1,500 agencies and companies, including the San Diego Association of Governments, the California Energy Commission, the California Departments of Finance, Transportation, Water Resources, and Labor and Employment, San Diego State University, Stanford, U.C. Berkeley, and numerous private consulting companies.³⁶

The core of IMPLAN is an input-output model. This type of model traces the “multiplier effect” of an industry making purchases from other industries.³⁷ The economy is described by 509 IMPLAN industry sectors, which are based on the North American Industry Classification System (NAICS) and the Bureau of Economic Analysis (BEA) commodity classifications. “Direct effects” are the changes in final demand being modeled (the goods and services produced or purchased from an industry). “Indirect effects” estimate inter-industry purchases. Regional purchase coefficients are used to estimate the proportion of inter-industry purchases occurring within the study area. In addition to the interactions between the 509 IMPLAN industries, “induced effects” estimate the impact of household spending caused by the change in final demand.³⁸ In the table and discussion that follow, the sum of indirect and induced effects are referred to as secondary effects.

According to the IMPLAN model, one dollar in revenue in the new residential home construction sector (Sector 33) causes \$0.86 in secondary impacts. The building costs per acre of development in Los Angeles, Orange, and Ventura counties were estimated as part of the welfare analysis. These costs are input as revenue to new residential home construction in IMPLAN.³⁹ The construction revenue associated with development is \$83 million, and this in turn results in \$71 million in secondary impacts. The 509 IMPLAN sectors are aggregated by 2-digit NAICS code. The distributional effects are described in Table 3: IMPLAN Analysis.

³⁵ MIG, Inc., IMPLAN Professional Version v.2.0.1024, 1997-2006.

³⁶ <http://www.implan.com/references.html>

³⁷ For a detailed discussion of this modeling method see, Ronald Miller and Peter Blair, *Input Output Analysis, Foundations and Extensions*, New Jersey: Prentice Hall.

³⁸ Direct impacts – the revenue in the construction sector – and indirect impacts –the purchases made by the construction sector and other businesses – are captured in the standard input-output model. Induced impacts – purchases by employees of the construction firms and indirect businesses – are captured when the model is “closed” with respect to households. The version of IMPLAN used here is closed.

³⁹ For simplicity, costs were annualized by dividing total costs by 20. Development may occur throughout the twenty-year timeframe. The total change in building costs divided by 20 is the average annual revenue to new home construction.

VI SECONDARY ECONOMIC EFFECTS

Federal guidelines require additional analysis of potential effects on the energy industry and small businesses.

VI.1 IMPACTS ON THE ENERGY INDUSTRY

Pursuant to Executive Order 13211, Federal agencies are required to submit a summary of the potential effects of regulatory actions on the supply, distribution, and use of energy, assuming those actions meet certain criteria outlined by the OMB:⁴⁰

- Reductions in crude oil supply in excess of 10,000 barrels per day;
- Reductions in fuel production in excess of 4,000 barrels per day;
- Reductions in coal production in excess of 5 million tons per year;
- Reductions in natural gas production in excess of 25 million mcf per year;
- Reductions in electricity production in excess of 1 billion kilowatt-hours per year or in excess of 500 megawatts of installed capacity;
- Increases in energy use required by the regulatory action that exceed any of the thresholds above;
- Increases in the cost of energy production in excess of one percent;
- Increases in the cost of energy distribution in excess of one percent; or
- Other similarly adverse outcomes.

As described in section IV.2.2, one subunit of critical habitat contains land owned by Southern California Edison. SCE stated that the proposed rule will not affect its operations in this unit. No present or planned power generation facilities are located within the area of proposed critical habitat.

VI.2 IMPACTS ON SMALL BUSINESSES

According to the Regulatory Flexibility Act, as amended by the Small Business Regulatory Enforcement Fairness Act, Federal agencies must determine if proposed legislation will have a “significant economic impact on a substantial number of small entities.”⁴¹ There is no consultation for this species relevant to private development, suggesting that the impacts presented in this section may be largely hypothetical.

Small business effects have been calculated on the total surplus generated from new housing construction within critical habitat. This assumption is conservative because it is

⁴⁰ U.S. Office of Management and Budget, “Memorandum for Heads of Executive Departments and Agencies, and Independent Regulatory Agencies,” July 13, 2001.

⁴¹ EPA, “Revised Interim Guidance for EPA Rulewriters: Regulatory Flexibility Act as Amended by the Small Business Regulatory Enforcement Fairness Act,” 29 March 1999, p.11.

the worst-case scenario of how critical habitat will affect small businesses. In the event that conservation is achieved without requiring developers to completely avoid critical habitat, impacts on small businesses will be lower.

This analysis employs a methodology used by Industrial Economics to estimate the potential impact to small construction firms for critical habitat designation of the thread-leaved brodiaea.⁴² Because the brodiaea designation occurred in a similar area of Southern California, its assumptions concerning development by small businesses can be cross-applied to this analysis.

To estimate the number of firms potentially affected, this analysis uses the following steps. First, it calculates the number of homes built by small businesses annually. Average annual revenues for a small construction firm are \$694,000 annually.⁴³ The mean new home price for the study area of this analysis is approximately \$970,000. Small construction firms are assumed to build one new home per year.

Second, it calculates the portion of new home construction discussed in section IV that would be undertaken by small businesses. Prior analysis of permitting data in Sacramento County found that 22% of building permits for single family dwellings were issued to builders which were classified as small businesses.⁴⁴ A total of 156 new homes are projected to be built within critical habitat over the next 20 years. Accordingly, 34 are projected to be built by small businesses. Since each firm builds one home per year, 34 small firms are potentially affected over the 20-year timeframe of this analysis.

⁴² Industrial Economics, "Final Economic Analysis of Critical Habitat Designation For The Thread-Leaved Brodiaea," November 16, 2005.

⁴³ Average annual revenues for small firms classified under NAICS code 236115 "New Single-Family Housing Construction (except Operative Builders)." Note that RMA reports annual sales for size classes zero to \$1 million, \$1 to \$3 million, \$3 to \$5 million, \$5 to \$10 million, and \$25 million and over. Entities classified under this NAICS code are small if they have annual revenues under \$28 million annually. This analysis estimates average annual sales for small businesses using data for size classes up to \$25 million in sales. As a result, it understates actual average annual revenues. (The Risk Management Association (RMA), Annual Statement Studies: Financial Ratio Benchmarks, 2004-2005, p. 177.)

⁴⁴ CRA International, "Economic Impacts of Critical Habitat Designation for Vernal Pool Species," June 20, 2005, p. 110.

Table 1: Results of Modeling Analysis

Name	Unit	Projected Households	Acres of CH	Mean New Home Price	Mean Square Feet	Surplus Per Home	Total Surplus Within CH	Surplus Per Developed Acre
Northern Simi Hills	1a	26	282.7	859,125	3,023	\$481,248	\$12,429,963	\$1,202,207
Northern Simi Hills	1b	10	18.7	781,059	2,953	\$409,862	\$4,150,432	\$679,745
Southern Simi Hills	2f	95	1,157.1	1,080,271	3,231	\$678,590	\$64,227,493	\$1,019,855
Monrovia	5	24	163.0	733,354	2,084	\$452,436	\$11,064,666	\$4,238,667
Total		155	1,622				\$91,872,553	

Table 2: Annualized Results of Modeling Analysis

Name	Unit	Annualized Surplus Within CH (3%)	Annualized Surplus Per Developed Acre (3%)	Annualized Surplus Within CH (7%)	Annualized Surplus Per Developed Acre (7%)
Northern Simi Hills	1a	\$811,154	\$78,454	\$1,096,543	\$106,056
Northern Simi Hills	1b	\$270,849	\$44,359	\$366,142	\$59,966
Southern Simi Hills	2f	\$4,191,356	\$66,554	\$5,666,001	\$89,969
Monrovia	5	\$722,058	\$276,607	\$976,099	\$373,925
Total		\$5,995,416		\$8,104,784	

Table 3: IMPLAN Analysis

Industry	Study Area Data: Industry Output	Model Results: Direct Effects	Model Results: Secondary Effects
11 Ag, Forestry, Fish & Hunting	\$1,993,879,000	\$0	\$100,227
21 Mining	\$3,035,610,000	\$0	\$200,554
22 Utilities	\$12,287,892,000	\$0	\$1,043,171
23 Construction	\$43,944,429,000	\$82,506,076	\$353,137
31-33 Manufacturing	\$178,154,345,000	\$0	\$10,091,871
42 Wholesale Trade	\$51,790,672,000	\$0	\$6,344,276
48-49 Transportation & Warehousing	\$30,933,625,000	\$0	\$3,351,718
44-45 Retail trade	\$51,050,228,000	\$0	\$11,945,399
51 Information	\$70,968,158,000	\$0	\$2,134,374
52 Finance & insurance	\$71,164,040,000	\$0	\$5,460,176
53 Real estate & rental	\$78,821,253,000	\$0	\$3,748,817
54 Professional- scientific & tech svcs	\$64,508,959,000	\$0	\$5,712,645
55 Management of companies	\$18,226,711,000	\$0	\$1,080,837
56 Administrative & waste services	\$27,985,650,000	\$0	\$2,281,376
61 Educational svcs	\$7,395,382,000	\$0	\$676,284
62 Health & social services	\$46,877,961,000	\$0	\$4,718,714
71 Arts- entertainment & recreation	\$20,602,660,000	\$0	\$761,168
72 Accomodation & food services	\$23,388,714,000	\$0	\$2,169,226
81 Other services	\$27,108,559,000	\$0	\$2,493,523
92 Government & non NAICs	\$97,258,922,000	\$0	\$5,889,218
Total	\$927,497,649,000	\$82,506,076	\$70,556,711