ECONOMIC IMPACTS OF CRITICAL HABITAT DESIGNATION FOR VERNAL POOL SPECIES

Prepared For:

Division of Economics

U.S. Fish & Wildlife Service

4401 North Fairfax Drive

Arlington, VA 22203

Prepared By:

CRA International

5335 College Avenue, Suite 26

Oakland, California 94618

June 20, 2005

CRA No. D07040

Table of Contents

List of Figures

List of Tables

I EXECUTIVE SUMMARY

I.1 PURPOSE AND APPROACH

On September 24, 2002, the U.S. Fish & Wildlife Service (Service) proposed critical habitat for vernal pool species pursuant to the Endangered Species Act of 1973. A total of 1,233,840 acres were designated in Jackson County, Oregon and 35 California counties, from Siskiyou and Modoc counties in the north through Ventura County in the south.[1] This report quantifies the economic impacts 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 report combines information on current and projected land uses within critical habitat areas with a defined economic model to calculate these impacts. This report also disaggregates individual critical habitat units defined by the Service to identify the sub-regions where most economic impacts occur.

The 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. 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. Distributional effects reflect which sectors of the economy experience changes in costs or revenues as a consequence of critical habitat.

I.2 REPORT ORGANIZATION

Following the Executive Summary is an outline of the analytical framework and approach used in the analysis and an overview of the socioeconomic conditions in the affected counties. The impacts to land development, public projects, and private activities are presented next, followed by an evaluation of the regional costs and impacts to small businesses.

I.3 DESCRIPTION OF HABITAT AND AFFECTED COUNTIES

The Service has designated critical habitat for 15 vernal pool species. Vernal pools are usually clustered into interconnected systems of pools, swales, and uplands forming an interwoven matrix of uplands and wetlands called vernal pool complexes. Water remains in the pools and swales for between a few days to a few months. The primary constituent elements used to determine suitable habitat tend to fall into two categories: (1) characteristics of areas such as vernal pools with seasonal periods of inundation and drying; and (2) characteristics of surrounding watersheds that maintain the hydrologic features of the seasonally inundated areas, provide a source of nutrients and food sources

[1] Since the September 2002 listing, habitat in Riverside County has been excluded and is not included in this analysis.

for listed species, provide habitat for pollinators for some of the listed plants, and/or provide habitat for birds and other animals (such as small mammals) known to aide in the dispersal of the listed vernal pool species.

Most species are associated with four to eight separate proposed habitat units. However, two shrimp species have more than 15 habitat units each, and one plant species, Solano grass, has only two proposed habitat units. The species with the greatest number of proposed habitat units is the vernal pool fairy shrimp, with 36 units and at least one unit in 27 of the 36 counties. In total, there are 129 habitat units covering 1,233,840 acres, or 2.4 percent of the land area of the counties included in the proposed designation.

Approximately 7,623 acres are located in Jackson County, Oregon. The vast majority of the proposed habitat falls within 35 counties in California, ranging from Siskyou County in the north to Ventura County in the south. Table I-1: Acres of Proposed Habitat identifies the number of acres in the affected California counties. A variety of economies are represented by the affected counties, from urban centers to farming communities. For profiles of the socioeconomic conditions in the affected counties, please see Section III.

I.4 Impacts on Real Estate Development

Critical habitat designation is expected to have the largest impacts on real estate development. Critical habitat for vernal pools occurs in a number of rapidly growing areas. Regulatory requirements to avoid onsite impacts and mitigate offsite affect the welfare of both producers and consumers. Two scenarios are considered. In the base scenario, avoidance requirements are assumed to reduce the construction of new housing. In this scenario, critical habitat is expected to impose losses of over $965 million relating to lost development opportunities. A second scenario, in which developers accommodate the reduction in developable land through densification, is also discussed.

I.5 Public Sector Activities

The California Department of Transportation is planning to undertake a number of projects to build, upgrade, and maintain the state's transportation network in areas of vernal pool critical habitat. After determining the number of affected critical habitat acres, the typical mitigation requirements were applied to determine the impacts on this type of activity. The total costs to California transportation projects, as a result of critical habitat designation, are estimated to be $16.9 million. This figure does not include the costs of project delays. It was determined that there were no large infrastructure projects planned in Jackson County, Oregon.

Vernal pool habitat is located near the future site of the University of California, Merced campus. Although the exact mitigation requirements and costs will be determined as a part of the planning process, it is estimated that the impacts will total $10 million. This estimate incorporates the cost of mitigating approximately 66.5 acres of affected habitat.

The report also considers potential impacts on the energy sector. This analysis examines planned power production facilities within the study area for proximity to proposed critical habitat. It finds the sites fall into one of two categories: either they are too far from critical habitat to be affected, or are within or near habitat but have already completed the environmental mitigation process for vernal pools. In both cases, the

incremental impacts of designation are zero; the regulation is not expected to impact energy production.

There are overlaps between critical habitat and land managed by the Department of the Defense, Bureau of Land Management, Bureau of Reclamation, the Forestry Service, the Fish and Wildlife Service, and the Bureau of Indian Affairs. After consideration and discussion with Service staff, it is determined that the impacts from designation on these organizations will be minimal.

I.6 Regional Economic Effects

Designation of critical habitat alters the level of economic activity. As a result, regulation has impacts that spread beyond the sectors directly affected. Indirect and induced impacts of the regulation are calculated using the standard IMPLAN model. Counties with the largest change in new residential home construction were included in this analysis. These counties consisted of, Sacramento, Solano and Butte. Critical habitat designation of vernal pool species has little effect on the regional economy. New residential construction is reduced by approximately $17 million, which causes output in other industries to decrease by approximately $12 million. These combined reductions represent only 0.03 percent of the region's output. Included among the industries most affected are wholesale trade and architectural/engineering services.

I.7 Small Business Impacts

Critical habitat is not expected to result in significant small business impacts since revenue losses are less than one percent of total small business revenues in affected areas. From Sacramento permit data, it appears that large businesses greatly dominate greenfield development. It is estimated that approximately 6 small businesses annually will be affected as a consequence of designation, mainly in Solano, Sacramento, and Butte Counties.

I.8 Summary Of Measured Impacts

The economic impacts of critical habitat designation vary widely among the 36 affected counties, and even within counties. The counties most impacted by the critical habitat designation include Sacramento ($374 million), Butte ($145 million), Placer ($120 million), Solano ($87 million), Fresno ($43 million), Stanislaus ($33 million), Madera ($32 million), Monterey ($29 million), Shasta ($20 million), Tehama ($19 million) and Merced ($16 million). Further, economic impacts are unevenly distributed within counties. Our analysis is conducted for each of the 158 affected census tracts, resulting in a high degree of spatial precision.

The economic impacts of critical habitat designation are highly localized. Roughly half of all economic impacts are attributable to less than five percent of designated acres.

Table I-1: Acres of Proposed Habitat

County	Acres of Proposed Habitat
Alameda	2,037
Amador	2,530
Butte	58,849
Calaveras	401
Colusa	994
Contra Costa	7,152
Fresno	32,218
Glenn	166
Jackson (OR)	7,623
Kings	836
Lake	4,141
Lassen	14,028
Madera	95,802
Mariposa	17,869
Mendocino	2,637
Merced	194,335
Modoc	347
Monterey	45,995
Napa	2,745
Placer	32,248
Plumas	1,287
Sacramento	68,820
San Benito	91,326
San Joaquin	16,507
San Luis Obispo	64,171
Santa Barbara	20,755
Shasta	22,348
Siskiyou	2,277
Solano	67,961
Stanislaus	132,708
Tehama	130,752
Tulare	41,247
Tuolumne	2,436
Ventura	46,531
Yolo	440
Yuba	1,324
Total[2]	**1,233,840**

Source: Critical Habitat Boundary Files, U.S. Fish and Wildlife Service.

[2] Numbers may not sum due to rounding.

Table I-2: Summary of Economic Effects of Critical Habitat Designation

County	Development Impacts[3]	Public Projects	Total	Annualized Impact[4]
Sacramento	$374,318,063		$374,318,063	$33,021,474
Butte	$145,365,498	$7,057,135	$152,422,633	$13,446,372
Placer	$119,842,952		$119,842,952	$10,572,268
Solano	$87,273,040		$87,273,040	$7,699,026
Fresno	$42,947,066		$42,947,066	$3,788,691
Stanislaus	$33,185,991		$33,185,991	$2,927,591
Madera	$31,682,033	$1,398,818	$33,080,851	$2,918,316
Monterey	$29,227,849		$29,227,849	$2,578,413
Shasta	$19,662,901		$19,662,901	$1,734,616
Tehama	$18,775,990	$6,093,965	$24,869,955	$2,193,970
Merced	$16,117,011	$10,000,000	$26,117,011	$2,303,982
San Luis Obispo	$14,530,647		$14,530,647	$1,281,860
Contra Costa	$11,072,864	$2,129,022	$13,201,886	$1,164,640
Alameda	$5,103,523		$5,103,523	$450,221
San Benito	$2,560,372		$2,560,372	$225,870
Mendocino	$1,992,384		$1,992,384	$175,764
Santa Barbara	$1,942,397		$1,942,397	$171,354
Napa	$1,875,754		$1,875,754	$165,475
Tulare	$1,823,668		$1,823,668	$160,880
Mariposa	$1,681,262		$1,681,262	$148,317
Jackson	$1,226,589		$1,226,589	$108,207
Lake	$872,465		$872,465	$76,967
Ventura	$743,051		$743,051	$65,550
Tuolumne	$406,103		$406,103	$35,825
Yuba	$396,585		$396,585	$34,986
San Joaquin	$259,220		$259,220	$22,868
Yolo	$228,443		$228,443	$20,153
Amador	$187,124		$187,124	$16,508
Glenn	$62,969		$62,969	$5,555
Plumas	$38,974		$38,974	$3,438
Kings	$18,943		$18,943	$1,671
Modoc	$4,412		$4,412	$389
Calaveras	$2,873		$2,873	$253

[3] Impacts in 2004 dollars.

[4] Annualized impacts represent the yearly payout of the 20-year immediate annuity, compounded annually at 7%, which has a present value equal to the total calculated impacts.

County	Development Impacts[3]	Public Projects	Total	Annualized Impact[4]
Colusa	$0		$0	$0
Lassen	$0	$174,461	$174,461	$15,391
Siskiyou	$0		$0	$0
Total	**$965,429,015**	**$26,853,401**	**$992,282,416**	$87,536,860

Sources: Critical Habitat Boundary Files, U.S. Fish and Wildlife Service; California Department of Transportation, Office of State Planning.

II RELEVANT BACKGROUND AND ANALYTICAL FRAMEWORK

II.1 REPORT PURPOSE

On September 24, 2002, the U.S. Fish & Wildlife Service (Service) proposed critical habitat for vernal pool species pursuant to the Endangered Species Act of 1973. Since the original designation, a number of non-economic exclusions were introduced.[5] For this economic analysis, a total of 1,233,840 proposed acres are examined. The habitat units span 35 California counties, from Siskiyou and Modoc counties in the north through Ventura County in the south. Critical habitat has also been proposed in Jackson County, Oregon.[6] This report attempts to quantify 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 report combines information on current and projected land uses within critical habitat areas with a defined economic model to calculate these impacts. This report also disaggregates individual critical habitat units defined by the Service to identify the sub-regions where most economic impacts occur.

This information is intended to assist the Secretary in determining whether the economic benefits of excluding particular areas from the designation outweigh the biological benefits of including them.[7] 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).[8] The small business analysis is included in Section VIII of this report. This report also complies with direction from the U.S. 10th Circuit Court of Appeals that effects resulting from the listing decision should be included in the economic analysis to inform decision-makers regarding which areas to designate as critical habitat.[9]

This section provides the framework for the economic analysis. First, it describes the general analytic approach to estimating economic effects, including 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. Finally, it describes the information sources employed to conduct this analysis.

---

[5] For an analysis of the economic impacts on Butte, Madera, Merced, Solano, and Sacramento counties, where no land has been excluded for non-economic reasons, please see section XI.

[6] Since the September 2002 listing, habitat in Riverside County has been excluded and is not included in this analysis.

[7] 16 U.S.C. §1533(b)(2).

[8] 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.

[9] 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)).

II.2 Approach To Estimating Economic Effects

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.

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, the energy industry, or governments. 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.3 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 vernal pool species, 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.[10]

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 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.

Where habitat protection measures are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surplus. For example, a designation that precludes the development of large areas of land may shift the price and quantity of housing

[10] 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.

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. However, if the cost of conservation measures is expected to significantly impact markets, the analysis will consider welfare impacts to affected markets.

II.3.1 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.[11] This analysis considers several types of distributional effects, including impacts on small entities; impacts on energy supply, distribution, and use; and regional economic impacts. It is important to note that these are fundamentally different measures of economic impact than efficiency effects, and thus cannot be added to or compared with estimates of changes in economic efficiency.

Section of this analysis considers how small entities, including small businesses, organizations, and governments, as defined by the RFA, may be affected by proposed critical habitat designation (CHD).[12] In addition, in response to Executive Order 13211 "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," considers the impacts of critical habitat on the energy industry and its customers.[13]

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 input / output models. These models investigate the effects of a change in one sector of the economy on economic output, income, or employment in other local industries. These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.

Regional input / output models may overstate the long-term impacts of a regulatory change because they provide a static view of the regional economy. 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. 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 affected 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

---

[11] 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.

[12] 5 U.S.C. § 601 *et seq.*

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

than efficiency losses. Thus, these types of distributional effects 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.

II.4 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 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 ESA-related impacts to be coextensive with the designation.[14]

II.4.1 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 CHD. 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."[15]

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.[16]
- 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

---

[14] 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. U.S. 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.

[15] 16 U.S.C. §1533.

[16] The Service notes, however, that a recent Ninth Circuit judicial opinion, Gifford Pinchot Task Force v. U. S. 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.

engage in any such conduct."[17] The economic impacts associated with this section manifest themselves in sections 7 and 10.

- Under section 10(a)(1)(B) of the Act, an entity (i.e., 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.[18] 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. Federal agencies are not typically the sole stakeholder agency involved with development of an HCP. Federal agencies, however, can be the lead agency on a multi-jurisdictional HCP.

II.4.2 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.[19] CEQA is a California State statute that requires State and local agencies (known here as "lead agencies") to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. Projects carried out by Federal agencies are not subject to CEQA provisions. CEQA regulations require a lead agency to initially presume that a project will result in a potentially significant adverse environmental impact and to prepare an EIR if the project may produce certain types of impacts, including when:

> "[T]he project has the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of an endangered, rare, or threatened species, or eliminate important examples of the major periods of California history or prehistory."[20]

State law instructs the lead agency (typically a county or city community development or planning department in the case of land development projects) to examine impacts from a very broad perspective, taking into account the value of animal and plant habitats to be modified by the project. The lead agency must determine which, if any, project impacts are potentially significant and, for any such impacts identified, whether feasible mitigation measures or feasible alternatives will reduce the impacts to a level less than significant. It is within the power of a lead agency to

---

[17] 16 U.S.C. §1538 and 16 U.S.C. §1532.

[18] U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," http://endangered.fws.gov/hcp/.

[19] 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.

[20] California Natural Resources Code §15065(a)

decide that negative impacts are acceptable in light of economic, social, or other benefits generated by the project.

II.4.3 Additional Analytic Considerations

Previous economic impact analyses prepared to support critical habitat decisions have considered other types of economic impacts related to CHD, including time delay. This analysis considers these economic impacts and has determined that the proposed critical habitat for vernal pool species will cause economic impacts of this nature. These impacts are described in detail in Section IV.4.

II.4.4 Benefits

The published economics literature has documented that social welfare benefits can result from the conservation and recovery of endangered and threatened species. Such benefits have also been ascribed to preservation of open space and biodiversity, both of which can be associated with species conservation, but are not the purpose of critical habitat. Likewise, regional economies and communities can benefit from the preservation of healthy populations of endangered and threatened species, and the habitat on which these species depend.

In Executive Order 12866, OMB directs Federal agencies to provide an assessment of costs and benefits of proposed regulatory actions.[21] However, in its guidance for implementing Executive Order 12866, OMB acknowledges that often, it may not be feasible to monetize, or even quantify, the benefits of environmental regulations.[22] Where benefits cannot be quantified, OMB directs agencies to describe the benefits of a proposed regulation qualitatively. Given the limitations associated with estimating the benefits of proposed CHD for the vernal pool species, the Service believes that the benefits of proposed CHD are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking. This discussion will be included in the preamble to the final rulemaking.

II.4.5 Analytic Time Frame

The analysis examines activities taking place both within and adjacent to the proposed designation. Estimates of post-designation impacts 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 impacts to activities from 2005 to 2025, twenty years from the year of final designation.

II.4.6 Critical Habitat Boundaries

This analysis relies on a Geographical Information System (GIS) to spatially characterize the proposed rule. The critical habitat boundaries analyzed are from final rule proposal made in August 6, 2003 by the Service. Areas that the Service excluded due to biological and/or non-economic reasons are *not* analyzed.[23]

---

[21] Executive Order 12866, "Regulatory Planning and Review," September 30, 1993.

[22] U.S. Office of Management and Budget, "Circular A-4," 68 FR 54023, September 17, 2003.

[23] For Butte, Madera, Merced, Solano, and Sacramento counties, this analysis also presents impacts when the biological and/or non-economic exclusions are included into the proposed rule. These calculations are presented in section X.

II.5 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 & Regional Planning;
- DataQuick Information Systems;
- U.S. Census 1990 and Census 2000;
- U.S. Department of Commerce, Bureau of Economic Analysis;
- U.S. Department of Labor, Bureau of Labor Statistics;
- California Department of Finance;
- California Department of Transportation;
- California Employment Development Department;
- Federal Highway Administration;
- California Department of Conservation Farmland Mapping and Monitoring Program;
- U.S. Bureau of Land Management;
- Federal Emergency Management Agency;
- U.S. Geological Survey;
- Marshall & Swift;
- IMPLAN;
- Dun & Bradstreet;
- Robert Morris Associates;
- ABAG;
- AMAG;
- Council of Fresno County Governments;
- SACOG;
- SANDAG;
- SJCOG;
- StanCOG;
- County Governments.

II.6 SPECIES AND HABITAT DESCRIPTIONS

Vernal pool species live either in vernal pools, swales (shallow drainages that carry water seasonally), or other ephemeral freshwater habitats.[24] Vernal pools are a subset of wetlands, characterized by seasonally specific timing and duration of inundation. These habitats form in regions with "Mediterranean" climates where shallow depressions fill with water during fall and winter rains and then evaporate in the spring. Downward percolation of standing water is prevented by the presence of an impervious subsurface layer, such as a claypan, hardpan, or volcanic stratum. The physical factors most important in determining the types and kinds of species found in vernal pools are:

- Pool size
- Depth
- Shape
- Water and soil chemistry
- Hydrology
- Soil type
- Geologic formation
- Landform

Vernal pools are usually clustered into interconnected systems of pools, swales, and uplands forming an interwoven matrix of uplands and wetlands called vernal pool complexes. Water remains in the pools and swales for between a few days to a few months.

II.6.1 Crustacean Species

Four vernal pool crustacean species are included in the proposed critical habitat designation. Three of the four (Conservancy fairy shrimp, longhorn fairy shrimp, and vernal pool tadpole shrimp) were federally listed as endangered, and the fourth, the vernal pool fairy shrimp, was federally listed as threatened in 1994.

Tadpole shrimp (*Lepidurus packardi*) have dorsal compound eyes, a large shield-like shell that covers most of their body, and a pair of long cercopods or appendages at the end of the last abdominal segment. They live primarily at the bottoms of the pools, climbing or scrambling over objects, and plowing along bottom sediments as they forage for food. Their diet consists of organic detritus and living organisms, such as fairy shrimp and other invertebrates.

In contrast to tadpole shrimp, all fairy shrimp have delicate elongated bodies, large stalked compound eyes, and 11 pairs of phyllopods, or gill-like structures that also serve as swimming legs. Fairy shrimp are filter feeders and consume algae, bacteria, protozoa, rotifers, and bits of detritus as they swim through the water on their backs.

Fertilized eggs of both species form a protective protein layer that allows the eggs to withstand heat, cold, and prolonged dehydration. These dormant eggs are known as cysts and they can remain

[24] Information on vernal pool species and their habitat is taken from the U.S. Fish and Wildlife Service, "Proposed Designation of Critical Habitat for Vernal Pool Species," September 24, 2002 (66 FR 133).

viable in the soil for decades after deposition. Cysts may hatch within days after the vernal pools fill with water and the early stages of the fairy shrimp develop rapidly into adults.

Conservancy fairy shrimp (*Branchinecta conservatio*) look similar to other fairy shrimp species. Distinguishing characteristics include the male second antennae, used in clasping the female during copulation. The end segment of each second antenna is about 30 percent shorter than the basal segment, and has a 90-degree bend at the tip. Observations suggest this species is often found in pools that are relatively large and turbid. In general, the Conservancy fairy shrimp have very large populations within a given pool and are usually the most abundant fairy shrimp when more than one fairy shrimp species is present.

The longhorn fairy shrimp (*Branchinecta longiantenna*) are named for their relatively long second antennae and are extremely rare. Three discontinuous locations along the eastern margin of the central coast range, from the vicinity of Livermore in Contra Costa County to Soda Lake in San Luis Obispo County, form the only known locations of the crustacean.

Vernal pool fairy shrimp (*Branchinecta lynchi*) are characterized by the presence of several bulges on the male's antenna and by the female's short pyriform, or pear-shaped, brood pouch. Although the vernal pool fairy shrimp is distributed more widely than most other fairy shrimp species, it is generally uncommon throughout its range and rarely abundant where it does occur.

II.6.2 Plant Species

Eleven listed species of vernal pool plants are included in the proposed critical habitat designation. Fleshy owl's clover (*Castilleja campestris spp. succulenta*) is an annual whose distribution is primarily along the Southern Sierra foothills of Merced, Fresno, Madera, Stanislaus, and San Joaquin Counties. The plant displays yellow or orange petals and produces capsules with numerous brown, spindle shaped seeds. It was federally listed as threatened in 1997.

Hoover's spurge (*Chamaesyce hooveri*) grows close to the ground in the shape of gray-green mats 2 to 40 inches in diameter. It has small structures between each pair of leaves which resemble single flowers, but which are actually flower clusters, consisting of one female and five maleflowers. The flowers themselves lack petals, but each flower cluster sits in a cuplike structure with small white appendages that resemble petals. Tiny, white seeds are contained in a spherical capsule that extends on a stalk beyond the edge of the cup. Hoover's spurge was also federally listed as threatened in 1997.

Contra Costa goldfields (*Lasthenia conjugens*) is a member of the Aster family and is found most prominently in Solano County east and south of the City of Fairfield. The species is still extant throughout many other Bay / Delta region counties. Each flower head is yellow with tiny disk flowers in addition to 6 to 13 ray flowers. The plant is 4 to 12 inches tall and was federally listed as endangered in 1997.

Butte County meadowfoam (*Limnanthes floccosa* ssp. californica) has always been confined to Butte County and occurs primarily on intermediate fan terraces in annual grasslands with a landform characterized by small piles of soil. Stems are typically less than ten inches tall, and produce small, yellow-veined, white flower next to each upper leaf. Each of five pistils in the flower is capable of producing an egg-shaped nutlet 0.1 to 0.2 inches long. Butte County meadowfoam was federally listed as endangered throughout its range in 1992.

The remaining seven plant species are members of the grass family and of the Orcuttiae tribe. The Orcuttiae grasses are endemic to vernal pools and have several unusual characteristics. They sprout under water, producing both aquatic and terrestrial leaves as circumstances require, and exude an aromatic coating that likely helps to repel herbivores.

Colusa grass (*Neostapfia colusana*) has zigzag stems 4 to 12 inches tall and has the broadest ecological range among the seven grass species included in the proposed critical habitat designation. Existing populations are concentrated in Merced, Solano, Stanislaus, and Yolo Counties. Colusa grass has fan-shaped lower bracts that subtend the flower. The plant was federally listed as threatened in 1997.

Sacramento Orcutt grass (*Orcuttia viscida*) is densely tufted, bluish green, and covered with hairs. It grows on high terrace sites in acidic soils with an iron-silica hardpan. Currently 70 percent of occupied habitat is located in a small area at a short distance from Mather Field. The plant was federally listed as endangered in 1997.

San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*) is found in Fresno, Mariposa, Madera, Merced, and Tulare Counties and grows underwater for 3 months or more in vernal pools located on alluvial fans, tabletop lava flows, and stream terraces. The erect stems are 2 to 12 inches in length and have long hairs, giving them a grayish-green color. San Joaquin Valley Orcutt grass was federally listed as threatened in 1997.

Hairy Orcutt grass (*Orcuttia pilosa*) stems are 2 to 8 inches tall and grow either erect or laying on the ground with the tips turned upward. The hairiness of the plant gives it a grayish appearance. The species is currently located in Butte, Colusa, Fresno, Glenn, Madera, Mariposa, Merced, Stanislaus, and Tehama Counties and prefers stream terraces and alluvial fans. It was federally listed as endangered in 1997.

Slender Orcutt grass (*Orcuttia tenuis*) grows in a variety of soil and vegetation types as a single stem or in small tufts of stems 2 to 8 inches tall. The plant's inflorescence (or grouping of flower structures) typically makes up half of the plant's height. Slender Orcutt grass is found primarily in Tehama County, but occurrences have also been reported in Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Sacramento Counties. It was federally listed as threatened in 1997.

Greene's tectaria (*Tectaria greenei*) grows in the Northern Basalt Flow, Northern Claypan, and Northern Hardpan types of vernal pools, typically at shallower depths than the six other grass species included in the critical habitat designation. It can be distinguished from those other species by the shape and arrangement of the scales enclosing flower parts, among other ways. In Central Valley counties the plant lives in grasslands, but in Shasta County the plant is surrounded by pine forests. It was federally listed as endangered in 1997.

Solano grass (*Tuctoria mucronata*) has leaves 0.5 to 1.5 inches long that are rolled inward and have pointed tips. It appears grayish-green, hairy, and sticky, with stems that lay on the ground with tips turned upward. Today, the species is found only in Solano and Yolo counties in vernal pools with Northern Hardpan soil types. The plant was federally listed as endangered in 1978.

II.6.3 Primary Constituent Elements

In identifying areas as critical habitat for vernal pool species, 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 Service established PCEs for vernal pool crustacean species based on those habitat components essential for the primary biological needs of foraging, sheltering, reproduction, and dispersal.

Similarly, PCEs for the vernal pool plant species are based on those habitat components essential for the primary biological needs of germination, growth, reproduction, and dispersal. The PCEs established by the Service for each species tend to fall into two categories: (1) characteristics of areas such as vernal pools with seasonal periods of inundation and drying; and (2) characteristics of surrounding watersheds that maintain the hydrologic features of the seasonally inundated areas, provide a source of nutrients and food sources for listed species, provide habitat for pollinators for some of the listed plants, and/or provide habitat for birds and other animals (such as small mammals) known to aide in the dispersal of the listed vernal pool species.
Because of limitations in GIS data, the Service did not exclude all developed areas, such as towns, housing developments, or other lands unlikely to contain the PCEs essential for the conservation of vernal pool species. In addition, the fragmented and isolated nature of remaining vernal pool habitats prevent an easy grouping of the habitats into cohesive units without including some areas that do not contain the PCEs. Existing features and structures within the boundaries of the mapped units, such as buildings, roads, most intensively farmed areas, etc., are unlikely to contain one or more of the PCEs, and are therefore not considered critical habitat. As a result, Federal actions in those areas would not trigger section 7 consultations unless the actions affect the species or PCEs in adjacent critical habitat.

II.7 Proposed Critical Habitat And Affected Counties

Habitat units for the 11 plant species and four crustacean species are proposed for 35 counties in California and one county in Oregon.[25] The total critical habitat acreage proposed for each species and the number of proposed habitat units for that species is shown in Table II-1: Common and Taxonomic Names of Vernal Pool Species. Included in this table is also a shorthand abbreviation for each species taken from Service GIS data that will be used in later tables. Most species are associated with four to eight separate proposed habitat units. However, two shrimp species have more than 15 habitat units each, and one plant species, Solano grass, has only two proposed habitat units.

The species with the greatest number of proposed habitat units is the vernal pool fairy shrimp, with 36 units and at least one unit in 27 of the 36 counties. In total, there are 129 habitat units covering 1,233,840 acres, or 2.4 percent of the land area of the counties included in the proposed designation. Because vernal pool species are often located together, many proposed critical habitat units overlap. Habitat units located partially or wholly within each county are shown in Table II-2: Summary of Critical Habitat Units by County and Region and the total acres covered by at least one critical habitat unit is shown in comparison to the land area of the entire county. Areas of overlap are only counted once to avoid double counting.

California includes a diverse array of cities, counties, and regions. Counties can be divided into regions in various ways. The division of counties into the regions described below follows Association of Government organizations in some cases, and the regional divisions used by W.

[25] As previously mentioned, since the listing, the units in Riverside County are no longer under consideration.

Fulton in his "Guide to California Planning," Second Edition, 1999. Regions with counties having no proposed critical habitat are excluded, as are counties on the periphery of regions if no habitat units in them have been proposed.

- **San Francisco Bay Area**: The San Francisco Bay Area, as defined by the Association of Bay Area Governments, consists of nine counties: Sonoma, Marin, Napa, Solano, Alameda, Contra Costa, San Francisco, San Mateo, and Santa Clara. Four counties—Alameda, Contra Costa, Napa, and Solano—contain proposed critical habitat units.
- **San Joaquin Valley**: The San Joaquin Valley Region consists of eight counties: Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare. All but Kern have proposed critical habitat units.
- **Mountain:** The Mountain Region consists of six counties: Lassen, Modoc, Nevada, Plumas, Sierra, and Siskiyou. All counties except Nevada and Sierra contain proposed critical habitat units.
- **Upper Sacramento Valley:** The Upper Sacramento Valley Region consists of five counties: Butte, Colusa, Glenn, Shasta, and Tehama. All five contain proposed critical habitat units.
- **Sacramento Valley:** The Sacramento Valley Region, as defined by the Sacramento Area Council of Governments, consists of six counties: Sacramento, Yolo, Sutter, Yuba, Placer, and El Dorado. Placer, Sacramento, Yolo, and Yuba all contain proposed critical habitat units.
- **North Coast**: The North Coast Region consists of five counties: Del Norte, Humboldt, Lake, Mendocino, and Trinity. Only Lake and Mendocino contain proposed critical habitat units.
- **Central Coast**: The Central Coast Region consists of four counties: Monterey, San Benito, San Luis Obispo, and Santa Cruz. All except Santa Cruz contain proposed critical habitat units.
- **Sierra Nevada Foothills**: The Sierra Nevada Foothills Region consists of four counties: Amador, Calaveras, Mariposa, and Tuolumne. All contain proposed critical habitat units.
- **Southern California**: Southern California, for the purposes of this analysis, includes eight counties: Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura. Only Ventura and Santa Barbara have proposed critical habitat units.
- **Southern Oregon**: Curry, Josephine, Jackson, Klamath, Lake, Harney, and Malheur counties are situated in southern Oregon, along the border with California. Only Jackson County contains proposed critical habitat for the vernal pool species.

II.7.1 Units in the San Francisco Bay Region

This region contains 19 proposed habitat units for seven species. One Colusa grass unit, two Conservancy fairy shrimp units, seven Contra Costa goldfields units, one longhorn fairy shrimp units, one Solano grass unit, four vernal pool fairy shrimp units, and three vernal pool tadpole shrimp units, all of which cover 79,894 acres across the four counties or 4.0 percent of the region's land area.

II.7.2 Units in the San Joaquin Valley Region

This region contains 45 proposed habitat units for ten species. Five Colusa grass units, three Conservancy fairy shrimp units, three Greene's tuctoria units, three Hairy Orcutt grass units, four Hoover's spurge units, one longhorn fairy shrimp unit, six San Joaquin Valley Orcutt grass units, six succulent owl's clover units, nine vernal pool fairy shrimp units, and five vernal pool tadpole shrimp units for a total of 513,652 acres within the seven counties. Combined, the proposed critical habitat acreage represents 4.2 percent of the region's land area.

II.7.3 Units in the Mountain Region

This region contains one proposed habitat units for one species, the Slender Orcutt grass. The habitat unit totals 17,940 acres, which represents 0.2 percent of the region's land area.

II.7.4 Units in the Upper Sacramento Valley Region

This region contains 33 proposed habitat units for eight species. Two Conservancy fairy shrimp units, six vernal pool fairy shrimp units, six vernal pool tadpole shrimp units, four Butte County meadow foam units, five Greene's tectaria units, three Hairy Orcutt grass units, three Hoover's spurge units, and four Slender Orcutt grass units are proposed on 213,108 acres in the five counties. Combined, the proposed critical habitat acreage represents 3.0 percent of the region's land area.

II.7.5 Units in the Sacramento Valley Region

This region contains 15 proposed habitat units for seven species. Four vernal pool fairy shrimp units, four vernal pool tadpole shrimp units, three Sacramento Orcutt grass units, and one unit each of Slender Orcutt grass, succulent owl's clover, Colusa grass, and Solano grass are proposed on 102,832 acres in the four counties. Proposed critical habitat acreage represents 3.9 percent of the region's land area.

II.7.6 Units in the Northern Coast Region

This region contains two proposed habitat units for two species. One Slender Orcutt grass unit and one Contra Costa goldfields unit are proposed on 6,778 acres in the two counties, which represents 0.2 percent of the region's land area.

II.7.7 Units in the Central Coast Region

This region contains five proposed habitat units for three species. Three vernal pool fairy shrimp units, one Contra Costa goldfields unit, and one longhorn fairy shrimp unit are proposed on 201,492 acres in three counties. The proposed critical habitat acreage represents 3.9 percent of the region's land area.

II.7.8 Units in the Sierra Nevada Foothills Region

This region contains 18 proposed habitat units for ten species. Two vernal pool tadpole shrimp units, one Sacramento Orcutt grass unit, one Conservancy fairy shrimp unit, three vernal pool fairy shrimp unit, three Colusa grass units, two Greene's tectaria units, two San Joaquin Valley Orcutt grass units, one Hoover's spurge unit, and two succulent owl's clover unit are proposed on 23,236 acres in the four counties. Combined, the proposed critical habitat acreage represents 0.7 percent of the region's land area.

II.7.9 Units in Southern California

This region contains three proposed habitat units for two species. One Conservancy fairy shrimp unit and two vernal pool fairy shrimp units are proposed on 67,286 acres in two counties. The proposed critical habitat acreage represents 2.4 percent of the region's land area.

II.7.10 Units in Southern Oregon

The Southern Oregon Region consists of Jackson County and contains four habitat units for the vernal pool fairy shrimp. The units cover 7,623 acres, which equals 0.4% of the county's land area.

II.8 Report Outline

The next section provides an overview of the baseline economic conditions in the 36 affected counties, including a description of past and projected employment conditions, housing growth, and population changes. Subsequent sections will quantify the economic effects on the land development market, as well as identify the effects on a regional level.

Table II-1: Common and Taxonomic Names of Vernal Pool Species

Common Name	Taxonomic Name	Abbreviation in Report	Critical Habitat Units
Succulent Owl's Clover	castilleja campestris succulenta	SUCCL	6
Conservancy Fairy Shrimp	branchinecta conservatio	CONFS	8
Hoover's Spurge	chamaesyce hooveri	HOOVR	7
Contra Costa Goldfields	lasthenia conjugens	CONTR	9
Longhorn Fairy Shrimp	branchinecta longiantenna	LONFS	3
Butte County Meadowfoam	limnanthes floccosa californica	BUTTE	4
Colusa Grass	neostapfia colusana	COLUS	7
San Joaquin Valley Orcutt Grass	orcutta inaequalis	SJVAL	6
Hairy Orcutt Grass	orcutta pilosa	HAIRY	6
Slender Orcutt Grass	orcutta tenuis	SLEND	6
Sacramento Orcutt Grass	orcutta viscida	SACRA	3
Greene's Tuctoria	tuctoria greenei	GREEN	8
Solano Grass	tuctoria mucronata	SOLAN	2
Vernal Pool Fairy Shrimp	branchinecta lynchi	VERFS	36
Vernal Pool Tadpole Shrimp	lepidurus packardi	VERTS	18

Sources: U.S. Fish and Wildlife Service data and “Proposed Designation of Critical Habitat for Vernal Pools Species,” September 24, 2002, (66 FR 133).

Table II-2: Summary of Critical Habitat Units by County and Region

Region	County	Proposed Habitat Units	Total Acres of Proposed Habitat	Percent of County Area
Mountain				
	Lassen	SLEND 1F SLEND 1G	14,028	0.5%
	Modoc	SLEND 1A	347	0.0%
	Plumas	SLEND 1I	1,287	0.1%
	Siskiyou	SLEND 1A	2,277	0.1%
		Subtotal	17,940	0.2%
Sierra Nevada Foothills				
	Amador	SACRA 3 VERFS 14 VERTS 9	2,530	0.7%
	Calaveras	COLUS 3	401	0.1%
	Mariposa	COLUS 6 CONSFS 6 GREEN 7 HAIRY 4 SJVAL 1 SJVAL 2 SUCCL 3A SUCCL 3B VERFS 21 VERFS 22 VERTS 15	17,869	1.9%
	Tuolumne	COLUS 4 GREEN 6 HOOVR 4 SUCCL 2	2,436	0.2%
		Subtotal	23,236	0.7%
Upper Sacramento				
	Butte	BUTTE 1 BUTTE 2 BUTTE3 BUTTE 4 CONSFS 1 GREEN 2 GREEN 3 GREEN 4 HAIRY 1 HAIRY2 HOOVR 1 HOOVR 2 SLEND 4 VERFS 7 VERFS 9 VERTS 3 VERTS 4	58,849	5.5%
	Colusa	CONSFS 2 GREEN 5 HAIRY 3 HOOVR 3 VERFS 10 VERTS 5 VERTS 6	994	0.1%
	Glenn	CONSFS 2 GREEN 5 HAIRY 3 HOOVR 3 VERFS 10 VERFS 8 VERTS 5	166	0.0%
	Shasta	GREEN1 SLEND 1A SLEND 1B SLEND 1C SLEND 1D SLEND 1E SLEND 1F SLEND 1H SLEND 2A SLEND 2B SLEND 2C SLEND 3 VERFS 5 VERTS 1 VERTS 2	22,348	0.9%
	Tehama	BUTTE 1 CONSFS 1 GREEN 2 HAIRY 1 HOOVR 1 SLEND 3 SLEND 4 VERFS 6 VERFS 7 VERFS 8 VERTS 2 VERTS 3	130,752	6.9%
		Subtotal	213,108	3.0%
Sacramento Valley				
	Placer	VERFS 12	32,248	3.4%
	Sacramento	SACRA 1 SACRA 2 SACRA 3 SLEND 6 SUCCL 1 VERFS 12 VERFS 13 VERFS 14 VERTS 8 VERTS 9	68,820	11.0%
	Yolo	COLUS 1 SOLAN 1 VERTS 10	440	0.1%
	Yuba	VERFS 11 VERTS 7	1,324	0.3%
		Subtotal	102,832	3.9%
San Joaquin Valley				
	Fresno	HAIRY 6 SJVAL 4 SJVAL 5B SUCCL 4 SUCCL 5 SUCCL 6A VERFS 24B VERTS 17	32,218	0.8%

Region	County	Proposed Habitat Units	Total Acres of Proposed Habitat	Percent of County Area
	Kings	VERFS 26A VERTS 18A	836	0.1%
	Madera	GREEN 8 HAIRY 5 HAIRY 6 SJVAL 2 SJVAL 3 SJVAL 5A SUCCL 4 SUCCL 6B VERFS 24A VERFS 25 VERTS 15	95,802	7.0%
	Merced	COLUS 5 COLUS 6 COLUS 7A COLUS 7B CONSFS 6 CONSFS 7 GREEN 7 HAIRY 4 HOOVR 5 HOOVR 6 LONFS 2 SJVAL 1 SJVAL 2 SUCCL 3A SUCCL 3B SUCCL 4 VERFS 21 VERFS 22 VERFS 23 VERTS 15 VERTS 16	194,335	15.4%
	San Joaquin	SUCCL 1 VERFS 18	16,507	1.8%
	Stanislaus	COLUS 3 COLUS 4 COLUS 5 CONSFS 5 GREEN 6 HAIRY 4 HOOVR 4 HOOVR 5 SUCCL 2 VERFS 18 VERFS 20 VERFS 21 VERTS 13	132,708	13.7%
	Tulare	HOOVR 7A HOOVR 7B HOOVR 7C HOOVR 7D SJVAL 6A SJVAL 6B VERFS 26A VERFS 26B VERFS 26C VERFS 27A VERFS 27B VERTS 18A VERTS 18B VERTS 18C	41,247	1.3%
		Subtotal	513,652	4.2%
San Francisco Bay Area				
	Alameda	CONTR 8 LONFS 1B VERFS 19C VERTS 14	2,037	0.4%
	Contra Costa	CONTR 6 CONTR 7 LONFS 1A VERFS 19A VERFS 19B	7,152	1.5%
	Napa	CONTR 2 CONTR 3 VERFS 17	2,745	0.5%
	Solano	COLUS 2 CONSFS 3 CONSFS 4 CONTR 4 CONTR 5A CONTR 5B SOLAN 2 VERFS 15 VERFS 16 VERTS 11 VERTS 12	67,961	12.9%
		Subtotal	79,894	4.0%
Northern Coast				
	Lake	SLEND 5A SLEND 5B	4,141	0.5%
	Mendocino	CONTR 1	2,637	0.1%
		Subtotal	6,778	0.2%
Central Coast				
	Monterey	CONTR 9 VERFS 28 VERFS 29A VERFS 29B VERFS 29C	45,995	2.2%
	San Benito	VERFS 28	91,326	10.3%
	San Luis Obispo	LONFS 3 VERFS 29B VERFS 29C VERFS 30	64,171	3.0%
		Subtotal	201,492	3.9%
Southern California				
	Santa Barbara	VERFS 31	20,755	1.3%
	Ventura	CONSFS 8 VERFS 32	46,531	4.0%
		Subtotal	67,286	2.4%
Southern Oregon				

Region	County	Proposed Habitat Units	Total Acres of Proposed Habitat	Percent of County Area
	Jackson	VERFS 1A VERFS 1B VERFS 1C VERFS 1D VERFS 1E VERFS 1F VERFS 1G VERFS 2A VERFS 2B VERFS 2C VERFS 2D VERFS 2E VERFS 3A VERFS 3B VERFS 3C VERFS 4A VERFS 4B	7,623	0.4%
Total			**1,233,840**	**2.4%**

Source: Critical habitat boundary files, provided by the U.S. Fish and Wildlife Service, February 2005.

III SOCIOECONOMIC PROFILE OF AFFECTED COUNTIES

To understand the economic impacts of critical habitat designation for the vernal pool species, it is essential to have an accurate picture of current and projected economic activity. This section presents a summary of the current conditions and forecasts for the affected counties by examining population growth, employment sectors and patterns, and housing trends.

The majority of the proposed critical habitat units for the vernal pool species are located in California. Assuming the present growth trends continue, the population in California will likely total 40 million in 2010 and 45.5 million in 2020.[26] The California Department of Finance estimates a statewide growth rate of 1.3 percent per year from 2010 to 2020 and a total change of 29 percent between 2000 and 2020. The population increase will strain the urban housing markets and an estimated 220,000 additional housing units will have to be constructed every year through 2020 in order to keep pace with the expanding population. For comparison, an average of 100,000 permits were issued for new home construction in the state each year between 1990 and 2000. Single-family home construction has been the trend; between 1987 and 2001, this type of development represented 80 percent of new home construction.[27]

Jackson and Josephine counties make up the Rogue Valley, which is considered a center of population and economic growth in Oregon. Forecasts suggest that this region will add jobs faster than any other area in the state. Southern Oregon remains a popular location for tourists and retirees. The region also anticipates growth from in-migration, as people are attracted to the quality of life offered.[28]

The following sections review the growth patterns in the regions and counties that contain proposed critical habitats. Table III-1 presents the changes in population, jobs, and housing units that occurred between 1990 and 2000 and the change in the unemployment rates between 2000 and 2004. Table III-2: Changes in Population: 2000-2020 displays the predicted changes in population between 2000 and 2020, as estimated by the Demographic Research Unit of the California Department of Finance. In addition, economic activity is characterized by the current and future employment sectors. Table III-3: 2002 Business and Employment Pattern summarizes the business and employment patterns for the 36 counties with critical habitat units, and Table III-4: Jobs to Housing Ratiosdisplays the jobs-to-housing ratios in the counties as of the 1990 Census and 2000 Census.

III.1 UNITS IN THE SAN FRANCISCO BAY REGION

Between 1990 and 2000, the San Francisco Bay Region, which includes Alameda, Contra Costa, Napa, and Solano counties, experienced 15 percent and 9.5 percent increases in population and housing, respectively. An additional 264,861 jobs were added over the same time period. Between 2000 and 2020, the population is predicted to increase by 413,036 (28.5 percent) in Alameda,

---

[26] California Department of Housing and Community Development, "Raising the Roof, California's Housing Development Projections and Constraints, 1997-2020," May 2000, http://www.hcd.ca.gov/hpd/hrc/rtr/index.html.

[27] California Department of Housing and Community Development, "Raising the Roof, California's Housing Development Projections and Constraints, 1997-2020," May 2000, http://www.hcd.ca.gov/hpd/hrc/rtr/index.html.

[28] Oregon Employment Department, "Regional Profile, Industry Employment in Region 8," June 7, 2004, http://www.qualityinfo.org/olmisj/PubReader?itemid=00003839.

372,577 (39 percent) in Contra Costa, 41,001 (32.8 percent) in Napa, and 158,480 (39.9 percent) in Solano.[29] According the California Department of Finance, the population of the region comprised of the four previously listed counties plus Marin, San Francisco, San Mateo, Santa Clara, and Sonoma counties, will add a "disproportionately-low 13.3 percent of California's future population".[30] Alameda and Santa Clara counties will account for over half of this anticipated growth. The four counties with critical habitat are predicted to grow by 985,094 residents between 2000 and 2020.

As of 2002, the following principal industries, in terms of annual payroll, existed in the region: manufacturing; health care and social assistance; finance and insurance; professional, scientific, and technical; and, construction.[31] The largest industries, ranked by number of employees in 2002, include trade, education, health, government, and professional services. The region is expected to add additional jobs in the services, financial, education, healthcare, hospitality, and retail sectors.[32]

The median new home prices in 2004 were $772,276 (Alameda), $582,770 (Contra Costa), $785,059 (Napa), and $492,613 (Solano).[33] As of the 2000 Census, the region held a 1.5 jobs-to-housing ratio, with a range of 1.2 (Solano) to 1.7 (Alameda and Contra Costa). The jobs-housing balance is of particular concern for this area, given the current strain on the transportation networks and the expectations for future growth.[34]

III.2 Units In The San Joaquin Valley Region

This region includes Fresno, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare counties and experienced a 20 percent increase in population between 1990 and 2000. The region also added 116,735 housing units (15.4 percent increase) and 215,665 jobs. Madera County posted the greatest increases in population (39.8 percent) and housing units (31 percent) over the ten-year period. Between 2000 and 2020, the region is expected to add 1,375,852 residents.

The following industries in the region ranked high in terms of annual payroll in 2002: manufacturing; retail trade; and, health care and social assistance.[35] The agriculture, trade, education, government, and manufacturing industries employed the majority of the residents in the region in 2002. Growth in the region is predicted to continue, with additional jobs in healthcare, services, manufacturing, government, education, and retail sectors.[36]

---

[29] State of California, Department of Finance, "Population Projections by Race / Ethnicity for California and Its Counties 2000-2050," May 2004, http://www.dof.ca.gov/html/demograp/DRU_Publications/Projections/P1.htm.

[30] California Department of Housing and Community Development, "Raising the Roof, California's Housing Development Projections and Constraints, 1997-2020," May 2000, http://www.hcd.ca.gov/hpd/hrc/rtr/index.html.

[31] U.S. Census Bureau,"2002 County Business Patterns," http://censtats.census.gov/cbpnaic/cbpnaic.shtml.

[32] California Department of Transportation, Office of Transporation Economics, "Long-Term Socioeconomic Forecasts by County 2003-2020," May 2000, http://www.dot.ca.gov/hq/tpp/offices/ote/socio-economic.htm.

[33] DataQuick Information Systems, Assessor Database, www.dataquick.com

[34] "ABAG Regional Housing Need Determination, Chapter 2, 2001-2006," October 2002.

[35] U.S. Census Bureau,"2002 County Business Patterns," http://censtats.census.gov/cbpnaic/cbpnaic.shtml.

[36] California Department of Transportation, Office of Transportation Economics, "Long-Term Socio Economic Forecasts by County 2003-2020," May 2000, http://www.dot.ca.gov/hq/tpp/offices/ote/socio-economic.htm

The median new home prices in 2004 were $307,600 (Fresno), $288,876 (Madera), $305,565 (Merced), $417,600 (San Joaquin), $366,681 (Stanislaus), and $231,175 (Tulare).[37] As of the 2000 Census, the region held a 1.4 jobs-to-housing ratio, with a range of 1.2 (Merced) to 1.5 (Fresno and Tulare). Within the state, this region is predicted to see the largest percentage household growth between 1997 and 2020, as estimated by the California Department of Finance.[38]

III.3 Units In The Mountain Region

Lassen, Modoc, Plumas, and Siskiyou counties comprise the Mountain Region, which experienced a 7.8 percent increase in population between 1990 and 2000. The region also added 5,027 housing units (10.7 percent increase) and 6,592 jobs, driven by increases in Lassen County. Between 2002 and 2020, the region is expected to add an additional 5,324 residents. Unlike the other counties in the region, Modoc County is estimated to slightly decline in population by 2020.

As of 2002, the following industries posted the highest annual payrolls in the region: retail trade; construction; manufacturing; wholesale trade; and, health care and social assistance.[39] The largest industries, ranked by number of employees in 2002, include trade, education, government, and leisure and hospitality. Jobs in the retail, government, and manufacturing sectors are predicted to increase.[40]

The median new home prices in 2004 were $203,390 (Lassen) and $249,767 (Siskiyou).[41] As of the 2000 Census, the region held a 1.0 jobs-to-housing ratio, with a range of 0.8 (Plumas) to 1.1 (Lassen).

III.4 Units In The Upper Sacramento Valley Region

Composed of Butte, Colusa, Glenn, Shasta, and Tehama counties, the Upper Sacramento Valley Region experienced an 11.4 percent change in population from 1990 to 2000. An additional 21,942 housing units and 37,430 jobs were added over the same time period. Butte County, the largest county in the region, is predicted to grow by 56,058 residents between 2000 and 2020.[42] The remaining counties are estimated to add 88,101 residents over the same time period.

As of 2002, the following principal industries, in terms of annual payroll, existed in the region: retail trade; construction; manufacturing; wholesale trade; and, health care and social assistance.[43] Agriculture, education, government, and manufacturing sectors employed the most residents in

---

[37] DataQuick Information Systems, Assessor Database, www.dataquick.com. Data were not available for Kings County in 2004.

[38] California Department of Housing and Community Development, "Raising the Roof, California's Housing Development Projections and Constraints, 1997-2020," May 2000, http://www.hcd.ca.gov/hpd/hrc/rtr/index.html.

[39] U.S. Census Bureau, "2002 County Business Patterns," http://censtats.census.gov/cbpnaic/cbpnaic.shtml.

[40] California Department of Transportation, Office of Transportation Economics, "Long-Term Socio Economic Forecasts by County 2003-2020," May 2000, http://www.dot.ca.gov/hq/tpp/offices/ote/socio-economic.htm.

[41] DataQuick Information Systems, Assessor Database, www.dataquick.com. Data were not available for Modoc and Plumas counties in 2004.

[42] State of California, Department of Finance, "Population Projections by Race / Ethnicity for California and Its Counties 2000-2050," May 2004, http://www.dof.ca.gov/html/demograp/DRU_Publications/Projections/P1.htm.

[43] U.S. Census Bureau, "2002 County Business Patterns," http://censtats.census.gov/cbpnaic/cbpnaic.shtml.

2002. Growth in the region is predicted to continue, with additional jobs in the healthcare, personal services, agriculture, government, and retail.[44]

The median new home prices in 2004 were $263,934 (Butte), $170,106 (Glenn), $303,707 (Shasta), and $259,845 (Tehama).[45] As of the 2000 Census, the region held a 1.2 jobs-to-housing ratio, with a range of 1.0 (Tehama) to 1.6 (Colusa).

III.5 Units In The Sacramento Valley Region

Between 1990 and 2000, the Sacramento Valley Region, which includes Placer, Sacramento, Yolo, and Yuba counties, experienced a 20 percent increase in population and a 17 percent increase in housing and added 192,720 jobs. According to the Sacramento Area Council of Governments (SACOG), the population of the region comprised of El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba counties, will grow by approximately 50 percent from 2000 to 2025. This growth represents an additional 900,000 residents across the six counties.[46] In particular, the populations of Placer, Sacramento, Yolo, and Yuba counties are predicted to change by 178,190 (75 percent increase), 476,638 (39 percent increase), 101,105 (61 percent increase), and 46,420 (75 percent increase), respectively.

As of 2002, the following principal industries, in terms of annual payroll, existed in the region: retail trade; construction; manufacturing; wholesale trade; and, health care and social assistance. Finance and insurance and professional, scientific, and technical sectors are especially important in Sacramento County.[47] The largest industries, ranked by number of employees in 2002, include trade, government, professional and business services, education, and healthcare. Growth in the region is predicted to continue, with a variety of sectors adding jobs, including manufacturing, education, health services, finance, and technology.[48]

The Final Interim Metropolitan Transportation Plan (MTP), published by SACOG in October 2004, concludes that 90 percent of the new housing development will occur outside of the current metropolitan boundaries.[49] According the California Association of Realtors, current housing conditions allow purchase of a median-priced house by 36 percent of the households in the region.[50] The median new home prices in 2004 were $478,382 (Placer), $414,551 (Sacramento), $361,754 (Yolo), and $197,948 (Yuba).[51] By 2025, if current growth patterns continue, a 54 percent increase in travel is expected due to the estimated increase in population. As of the 2000 Census, the region held a 1.5 jobs-to-housing ratio, with a range of 1.2 (Yuba) to 1.8 (Yolo).

---

[44] California Department of Transportation, Office of Transportation Economics, "Long-Term Socio Economic Forecasts by County 2003-2020," May 2000, http://www.dot.ca.gov/hq/tpp/offices/ote/socio-economic.htm.

[45] DataQuick Information Systems, Assessor Database, www.dataquick.com. Data were not available for Colusa County in 2004.

[46] SACOG, "Final Interim Metropolitan Transportation Plan," October 2004, pp. 11 and 12.

[47] U.S. Census Bureau, "2002 County Business Patterns," http://censtats.census.gov/cbpnaic/cbpnaic.shtml.

[48] California Department of Transportation, Office of Transportation Economics, "Long-Term Socio Economic Forecasts by County 2003-2020," May 2000, http://www.dot.ca.gov/hq/tpp/offices/ote/socio-economic.htm.

[49] SACOG, "Final Interim Metropolitan Transportation Plan," October 2004, pp. 11 and 12.

[50] SACOG, http://www.sacog.org/housingcompact/index.cfm.

[51] DataQuick Information Systems, Assessor Database, www.dataquick.com.

III.6 Units In The Northern Coast Region

The Northern Coast Region, which includes Lake and Mendocino counties, experienced a 10.4 percent growth in population from 1990 to 2000, which represented an increase of 13,598 residents. In the same time period, the region added 12,060 jobs and 6,994 housing units. The California Department of Finance considers both geographies as "non-metropolitan". Out of the 21 non-metropolitan counties in California, Lake and Mendocino counties are projected to rank 4th and 6th, respectively, in total growth between 1997 and 2020.[52] The California Department of Finance predicts population changes of 35.4 percent for Lake County and 15.9 percent for Mendocino County between 2000 and 2020.

The following principal industries, ranked in terms of annual payroll in 2002, existed in the region: retail trade; health care and social assistance; manufacturing; and construction.[53] The largest employers of residents in 2002 included trade, education, government, and leisure and hospitality. The social services, recreation, government, business services, and retail sectors are expected to add additional jobs in the region.[54]

Housing prices remain unaffordable in the region and on average, purchases require the income of 2.31 employed workers per household, according to a study prepared in July 2004 by the Wine County InterRegional Partnership (IRP).[55] The IRP study predicts a slowdown in job growth from 2002 to 2020 that will result in a job-housing ratio of 1.14, but also notes a lack of "moderately priced workforce housing".[56] For comparison, the 2000 jobs-to-housing ratios were 0.7 (Lake) and 1.3 (Mendocino). The median new home price in 2004 was $338,959 in Lake County.[57] The transportation network in the region is strained and the IRP study concludes that commutes across Wine Country counties are increasing, due to shortages in workforce housing.

III.7 Units In The Central Coast Region

Between 1990 and 2000, the Central Coast Region, which includes Monterey, San Luis Obispo, and San Benito counties, realized 15 and 12 percent increases in population and housing, respectively. An additional 60,647 jobs were added to the region. Growth in San Benito County was dynamic; over the ten-year period, population and housing units increased by 45 and 35 percent, respectively.[58] Between 2000 and 2020, an additional 19,777 residents are predicted to live

---

[52] California Department of Housing and Community Development, "Raising the Roof, California's Housing Development Projections and Constraints, 1997-2020," May 2000, http://www.hcd.ca.gov/hpd/hrc/rtr/index.html.

[53] U.S. Census Bureau, "2002 County Business Patterns," http://censtats.census.gov/cbpnaic/cbpnaic.shtml.

[54] California Department of Transportation, Office of Transportation Economics, "Long-Term Socioeconomic Forecasts by County 2003-2020," May 2000, http://www.dot.ca.gov/hq/tpp/offices/ote/socio-economic.htm.

[55] Wine Country InterRegional Partnership, "Final Report," June 2004, p. 8.

[56] Wine Country InterRegional Partnership "Final Report," June 2004, p. 21.

[57] DataQuick Information Systems, Assessor Database, www.dataquick.com. Data were not available for Mendocino County in 2004.

[58] U.S. Census Bureau, "Census 2000 PHC-T-4. Ranking Tables for Counties: 1990 and 2000," released 2 April 2001, Census 2000 Redistricting Data (P.L. 94-171) Summary File and 1990 Census, http://www.census.gov/population/www/cen2000/phc-t4.html.

in San Benito County, an increase of 36.8 percent. The populations of Monterey and San Luis Obispo are projected to increase by 22-25 percent over the same date range.

As of 2002, the following principal industries, in terms of annual payroll, existed in the region: retail trade; construction; manufacturing; wholesale trade; and, health care and social assistance.[59] The largest industries, ranked by number of employees in 2002, include trade, agriculture, government, and leisure and hospitality. Growth in the region is predicted to continue, with additional jobs in the services, government, education, and healthcare sectors.[60]

The median new home prices in 2004 were $450,843 (Monterey) and $461,426 (San Luis Obispo).[61] As of the 2000 Census, the region held a 1.5 jobs-to-housing ratio, with a range of 1.3 (San Benito) to 1.7 (Monterey).

III.8 Units In The Sierra Nevada Foothills Region

Amador, Calaveras, Mariposa, and Tuolumne counties comprise the Sierra Nevada Foothills Region. Between 1990 and 2000, this region experienced a population change of 18 percent, driven by the growth in Calaveras County. The region added 22,490 residents, 10,301 housing units, and 11,767 jobs over the ten-year period. The California Department of Finance estimates population changes of approximately 20 percent between 2000 and 2020 for Amador, Mariposa, and Tuolumne counties. Calaveras County is predicted to grow by 46 percent over the same time period.

As of 2002, the following principal industries, in terms of annual payroll, existed in the region: retail trade; health care and social assistance; manufacturing; construction; and, accommodation and food services.[62] In 2002, the largest industries, ranked by number of employees, included trade, government, leisure and hospitality; and, professional and business services. All four counties are expected to add additional jobs in government, services, and retail trade, as well as see continued success in the tourism industry.[63]

At the time of the 2000 Census, the region had a 0.9 jobs-to-housing ratio, with a range of 0.7 (Calaveras) to 1.1 (Amador). The median new home prices in 2004 were $365,373 (Amador) and $354,584 (Calaveras).[64]

III.9 Units In Southern California

The Southern California Region, which includes Santa Barbara and Ventura counties, grew by 11 percent, or 113,920 people, between 1990 and 2000. The region also added 106,279 jobs and

---

[59] U.S. Census Bureau, "2002 County Business Patterns," http://censtats.census.gov/cbpnaic/cbpnaic.shtml.

[60] California Department of Transportation, Office of Transportation Economics, "Long-Term Socioeconomic Forecasts by County 2003-2020," May 2000, http://www.dot.ca.gov/hq/tpp/offices/ote/socio-economic.htm

[61] DataQuick Information Systems, Assessor Database, www.dataquick.com. Data were not available for San Benito County in 2004.

[62] U.S. Census Bureau, "2002 County Business Patterns," http://censtats.census.gov/cbpnaic/cbpnaic.shtml.

[63] California Department of Transportation, Office of Transportation Economics, "Long-Term Socioeconomic Forecasts by County 2003-2020," May 2000, http://www.dot.ca.gov/hq/tpp/offices/ote/socio-economic.htm.

[64] DataQuick Information Systems, Assessor Database, www.dataquick.com. Data were not available for Mariposa and Tuolumne counties in 2004.

27,986 housing units. According to the California Department of Housing & Community Development, the Greater Los Angeles Metropolitan Area is projected to absorb half of California's 1997-2020 population increase, with the majority of the growth occurring in Los Angeles, Riverside, San Bernardino, and Orange counties. Smaller growth is predicted for Ventura County, which will add approximately 167,200 new residents between 2000 and 2020. Santa Barbara will grow at a slighter slower pace over the same time period, with an increase of 63,200 in population.

As of 2002, the following principal industries, in terms of annual payroll, existed in the region: manufacturing; finance and insurance; health care and social assistance; and, retail trade.[65] The largest industries, ranked by number of employees in 2002, include trade; government; leisure and hospitality; professional and business services; and, manufacturing. According to the California Office of Transportation Economics, the employment forecast for Ventura County is restricted by the lack of affordable housing.[66] A similar picture is painted for Santa Barbara County; however, growth is predicted in the education and services industries.[67]

According to the Ventura County COG, the number of households is expected to reach 303,596 by 2020 and 317,831 by 2025, an increase of 59,120 and 73,355, respectively, over the 2005 total. County forecasts suggest a 1.4 jobs-to-housing ratio by 2025.[68] For comparison, the jobs-to-housing ratios at the time of the 2000 Census were 1.6 (Ventura) and 1.7 (Santa Barbara). In 2004, the median new home prices were $773,950 (Ventura) and $491,863 (Santa Barbara).[69]

III.10 Units in Southern Oregon

Between 1990 and 2000, Jackson County experienced a population change of 24 percent. The region added 34,880 residents, 15,361 housing units, and 27,646 jobs over the ten-year period. The Oregon Office of Economic Analysis estimates population changes of approximately 31 percent between 2000 and 2020 for the county.

As of 2002, the following principal industries, in terms of annual payroll, existed in the region: health care and social assistance; retail trade; and, manufacturing.[70] In 2002, the largest employers, ranked by number of employees, included retail trade and government. Jackson County is expected to add jobs in the services, retail, health care, and social assistance industries.[71]

---

[65] U.S. Census Bureau, "2002 County Business Patterns," http://censtats.census.gov/cbpnaic/cbpnaic.shtml.

[66] California Department of Transportation, Office of Transportation Economics, "Long-Term Socioeconomic Forecasts by County 2003-2020," May 2000, http://www.dot.ca.gov/hq/tpp/offices/ote/socio-economic.htm.

[67] California Department of Transportation, Office of Transportation Economics, "Long-Term Socioeconomic Forecasts by County 2003-2020," May 2000, http://www.dot.ca.gov/hq/tpp/offices/ote/socio-economic.htm.

[68] SCAG, Community Development Division, Planning and Policy Department, "2000-2030 City Projections," Adopted April 2004, http://www.scag.ca.gov/forecast/downloads/2004GF.xls.

[69] DataQuick Information Systems, Assessor Database, www.dataquick.com.

[70] U.S. Census Bureau, "2002 County Business Patterns," http://censtats.census.gov/cbpnaic/cbpnaic.shtml.

[71] Oregon Employment Department, "Regional Profile, Industry Employment in Region 8," June 7, 2004, http://www.qualityinfo.org/olmisj/PubReader?itemid=00003839.

At the time of the 2000 Census, the county had a 1.4 jobs-to-housing ratio. The median home price in 2003 was $171,000 in urban Jackson County.[72]

[72] Jackson County website, http://www.co.jackson.or.us/Page.asp?NavID=133, accessed May 25, 2005.

Table III-1: Population, Housing, and Employment Characteristics

Region	County	Change in Population, 1990-2000	Percent Change in Population, 1990-2000	Change in Housing Units, 1990-2000	Percent Change in Housing Units, 1990-2000	Change in Number of Jobs, 1990-2000	Change in Unemployment Rate, 2004-2000
Mountain							
	Lassen	6,230	22.6	1,642	15.9	2,783	-0.5
	Modoc	-229	-2.4	135	2.9	343	-0.4
	Plumas	1,085	5.5	1,444	12.1	1,295	2.5
	Siskiyou	770	1.8	1,806	9.0	2,171	1.3
	Region	7,856	7.8	5,027	10.7	6,592	
Sierra Nevada Foothills							
	Amador	5,061	16.8	2,221	17.3	4,096	0.4
	Calaveras	8,556	26.7	3,793	19.8	3,702	0.6
	Mariposa	2,828	19.8	1,126	14.6	222	-0.5
	Tuolumne	6,045	12.5	3,161	12.6	3,747	1.0
	Region	22,490	18.0	10,301	15.9	11,767	
Upper Sacramento							
	Butte	21,051	11.6	9,408	12.4	16,007	0.7
	Colusa	2,529	15.5	479	7.6	2,008	1.6
	Glenn	1,655	6.7	653	7.0	600	0.3
	Shasta	16,220	11.0	8,258	13.6	12,905	1.2
	Tehama	6,414	12.9	3,144	15.4	5,910	0.1
	Region	47,869	11.4	21,942	12.7	37,430	
Sacramento Valley							
	Placer	75,603	43.8	29,423	37.8	56,976	1.5
	Sacramento	182,280	17.5	57,240	13.7	107,996	1.3
	Yolo	27,568	19.5	8,587	16.2	27,724	0.8
	Yuba	1,991	3.4	1,391	6.5	24	2.0
	Region	287,442	20.3	96,641	17.0	192,720	
San Joaquin Valley							
	Fresno	131,917	19.8	35,204	14.9	65,882	-1.3
	Kings	27,992	27.6	5,720	18.5	10,267	-0.5
	Madera	35,019	39.8	9,556	31.0	17,990	0.0
	Merced	32,151	18.0	9,963	17.1	7,322	-0.3
	San Joaquin	82,970	17.3	22,886	13.8	43,729	1.1
	Stanislaus	76,475	20.6	18,780	14.2	36,735	0.8
	Tulare	56,100	18.0	14,626	13.9	33,740	-0.4
	Region	442,624	20.1	116,735	15.4	215,665	

Region	County	Change in Population, 1990-2000	Percent Change in Population, 1990-2000	Change in Housing Units, 1990-2000	Percent Change in Housing Units, 1990-2000	Change in Number of Jobs, 1990-2000	Change in Unemployment Rate, 2004-2000
San Francisco Bay							
	Alameda	164,559	12.9	36,074	7.2	140,605	2.9
	Contra Costa	145,084	18.1	38,407	12.1	77,486	2.3
	Napa	13,514	12.2	4,355	9.9	24,109	1.4
	Solano	54,121	15.9	14,980	12.5	22,661	1.5
	Region	377,278	14.9	93,816	9.5	264,861	
Northern Coast							
	Lake	7,678	15.2	3,706	12.9	4,888	1.6
	Mendocino	5,920	7.4	3,288	9.8	7,172	-0.1
	Region	13,598	10.4	6,994	11.2	12,060	
Central Coast							
	Monterey	46,102	13.0	10,484	8.6	20,196	0.3
	San Luis Obispo	29,519	13.6	12,075	13.4	34,465	0.4
	San Benito	16,537	45.1	4,269	34.9	5,986	1.2
	Region	92,158	15.1	26,828	12.0	60,647	
Southern California							
	Santa Barbara	29,739	8.0	4,752	3.4	33,041	0.1
	Ventura	84,181	12.6	23,234	10.2	73,238	0.5
	Region	113,920	11.0	27,986	7.6	106,279	
California		4,111,627	14	1,031,667	9.2	2,660,826	1.2
Southern Oregon							
	Jackson	34,880	23.8	15,361	25.4	27,646	1.3

Sources:

(1) Fulton, W., “Guide to California Planning, Second Edition,” 1999

(2) U.S. Census Bureau, "Census 2000 PHC-T-4. Ranking Tables for Counties: 1990 and 2000", released 2 April 2001, Census 2000 Redistricting Data (P.L. 94-171) Summary File and 1990 Census, http://www.census.gov/population/www/cen2000/phc-t4.html

(3) U.S. Census 1990 Summary File 3, Table H1: Housing Units and U.S. Census 2000 Summary File 3, Table H1: Housing Units, http://factfinder.census.gov

(4) U.S. Bureau Economic Analysis, Regional Economic Information System, Table CA30, May 2004, http://www.bea.doc.gov/bea/regional/reis/

(5) U.S. Bureau of Labor Statistics, Unemployment Rates by County in 2000 and 2005, Not Seasonally Adjusted, http://data.bls.gov/map/servlet/map.servlet.MapToolServlet?survey=la.

Table III-2: Changes in Population: 2000-2020

County	Population Change	Percent Change
Alameda	413,036	28.5
Amador	6,823	19.3
Butte	56,058	27.4
Calaveras	18,801	46.0
Colusa	7,414	39.2
Contra Costa	372,577	39.0
Fresno	311,253	38.7
Glenn	5,232	19.6
Kings	54,928	42.3
Lake	20,813	35.4
Lassen	4,193	12.3
Madera	59,594	47.9
Mariposa	3,422	19.9
Mendocino	13,812	15.9
Merced	149,955	71.1
Modoc	-190	-2.0
Monterey	101,723	25.2
Napa	41,001	32.8
Placer	206,569	82.8
Plumas	154	0.7
Sacramento	716,214	58.2
San Benito	19,777	36.8
San Joaquin	421,664	74.3
San Luis Obispo	56,947	22.9
Santa Barbara	63,241	15.8
Shasta	63,174	38.3
Siskiyou	1,167	2.6
Solano	158,480	39.9
Stanislaus	204,064	45.4
Tehama	12,281	21.9
Tulare	174,394	47.2
Tuolumne	10,506	19.1
Ventura	167,238	22.1
Yolo	101,158	59.5
Yuba	24,263	40.1
California	9,808,543	28.8
Jackson (OR)	56,665	31.1

Sources:

(1) State of California, Department of Finance, “Population Projections by Race/Ethnicity for California and Its Counties 2000–2050,” May 2004

(2) State of Oregon, Office of Economic Analysis, “Forecasts of Oregon's County Populations and Components of Change, 2000 – 2040.”

Table III-3: 2002 Business and Employment Patterns

Region	County	Top Three Industries [a]	Number of Employees	Percent of Total Employees in County
Mountain				
	Lassen	Government	5,510	53.5
		Trade, Transportation, and Utilities	1,350	13.1
		Educational and Health Services	890	8.6
	Modoc	Government	1,360	44.2
		Trade, Transportation, and Utilities	520	16.9
		Other Services	420	13.6
	Plumas	Government	2,510	34.1
		Trade, Transportation, and Utilities	1,230	16.7
		Leisure and Hospitality	1,010	13.7
	Siskiyou	Government	3,880	27.5
		Trade, Transportation, and Utilities	2,660	18.8
		Leisure and Hospitality	2,030	14.4
Sierra Nevada Foothills				
	Amador	Government	4,690	37.6
		Trade, Transportation, and Utilities	2,010	16.1
		Professional and Business Services	1,220	9.8
	Calaveras	Government	2,580	29.2
		Trade, Transportation, and Utilities	1,480	16.7
		Leisure and Hospitality	1,150	13.0
	Mariposa	Leisure and Hospitality	1,970	35.1
		Government	1,880	33.5
		Professional and Business Services	640	11.4
	Tuolumne	Government	4,700	28.2
		Trade, Transportation, and Utilities	2,880	17.3
		Leisure and Hospitality	2,250	13.5
Upper Sacramento				
	Butte	Government	16,800	22.5

Region	County	Top Three Industries [a]	Number of Employees	Percent of Total Employees in County
		Trade, Transportation, and Utilities	14,100	18.9
		Educational and Health Services	11,400	15.2
	Colusa	Agriculture	2,160	29.3
		Government	1,950	26.5
		Trade, Transportation, and Utilities	1,040	14.1
	Glenn	Government	2,310	31.5
		Agriculture	1,400	19.1
		Trade, Transportation, and Utilities	1,300	17.7
	Shasta	Trade, Transportation, and Utilities	13,300	20.7
		Government	12,900	20.0
		Educational and Health Services	10,400	16.1
	Tehama	Government	4,080	23.3
		Trade, Transportation, and Utilities	3,910	22.3
		Manufacturing	2,340	13.3
Sacramento Valley				
	Placer / Sacramento [b]	Government	195,800	26.2
		Trade, Transportation, and Utilities	120,700	16.2
		Professional and Business Services	88,700	11.9
	Yolo	Government	31,600	34.3
		Trade, Transportation, and Utilities	20,400	22.1
		Professional and Business Services	7,900	8.6
	Yuba [c]	Government	10,100	23.6
		Trade, Transportation, and Utilities	8,100	18.9
		Educational and Health Services	4,900	11.4
San Joaquin Valley				
	Fresno / Madera [d]	Trade, Transportation, and Utilities	58,800	16.0

Region	County	Top Three Industries [a]	Number of Employees	Percent of Total Employees in County
		Agriculture	55,700	15.2
		Educational and Health Services	38,700	10.6
	Kings	Government	13,400	34.6
		Agriculture	7,000	18.1
		Trade, Transportation, and Utilities	4,600	11.9
	Merced	Government	13,500	20.5
		Trade, Transportation, and Utilities	11,000	16.7
		Agriculture	10,900	16.5
		Manufacturing	10,900	16.5
	San Joaquin	Trade, Transportation, and Utilities	44,300	21.1
		Government	40,100	19.1
		Educational and Health Services	23,300	11.1
	Stanislaus	Trade, Transportation, and Utilities	31,700	19.2
		Government	25,300	15.3
		Manufacturing	22,500	13.6
	Tulare	Agriculture	33,700	24.7
		Government	29,600	21.7
		Trade, Transportation, and Utilities	21,900	16.1
San Francisco Bay				
	Alameda / Contra Costa [e]	Trade, Transportation, and Utilities	203,900	19.5
		Government	185,500	17.7
		Professional and Business Services	151,200	14.5
	Napa / Solano [f]	Government	36,300	19.2
		Trade, Transportation, and Utilities	33,100	17.5
		Educational and Health Services	23,000	12.2
Northern Coast				
	Lake	Government	3,990	27.1
		Trade, Transportation, and Utilities	2,890	19.6

Region	County	Top Three Industries [a]	Number of Employees	Percent of Total Employees in County
		Educational and Health Services	2,100	14.3
	Mendocino	Government	7,800	23.1
		Trade, Transportation, and Utilities	6,000	17.8
		Leisure and Hospitality	4,200	12.4
Central Coast				
	Monterey	Agriculture	35,400	21.2
		Government	31,300	18.7
		Trade, Transportation, and Utilities	25,600	15.3
	San Luis Obispo	Government	23,100	22.2
		Trade, Transportation, and Utilities	19,000	18.3
		Leisure and Hospitality	13,700	13.2
	San Benito	Government	3,000	19.9
		Trade, Transportation, and Utilities	2,610	17.3
		Agriculture	2,420	16.0
Southern California				
	Santa Barbara	Government	35,600	19.8
		Leisure and Hospitality	20,800	11.6
		Professional and Business Services	20,500	11.4
	Ventura	Trade, Transportation, and Utilities	51,800	17.3
		Government	45,400	15.2
		Manufacturing	38,000	12.7
Southern Oregon				
	Jackson County (OR)[73]	Retail Trade	16,200	15.2
		Health Care and Social Assistance	12,500	11.7
		Government	11,700	11.0

Sources:

[73] Data for Jackson County obtained from the U.S. Department of Commerce, Bureau of Economic Analysis.

(1) Counties divided into regions based on Association of Government organizations and the "Guide to California Planning, Second Edition, 1999" by W. Fulton

(2) California Employment Development Department, Labor Market Information Division, 2002 County Snapshots, http://www.calmis.ca.gov/htmlfile/subject/COsnaps.htm

(3) U.S. Department of Commerce, Bureau of Economic Analysis, Table CN25N for Jackson County, Oregon, http://www.bea.doc.gov/bea/regional/data.htm.

Notes:

(a) Ranked by number of employees in 2002

(b) Sacramento Metropolitan Statistical Area (includes Placer County)

(c) Yuba City Metropolitan Statistical Area

(d) Fresno Metropolitan Statistical Area (includes Madera County)

(e) Oakland Metropolitan Statistical Area

(f) Vallejo - Fairfield - Napa Metropolitan Statistical Area.

Table III-4: Jobs to Housing Ratios

Region	County	Jobs-to-Housing Ratio, 1990	Jobs-to-Housing Ratio, 2000
Mountain			
	Lassen	1.0	1.1
	Modoc	0.9	0.9
	Plumas	0.8	0.8
	Siskiyou	1.0	1.0
	Region	0.9	1.0
Sierra Nevada Foothills			
	Amador	1.0	1.1
	Calaveras	0.6	0.7
	Mariposa	1.0	0.9
	Tuolumne	0.8	0.9
	Region	0.8	0.9
Upper Sacramento			
	Butte	1.1	1.2
	Colusa	1.4	1.6
	Glenn	1.2	1.2
	Shasta	1.2	1.2
	Tehama	0.9	1.0
	Region	1.1	1.2
Sacramento Valley			
	Placer	1.2	1.4
	Sacramento	1.5	1.5
	Yolo	1.5	1.8
	Yuba	1.2	1.2
	Region	1.4	1.5
San Joaquin Valley			
	Fresno	1.5	1.5
	Kings	1.3	1.4
	Madera	1.2	1.3
	Merced	1.3	1.2
	San Joaquin	1.3	1.4
	Stanislaus	1.3	1.4
	Tulare	1.4	1.5
	Region	1.4	1.4
San Francisco Bay			

Region	County	Jobs-to-Housing Ratio, 1990	Jobs-to-Housing Ratio, 2000
	Alameda	1.5	1.7
	Contra Costa	1.3	1.3
	Napa	1.4	1.7
	Solano	1.2	1.2
	Region	1.4	1.5
Northern Coast			
	Lake	0.6	0.7
	Mendocino	1.3	1.3
	Region	1.0	1.0
Central Coast			
	Monterey	1.7	1.7
	San Luis Obispo	1.2	1.4
	San Benito	1.3	1.3
	Region	1.5	1.5
Southern California			
	Santa Barbara	1.6	1.7
	Ventura	1.4	1.6
	Region	1.5	1.7
California		1.5	1.6
Southern Oregon			
	Jackson County (OR)	1.3	1.4

Sources:

(1) Fulton, W., Guide to California Planning, Second Edition, 1999

(2) U.S. Census 1990 Summary File 3, Table H1: Housing Units, http://factfinder.census.gov

(3) U.S. Census 2000 Summary File 3, Table H1: Housing Units, http://factfinder.census.gov

(4) U.S. Bureau Economic Analysis, Regional Economic Information System, Table CA30, May 2004, http://www.bea.doc.gov/bea/regional/reis/.

IV ECONOMIC IMPACTS ON LAND DEVELOPMENT

A primary aim of this analysis is to estimate the economic impacts of designation on the markets for land, housing and commercial real estate. The methodology used to estimate these impacts is described below, followed by a discussion of the calculated results. Further detail, including a formal description of the conceptual model and econometric results used in the calculation of welfare impacts, is provided in two appendices to this report. The section concludes with an estimate of the total costs of critical habitat designation attributable to regulation of land development.

IV.1 BACKGROUND

This portion of the analysis considers the effects of designation on the linked markets for land and improvements to land such as housing and commercial buildings. At the guidance of the OMB and in compliance with Executive Order 12866 "Regulatory Planning and Review," Federal agencies measure changes in economic efficiency in order to understand how society, as a whole, will be affected by a regulatory action.[74] In the context of this regulatory action, these efficiency effects represent the overall welfare gained or lost by society as a result of critical habitat designation. Economists generally characterize welfare in terms of changes in producer and consumer surpluses in affected markets.[75]

IV.1.1 Compliance with Section 7 of the Act

The measurement of direct compliance costs focuses on the implementation of Section 7 of the Act. This section 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 critical habitat. The costs of project modifications and mitigation requirements resulting from these consultations represent the direct compliance costs of designating critical habitat.

The estimate of total Section 7 impacts presented in this analysis does not differentiate between consultations that result from the listing of the species (i.e., the jeopardy standard) and consultations that result from the presence of critical habitat (i.e., the adverse modification standard). Consultations resulting from the listing of the species, or project modifications meant specifically to protect to the species as opposed to its habitat, may occur even in the absence of critical habitat. However, in 2001, the 10th Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of critical habitat designation, regardless of whether those impacts are attributable to the listing of the species or to critical habitat.[76]

---

[74] 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; and 2 U.S.C. §§658–658g and 1501–1571.

[75] 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. Environmental Protection Agency, *Guidelines for Preparing Economic Analyses*, EPA 240-R-00-003, September 2000, available at http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html.

[76] *New Mexico Cattle Growers Ass'n v. U.S.F.W.S.*, 248 F.3d 1277 (10th Cir. 2001).

In a section 7 consultation, the Service may request an applicant for a 404 permit to compensate each wetted acre of vernal pools filled by performing the following tasks:

- Restoring an equal acreage of wetted vernal pools on-site ("restoration requirement")
- Preserving a certain number of wetted acres of vernal pools either on- or off-site ("preservation requirement").

The Service's restoration requirements are structured to be similar to the "no net loss" requirement of the Army Corps of Engineers, equaling or requiring a greater level of restoration.

The "preservation" requirement is typically expressed as a ratio. For example, a 3:1 conservation ratio indicates that three acres of wetland must be conserved or avoided for every acre filled and developed within critical habitat. Thus, this ratio indicates that only 25% of the habitat is developable.

For those acres that are developed, the Service may further require the developer to create or purchase additional wetlands away from the development site. This requirement is also typically expressed as a ratio. A 2:1 "restoration" ratio obliges a developer to create or purchase two acres of wetlands off-site for every acre filled in construction.

IV.1.2 Benefits

As previously mentioned, 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 often, it may not be feasible to monetize, or even quantify, the benefits of environmental regulations. Where benefits cannot be quantified, OMB directs agencies to describe the benefits of a proposed regulation qualitatively.[77] This report provides insight into the potential economic benefits of critical habitat designation based on information obtained in the course of developing the economic analysis. It is not intended to provide a complete analysis of all of the benefits that could result from the designation. Given these limitations, the Service believes that the benefits of critical habitat designation are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.

IV.1.3 Defining the Baseline

OMB guidelines for conducting economic analysis of environmental regulation direct Federal agencies to measure the costs of a regulatory action against a baseline.[78] In its guidance, OMB states, the "baseline should be the best assessment of the way the world would look absent the proposed action." In other words, the baseline includes the currently existing regulatory and

---

[77] 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; and U.S. Office of Management and Budget, "Appendix 4: Guidelines to Standardize Measure of Costs and Benefits and the Format of Accounting Statements," in *Report to Congress on the Costs and Benefits of Federal Regulations*, March 22, 2000.

[78] U.S. Office of Management and "Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations; Notice," 68 Federal Register 5492, February 3, 2003; and U.S. Office of Management and Budget, "Appendix 4: Guidelines to Standardize Measure of Costs and Benefits and the Format of Accounting Statements," in Report to Congress on the Costs and Benefits of Federal Regulations, March 22, 2000.

socioeconomic burden imposed on landowners and managers potentially affected by the designation of critical habitat. The baseline burden may include, for example:

- Local zoning laws;
- State natural resource laws;
- Enforceable management plans and best management practices applied by other State and Federal agencies; and / or
- Federal, State, and local protections already in place in the same geographic area for other (Federal and State) listed species.[79]

This analysis describes impacts that are expected to occur above and beyond the baseline. That is, it measures the costs of compliance with the Act that would not occur in the absence of the currently proposed critical habitat. 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 to the listing decision (New Mexico Cattle Growers Assn v. U.S. Fish and Wildlife Service, 248 F.3d 1277 (10th Cir. 2001)). Thus, the economic analysis considers the economic impact of all ESA-related conservation of vernal pools undertaken in areas of critical habitat.

IV.1.4 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.

Twenty years is an optimal time frame for this analysis for several reasons. First, the scale of the proposed critical habitat designation requires the use of regional and county level growth data. In the State of California, this data is readily available beyond the ten year horizon. A 20-year time frame is very common among a number of planning and development tools including: California State-mandated jurisdictional General Plans, population and employment projections by regional associations of governments, and project planning and the calculation of absorption rates and financial rates of return by real estate developers. If the proposed critical habitat designation had been restricted to a handful of local, single-county sites, this data would not have been useful and a shorter interval period, perhaps 10 years, would have been more appropriate.

In addition, speculative real estate transactions in high growth communities in the Central Valley frequently involve land not yet annexed into cities and land upon which development is not likely to occur for 15 to 20 years. Master planned communities consisting of hundreds, if not thousands, of acres of raw land increasingly require more than ten years to receive planning approvals from local, State and Federal agencies. Certain land development interests that precede the ownership by the eventual land developer, therefore, often financially control property more than a decade in advance of the first project application. Farming or ranching may continue, but critical habitat

[79] Certain regulations that provide baseline protection for the species and its habitat may also be the source of indirect costs resulting from new information provided by the designation.

designation has the potential to affect development potential and associated speculative land value at a very early stage in the development process.

IV.2 METHODOLOGY

The total economic impact of critical habitat designation depends on a variety of factors, including the size of the designation, the nature of pre-existing markets and regulation, and geographical features of the designated land itself. Because these factors vary by region, the methodology adopts the Census tract as its baseline unit of analysis. This modeling choice invests the results with a high degree of spatial precision.

Economic repercussions of the designation affect landowners, builders and housing consumers in different ways. Accordingly, the methodology analyzes both costs of designation and their incidence on producers and consumers.

The steps followed to determine the impacts of critical habitat designation on housing markets are:

- Describe current and projected economic and demographic characteristics in the proposed critical habitat areas;
- Determine the effects and significance of prior regulation of land development in affected areas;
- Determine the intersection of future development and critical habitat determination;
- Determine the incremental, project-level regulatory requirements resulting from critical habitat designation;
- Calculate the market effects of critical habitat and estimate economic costs for these areas.

Each step is discussed in greater detail below.

IV.2.1 Socioeconomic Characteristics Critical Habitat Areas

Data on current and future socioeconomic characteristics for areas affected by critical habitat designation are necessary precursors to this analysis. To obtain present-day estimates, data were obtained from several sources, including population and household data the most recent United States Census, and data on new home characteristics from DataQuick, a housing market research firm. These are used to establish the economic baseline against which the market impacts of the critical habitat designation are measured.

The analysis also requires forecasted data to investigate impacts at the end of the 20-year time frame (see Section for further information on the time frame.) Population forecasts were derived from several sources, including federally-recognized metropolitan planning organizations and forecasting performed in prior studies for transportation planning purposes. County-level forecasts on gross urban density—including residential, commercial and public development—along with shares of greenfield and infill development were obtained from a study performed by urban planning researchers at the University of California.[80,81] Combining density and population forecasts yields an estimate of the overall urban footprint within each Census tract.

---

[80] John D. Landis and Michael Reilly, "How We Will Grow: Baseline Projections of the Growth of California's Urban Footprint through the Year 2100" (August 1, 2003). Institute of Urban & Regional Development. IURD Working Paper Series. Paper WP-2003-04. http://repositories.cdlib.org/iurd/wps/WP-2003-04

Table IV-1: Socioeconomic Characteristics of Affected Tracts summarizes some of this baseline information. Each FIPS code corresponds to a distinct Census tract within a county. Median home prices are in 2005 dollars and are for newly constructed single-family residences. These home prices range to well over $1 million. Average square footage is indicative of the size of these homes. The projected population increase indicates the Census tracts projected to experience the most rapid development. Since these are net population increases, they are used to specify the demand for additional housing. The last column shows the number of new dwellings needed to accommodate the projected population increase in each Census tract.

IV.2.2 Prior Regulation in Affected Areas

Markets for land, housing and commercial real estate are highly regulated by governments at the local, State and Federal level. The welfare impacts of critical habitat designation are affected by the nature and extent of prior regulation, and by the response of governments at all levels to the designation of critical habitat.

Regulation can have several types of effects on land and housing markets. Zoning and other interventions in the land market can limit the stock of developable land and increase its price. Local regulations can also directly limit the construction of new housing. This latter type of intervention is important as it generates qualitatively different predictions about the effects of critical habitat than regulations that simply limit the amount of developable land.

As explained in an Appendix to the report, when the number of housing units constructed is directly limited by regulation, there is a "shadow value" of housing that is not necessarily incorporated in the price of land. These rents are earned by providers of fixed factors to the homebuilding process. When critical habitat designations impose further restrictions on an already constrained homebuilding process, welfare impacts can be larger than if the number of housing units constructed is not directly controlled by regulation.

As noted in the recent academic literature, there are ways to test whether housing is rationed by prior regulation.[82] These tests amount to comparing the "extensive" and "intensive margin" values of land. These terms are loosely defined as the value of land with a house on it and the marginal willingness of consumers to pay for an additional unit of lot size. In the conventional case where regulation may limit the supply of land but not the number of housing units built, extensive and intensive margin values should be the same since density will adjust to equate the two. When housing is directly limited by regulation, the extensive margin value will exceed the intensive margin value. The rationale is that the extensive margin value incorporates the shadow value of housing while the intensive margin value is simply the value of additional lot size.

This test was implemented using our data on new home sales and house characteristics described earlier. A hedonic regression was estimated to gauge the contributions of various housing characteristics to the sales price of new housing. This regression analysis revealed an intensive

---

[81] Greenfield development refers to development occurring on land that was not previously urbanized. Infill development refers to the redeveloping of already-urbanized land—for example, leveling an old home and building a new apartment complex over it.

[82] David Sunding and Aaron Swoboda, *Does Regulation Ration Housing?*, UC Berkeley Working Paper, 2004, and Ed Glaeser and Joseph Gyourko, *The Impacts of Building Restrictions on Housing Affordability*, Federal Reserve Boads of New York Economic Policy Review, 2003.

margin value of roughly $10 per square foot in the study area. The extensive margin value of land was calculated by subtracting building costs from home price and dividing by lot size. This calculation revealed a mean extensive margin value of over $30 per square foot. Test results strongly reject the hypothesis that intensive and extensive margin values are equal, even in the census tracts with the highest growth. Indeed, extensive margin values exceed intensive more than 97% of the time (with a p-value of 0.000). Details are contained in the econometrics appendix to this report. Thus, we are unable to rule out the possibility that new housing in the study area is rationed by regulation unrelated to critical habitat.

One implication of this finding is that the ultimate impacts of vernal pool critical habitat may depend in an important way on how local governments respond to the designation. If housing restrictions are relaxed in response to the designation of critical habitat, then impacts will be lower than in the case where regulations are unaffected. For example, if cities accommodate critical habitat designation by allowing for higher density development, then economic losses may be lower than if housing is even further restricted by critical habitat.

Following this line of reasoning, two scenarios are discussed in this analysis. First, the more conservative scenario is that critical habitat results in a reduction in the housing stock in Census tracts where avoidance requirements place some land off-limits to development.[83] In this case, critical habitat will result in housing price increases to clear the market and potential gains to developers and landowners who benefit from the increased price. These potential producer gains must be counterbalanced against the requirement for mitigation expenditures resulting from development in critical habitat areas, and profits lost through the reduction in housing units constructed. An alternative scenario is that critical habitat designation is accommodated entirely through densification. Consumer losses in this case result from reductions in lot size since the number of housing units is unaffected. Producer losses will result mainly from mitigation expenditures.

IV.2.3 Critical Habitat Likely To Be Developed

The method for calculating the quantity of new development per Census tract was described in the preceding section. It remains to allocate that development within the tract itself. To do so, GIS analysis was used to calculate overlap between proposed critical habitat and the development probabilities that form the basis of an urban growth model designed at the University of California, Berkeley. The California Urban and Biodiversity Analysis (CURBA) model, developed by researchers at UC Berkeley's Department of City and Reigonal Planning, uses GIS technology to provide spatial predictions of the extent of urban growth in the year 2025.

The basis of the CURBA model is a set of econometrically estimated development probabilities that incorporate the preferences of consumers for distance and landscape features in their choice of location. These development probabilities (as opposed to the ordinal (1/0) predictions of location of development that are ultimately generated by CURBA). The probabilities also are a good indication of the degree to which consumers view alternative development sites as substitutes. By overlaying the proposed critical habitat unit areas over CURBA predictions, it is possible to measure the expected amount of development that is likely to take place within critical habitat. Furthermore, the precise nature of the CURBA model—predictions have resolution of one one-hundredths of a

[83] This will occur only in Census tracts containing Group B vernal pool habitat.

hectare—invests this analysis with a high degree of specificity, resulting in a more accurate impact assessment.

The CURBA model covers 20 of the 35 counties containing critical habitat. For the remaining 15, GIS is used to exclude land in critical habitats that has already been, or cannot be developed. Therefore, the impact estimates of critical habitat on land markets are limited to only those parcels which might actually support development.

To determine already developed land, GIS data is used from the California Fire and Resource Assessment Program (FRAP). The FRAP data delineates land that is already developed at the time of designation, with a cutoff of one structure per acre or higher.

To determine land that is not developable, the analysis excludes those portions of critical habitat which meet one or more of the following criteria (unless otherwise noted, the features listed were obtained from GIS data provided by ESRI, the leading GIS provider):

- Land that is classified as "prime farmland" by the California Farmland Mapping and Monitoring Program (FMMP).
- Land that is under water. These features include rivers, reservoirs, intermittent reservoirs, lakes, intermittent lakes, streams, and canals.
- Land that is on or within two meters of a major highway, minor highway, major road or railroad.
- Land that is on the property of an airport.
- Land owned by the federal government. This includes land holdings of the Bureau of Land Management, National Forest Service, National Park Service, or the Department of Defense.
- Land forming part of an American Indian reservation or tribal lands.
- Land that cannot be developed due to geography. This includes land within the 100-year flood plane as determined by the Federal Emergency Management Agency, and land that is sloped at more than a 15% grade.

IV.2.4 Avoidance, Mitigation and Indirect Effects of Critical Habitat

Land areas affected by the designation of vernal pool critical habitat were differentiated into two groups according to the species they contain.[84] Habitat groups A and B address the different section 7 requirements issued by the Service, depending on the relative abundance of each species. The species with the higher frequencies of occurrence are referred to as belonging to Group A. The species with the lower frequency of occurrence, for which conservation banks are very unlikely to be established, are referred to as belonging to Group B. All land development projects affected by section 7 will be subject to one or the other of the corresponding conservation requirements for each group. The next section explains the two sets of requirements in the context of baseline regulations.

---

[84] Group B species (as defined in this section) include the Butte County meadowfoam, Colusa grass, Conservancy fairy shrimp, Contra Costa goldfields, Sacramento Orcutt grass, and Solano grass. Group A species (as defined in this section) include Greene's tuctuoria, hairy Orcutt grass, Hoover's spurge, longhorn fairy shrimp, San Joaquin Valley Orcutt grass, slender Orcutt grass, succulent owls-clover, vernal pool tadpole shrimp, and vernal pool fairy shrimp.

Net of Clean Water Act requirements relating to Section 404, Service personnel estimate that the average private development project sited in Group A proposed critical habitat will be subject to a 2:1 mitigation ratio for impacts to each wetted acre of vernal pool habitat. This requirement is not an assumption that has been drawn from the species' consultation histories but instead serves as an analytical proxy for recommendations the Service may make in the future. Projects may fulfill the requirement for compensation by purchasing conservation credits from a conservation bank, purchasing suitable habitat and managing that habitat in perpetuity, or dedicating land already owned by the project applicant and having suitable vernal pool habitat.

For Group B critical habitat units, additional section 7 conservation requirements will consist of avoidance of 85.7 percent of vernal pools on the project site, a condition which allows only 14.3 percent of the vernal pools to be developed. The amount of land area avoided permits the project applicant to achieve the 6:1 preservation / avoidance ratio (six wetted acres preserved for each wetted acre of vernal pools filled).

In addition, restoration requirements above the baseline will consist of the creation and restoration of vernal pool habitat at the rate of 3:1 for each wetted acre of vernal pools filled. Service personnel have little experience with development projects impacting Group B species, so the 6:1 ratio was chosen to fit general knowledge about the level of protection required for Group B species habitat.

This requirement is not an assumption that has been drawn from the species' consultation histories but instead serves as an analytical proxy for recommendations the Service may make in the future. This ratio also produces results more likely to overestimate than to underestimate regulatory impacts. Because of the very low frequency of Group B species populations, projects cannot fulfill this requirement in any way except to set aside on-site acreage in accordance with the 6:1 ratio.

Conservation bank prices are used to estimate the project modification costs associated with section 7 requirements. The analysis uses market data collected from several private vernal pool conservation banks in the Sacramento and central California regions to determine average off-site mitigation prices by county. The largest prevalence of existing conservation banks is in the Sacramento Region, where each conservation credit costs about $200,000 per acre. For other regions, data on average compensation costs were obtained from the Service, which estimates that the cost of mitigation is $135,000 per credit in Placer and $105,000 elsewhere.

The Section 7 consultation process may result in time delays and other effects that have impacts that are incremental to direct compliance costs. If such effects would not have occurred in the absence of critical habitat (i.e., "but for" critical habitat), then they are considered by this analysis to be an impact of the designation.

These costs include project delays stemming from the consultation process or compliance with other regulations, or, in the case of land location within or adjacent to the designation, loss in property values due to regulatory uncertainty, and loss (or gain) in property values resulting from public perceptions regarding the effects of critical habitat.

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 triggered by 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 baseline 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.

To the extent that delays result from the designation, they are considered in the analysis. Specifically, the analysis considers costs associated with any incremental time delays associated with Section 7 consultation or other requirements triggered by the designation above and beyond project delays resulting from baseline regulatory processes. The average time of a Section 7 consultation, 111 days, was determined based on Service records of technical assistance provided to private developers.

IV.3 Calculation of Market Effects and Welfare Losses

Estimates of welfare impacts on the markets for land, housing and other goods proceed directly from the spatial and socioeconomic data described above. This analysis adopts a supply and demand approach based on partial equilibrium to assess those impacts.

Estimating the regulatory impact requires several steps within the context of this framework:

1. Identify the supply and demand functions and determine the market equilibrium "but for" the regulatory action.
2. Determine the effects of regulation on supply, demand and relevant constraints.
3. Estimate the resulting new market equilibrium and resultant changes in producer and consumer surplus.

Determining the "but-for" equilibrium was discussed in section IV.2.1. Because of its conservatism, the rationed housing scenario is the base case. In this scenario, critical habitat reduces the number of new housing units built, and welfare impacts can be calculated only after specifying a demand function for housing as well as costs of building and development. The densification scenario requires specification of a demand function for land together with land prices equal to intensive margin values. In both scenarios, critical habitat will result in economic welfare impacts that are distributed among consumers, builders, developers and landowners. More detail on the mathematical model for calculating impacts is given in the appendix.

New residents' demand for housing in each Census tract is specified as linear and of unit price elasticity as suggested by the academic literature.[85] The number of new housing units is taken from the population growth forecasts and new home prices are taken from DataQuick as described above.

---

[85] The seminal analysis of Muth (1964) suggested that the price elasticity of demand for residential land could be expressed as $\varepsilon_L = -k_N\sigma + k_L\varepsilon_H$, where ε_L and ε_H are the own-price elasticities of residential land and housing, respectively, σ is the elasticity of substitution between land and capital in the production of housing, and k_L and k_N are the shares of land and non-land factors in housing production. Thorsnes (1997) has estimated the value of σ as roughly -1.0. Reid (1962) first demonstrated that the price elasticity of housing was near -1.0. While several studies have reported lower elasticities, Rosen (1979) reported a price elasticity of -1.0 using time series data. Representative cost shares for land and non-land factors of production are 0.3 and 0.7, respectively. Richard Muth, "The Derived Demand for a Factor of Production and the Industry Supply Curve," *Oxford Economic Papers* (July 1964): 221-234; Paul Thorsnes, "Consistent Estimates of the Elasticity of Substitution between Land and Non-Land Inputs in the Production of Housing," *Journal of Urban Economics* (1997): 98-108; Harvey Rosen, "Housing Decisions and the U.S. Income Tax," *Journal of Public Economics* (1979): 1-23.

For the densification scenario, the land demand function is also specified as linear, with the own-price elasticity set at one.[86] The quantity of land demanded in each Census tract is taken by combining population growth forecasts with county-specific urban densities as described earlier. The price of land is calculated econometrically and is equal to the intensive margin value of land in each county. Mean marginal land values range from $3 to $13 per square foot across the study area.

The indirect effects of critical habitat resulting from delay in project completion result from the fact that producers and consumers receive the benefits of housing development later than would have been the case without the incremental regulation and need for Section 7 consultation. As discussed in the previous section, the assumed period of delay is relatively brief (111 days). However, it is important to remember that delay affects the entire amount of consumer and producer surplus from new housing, which is quite large in a rapidly growing area like California. Thus, the effects of delay may be significant even though the delay period is only a few months rather than years.

IV.4 Results of the Analysis

In the base scenario where critical habitat reduces the amount of new housing, designation of vernal pool critical habitat results in over $965 million in losses to consumers and producers between the present and 2025.

Table IV-2: Market Impacts of Designation shows how vernal pool critical habitat perturbs the housing market equilibrium in the case where critical habitat results in construction of fewer housing units. For each Census tract, the table shows the number of new housing units projected to be built in Group A and Group B critical habitat, as well as the total number of new housing units projected to be constructed.

On-site avoidance requirements for Group B habitat result in the loss of a certain number of housing units. The market price of housing must increase to clear the market and reestablish a new equilibrium. The last two columns display the pre-regulation price of new housing and the imputed change in the price of housing resulting from protection of vernal pool critical habitat. The predicted price changes are modest when viewed in relation to the generally high price of new housing in the study area. However, these price increases are applied to all new housing to be built in the Census tracts containing critical habitat since this is the relevant market. Thus, critical habitat may cause housing market impacts well outside of the immediate footprint of critical habitat.

Table IV-3: Welfare Impacts of Designation combines these market impacts with mitigation expenditures to arrive at welfare losses in each Census tract. Losses per Census tract range from $0 to over $300 million for the rationed housing analysis. Total welfare impacts for this scenario are $965.4 million over the 20-year study period. Table IV-5: County-Level Welfare Impacts shows losses for each affected county. Sacramento County is the most impacted in both cases. Impacts are in excess of $374.3 million for this county alone. The four most impacted counties are Sacramento, Butte, Placer and Solano. These counties appear to experience impacts that are significantly larger than is the case in other counties – more than twice as large as the next most impacted county.

[86] Gyourko and Voight (2001) review the literature on the demand for residential land and report elasticity estimates ranging from -0.7 to -1.6. The assumption of a land price elasticity of -1.0 is consistent with the analysis in the previous footnote if the price elasticity of housing demand is also -1.0.

The impacts of critical habitat designation for vernal pools varies widely even within counties. That is, the impacts of vernal pool critical habitat designation are frequently localized. This finding is sensible from an economic point of view and is consistent with the teachings of urban economics. Housing prices vary over urban areas, typically declining as the location of the house becomes more remote. Critical habitat is not evenly distributed across the landscape, and large impacts may result if a particular area has a large fraction of developable land in critical habitat. Critical habitat for vernal pools is not all of the same type, and a preponderance of Group B habitat will tend to increase losses. Some areas have few alternate sites for development, or have highly rationed housing resulting in high prices. Any of these factors may cause the cost of critical habitat designation to increase.

The disaggregated spatial scale of the analysis permits identification of specific locations, or parts of individual critical habitat units, that result in the largest economic impacts. The maps contained at the end of this section are instructive in this regard. The maps identify the Census tracts within the counties where the impacts are predicted to occur. They appear in order of impact per county. The color scheme on the maps displays the range of impacts, from dark green (impacts of $0.00 to $1,000,000.00) to dark red (impacts of $50,000,000.01 to $500,000,000.00).

Sacramento County is expected to experience the largest economic impacts from critical habitat – over $374 million in consumer and producer surplus losses. As shown in the map of impacts in Sacramento County, these impacts are concentrated in Census tracts close to downtown Sacramento. Further, impacts generally decline in Census tracts further from the city center. This pattern is generally repeated in other counties.

A final measure of the localized nature of critical habitat impacts is obtained by constructing a Lorenz curve, a technique usually associated with the analysis of income distribution. The Lorenz curve relevant to our analysis is constructed by ranking Census tracts according to impacts per acre of critical habitat contained in the tract. Impacts and acres for each tract are then expressed as fractions of the total. Then, acreages and impacts are cumulated by summing from lowest to highest impacts per acre. The resulting Lorenz curve shows what fraction of critical habitat is responsible for a given fraction of total economic impacts. As seen in Figure 1, roughly 5 percent of critical habitat acreage is responsible for 50 percent of total impacts. Roughly 25 percent of critical habitat is responsible for 80 percent of losses.

For the densification scenario, overall projected impacts are $820.2 million. The most impacted counties are, in order, Sacramento ($276 million), Placer ($120 million), Butte ($116 million) and Solano ($90 million.) As described in Section IX, this scenario assumes that critical habitat does not result in the loss of any housing units, but rather entails that the same number of units are built on a smaller footprint. Thus the economic impact of critical habitat designation results from a combination of mitigation costs, a reduction in lot size and delay costs.

Densification results in smaller economic impacts than the rationed housing scenario because critical habitat results in the loss of yard space rather than housing units. In reality, densification may be prohibited by local regulations that impose minimum lot sizes and other constraints. Thus, densification may be accommodated only by relaxing these local regulations, and our findings illustrate that the ultimate economic impacts of critical habitat designation may be dependent on how local governments respond to federal habitat protections.

Table IV-1: Socioeconomic Characteristics of Affected Tracts

FIPS	County	Median New Home Price	Average Square Feet	Projected Population Increase	New Households
06001441503	Alameda	$656,521	1,706	3,148	1,117
06001451101	Alameda	$646,197	2,055	4,395	1,571
06001451201	Alameda	$841,386	2,755	1,646	639
06001451202	Alameda	$599,200	1,670	8,239	2,693
06005000301	Amador	$204,789	1,788	421	46
06005000302	Amador	$335,293	1,704	1,778	679
06007000101	Butte	$260,971	1,520	10,199	3,927
06007000102	Butte	$265,572	2,047	2,223	908
06007000201	Butte	$255,669	1,547	1,084	463
06007000900	Butte	$311,627	1,511	17,714	7,032
06007001400	Butte	$456,840	2,579	4,473	1,532
06007001500	Butte	$392,497	2,256	2,221	813
06007001600	Butte	$454,191	2,645	3,545	1,397
06007002200	Butte	$272,039	2,318	3,160	1,374
06007002300	Butte	$452,976	2,483	2,837	1,226
06007002500	Butte	$168,559	1,743	2,190	682
06007002900	Butte	$168,964	1,248	3,417	1,212
06007003600	Butte	$170,783	1,401	1,999	679
06009000120	Calaveras	$439,611	2,110	70	28
06011000200	Colusa	$241,016	2,009	5,658	1,923
06011000400	Colusa	$186,787	1,857	2,829	976
06013303200	Contra Costa	$520,547	2,380	14,682	4,831
06013304000	Contra Costa	$558,082	2,682	2,726	980
06013355104	Contra Costa	$1,154,277	3,085	11,362	3,691
06013355106	Contra Costa	$539,420	2,835	5,365	1,584
06013356001	Contra Costa	$378,292	2,464	410	120
06013356002	Contra Costa	$727,407	2,640	2,028	690
06013359203	Contra Costa	$639,325	2,603	2,402	782
06019005503	Fresno	$390,537	3,892	5,600	2,008
06019005511	Fresno	$520,266	2,955	25,501	7,990
06019005515	Fresno	$745,634	3,875	5,839	2,127
06019005902	Fresno	$361,981	2,414	9,759	3,156
06019005903	Fresno	$325,418	2,026	23,866	7,654
06019006401	Fresno	$336,794	2,229	5,379	1,871
06021010200	Glenn	$266,724	1,711	3,346	1,213
06021010502	Glenn	$224,747	2,122	986	345
06031000100	Kings	$289,567	2,085	435	140
06033001100	Lake	$232,448	1,838	1,640	629
06033001200	Lake	$189,552	2,140	2,101	858
06035040100	Lassen	$167,751	2,837	2,564	297

FIPS	County	Median New Home Price	Average Square Feet	Projected Population Increase	New Households
06035040200	Lassen	$180,282	1,996	387	163
06039000102	Madera	$282,198	2,072	1,733	696
06039000105	Madera	$225,329	1,986	11,943	4,512
06039000200	Madera	$251,806	2,307	24,222	3,087
06039000507	Madera	$203,327	1,686	6,952	1,887
06039000508	Madera	$284,385	2,196	4,802	1,233
06039000509	Madera	$246,820	1,836	3,704	1,141
06039001000	Madera	$264,274	2,043	678	194
06043000100	Mariposa	$287,575	1,857	1,853	785
06043000200	Mariposa	$274,983	1,895	1,405	586
06045011100	Mendocino	$400,377	1,781	2,329	1,006
06047000100	Merced	$200,691	1,741	310	102
06047000303	Merced	$79,273	1,343	919	278
06047000400	Merced	$295,165	1,736	4,477	1,440
06047000503	Merced	$220,841	1,638	2,090	625
06047000901	Merced	$188,600	1,431	377	111
06047000903	Merced	$535,107	3,161	640	214
06047001801	Merced	$346,551	1,902	2,684	892
06047001901	Merced	$214,923	1,271	1,818	426
06047001902	Merced	$163,304	1,239	1,983	550
06047002000	Merced	$341,305	2,131	2,640	897
06049000200	Modoc	$129,552	2,009	684	269
06053011301	Monterey	$187,615	1,207	12,224	3,136
06053011400	Monterey	$207,516	1,895	1,486	515
06053013200	Monterey	$1,120,357	4,425	874	334
06053014103	Monterey	$553,777	1,857	5,659	1,892
06055200802	Napa	$476,820	933	909	379
06055201001	Napa	$348,288	2,312	2,754	800
06055201002	Napa	$427,399	1,895	1,795	736
06055201100	Napa	$635,653	2,271	493	185
06055201400	Napa	$925,511	3,609	494	194
06061020902	Placer	$328,492	1,350	3,410	1,196
06061021005	Placer	$595,258	2,833	8,121	2,551
06061021107	Placer	$473,476	2,455	6,125	2,317
06061021301	Placer	$383,955	1,821	32,287	11,455
06061021303	Placer	$529,146	2,022	34,845	11,725
06061021304	Placer	$371,645	2,179	1,306	453
06061021402	Placer	$474,801	1,959	317	105
06063000500	Plumas	$328,428	2,047	994	448
06067007206	Sacramento	$240,308	2,074	1,269	382
06067008005	Sacramento	$534,572	2,506	1,789	656
06067008600	Sacramento	$464,084	2,514	9,248	3,693

FIPS	County	Median New Home Price	Average Square Feet	Projected Population Increase	New Households
06067008701	Sacramento	$450,638	2,209	90,327	37,498
06067008800	Sacramento	$346,657	1,993	3,975	1,591
06067009005	Sacramento	$223,129	1,092	0	0
06067009200	Sacramento	$291,883	1,858	17,093	5,477
06067009315	Sacramento	$637,657	3,201	36,447	11,606
06067009404	Sacramento	$380,438	2,263	1,030	340
06067009406	Sacramento	$352,231	1,932	273	90
06069000800	San Benito	$807,560	2,350	2,525	905
06077004600	San Joaquin	$357,954	2,592	1,049	370
06077004702	San Joaquin	$322,583	2,538	3,963	1,273
06077004800	San Joaquin	$360,668	2,131	127	41
06079010000	San Luis Obispo	$310,099	1,933	5,921	2,362
06079010201	San Luis Obispo	$412,532	2,198	4,616	1,429
06079010300	San Luis Obispo	$397,920	1,303	9,046	3,130
06079012702	San Luis Obispo	$446,977	1,971	4,226	1,604
06083001800	Santa Barbara	$124,351	1,743	767	263
06083001905	Santa Barbara	$911,521	2,160	1,535	587
06083001906	Santa Barbara	$616,912	12,041	2,972	1,083
06089010802	Shasta	$289,904	1,634	18,547	6,996
06089011300	Shasta	$191,808	1,341	766	292
06089011400	Shasta	$387,784	2,181	7,034	2,413
06089011500	Shasta	$285,603	2,374	541	215
06089011900	Shasta	$316,920	2,276	877	316
06089012200	Shasta	$210,487	1,825	2,395	906
06089012602	Shasta	$154,227	1,648	2,922	1,178
06089012701	Shasta	$171,591	1,475	693	286
06089012702	Shasta	$219,289	1,660	2,466	961
06093001200	Siskiyou	$189,377	1,897	0	0
06095252305	Solano	$439,510	2,805	1,499	534
06095252309	Solano	$473,026	2,275	6,572	2,110
06095252402	Solano	$283,045	1,799	1,835	609
06095252502	Solano	$225,615	1,490	1,600	451
06095252609	Solano	$283,631	2,009	1,766	589
06095252702	Solano	$457,774	2,461	3,744	1,285
06095252703	Solano	$383,199	1,730	664	204
06095252706	Solano	$313,713	2,198	341	103
06095252707	Solano	$307,071	3,005	1,018	367
06095252904	Solano	$417,088	1,945	2,810	1,005
06095252907	Solano	$485,051	2,385	4,814	1,574
06095253202	Solano	$450,378	1,968	5,774	1,832
06095253300	Solano	$415,752	2,100	255	77
06095253500	Solano	$366,065	1,619	13,039	5,186

FIPS	County	Median New Home Price	Average Square Feet	Projected Population Increase	New Households
06099000101	Stanislaus	$426,469	2,339	5,990	2,104
06099000102	Stanislaus	$579,854	2,966	6,015	2,028
06099000508	Stanislaus	$362,572	2,123	3,950	1,273
06099002801	Stanislaus	$243,527	1,383	2,832	823
06099002901	Stanislaus	$354,485	2,100	699	231
06103000100	Tehama	$237,883	1,783	819	317
06103000200	Tehama	$200,078	1,625	4,719	1,715
06103000300	Tehama	$241,327	1,887	3,304	1,221
06103000400	Tehama	$274,256	1,942	3,905	1,509
06103000700	Tehama	$243,305	1,405	2,916	1,076
06103000800	Tehama	$150,434	1,543	2,089	718
06103000900	Tehama	$184,728	1,449	1,990	738
06103001000	Tehama	$210,936	1,496	4,009	1,418
06103001100	Tehama	$164,292	1,747	4,174	1,485
06107000100	Tulare	$337,761	1,895	943	368
06107000202	Tulare	$257,105	1,971	608	162
06107000302	Tulare	$116,952	1,668	785	181
06107000600	Tulare	$140,442	1,781	906	195
06107000800	Tulare	$145,735	1,857	4,305	1,171
06107000900	Tulare	$130,682	1,895	2,031	466
06107003100	Tulare	$120,095	1,857	1,819	537
06107003200	Tulare	$125,057	1,857	2,769	675
06107004200	Tulare	$130,351	1,743	2,304	589
06107004300	Tulare	$122,742	1,592	6,293	1,434
06109005201	Tuolumne	$308,771	2,047	3,067	332
06111000100	Ventura	$366,559	2,200	1,017	420
06113010506	Yolo	$763,015	2,312	681	253
06115040901	Yuba	$282,953	2,122	2,435	888
41029001100	Jackson[87]			0	0
41029001301	Jackson			126	47
41029001302	Jackson			91	34
41029001400	Jackson			2	1
41029002700	Jackson			0	0
41029002800	Jackson			0	0
Total				**759,723**	**259,677**

[87] Housing characteristics unavailable for Oregon.

Table IV-2: Market Impacts of Designation

FIPS	County	Projected Housing Units, Group A	Projected Housing Units, Group B	Projected Housing, Total	Change in Housing Units	Pre-Regulation Housing Price	Change in Housing Price
06001441503	Alameda	0	4	1,117	0	$656,521	$157
06001451101	Alameda	19	0	1,571	0	$646,197	$0
06001451201	Alameda	0	0	639	0	$841,386	$0
06001451202	Alameda	306	0	2,693	0	$599,200	$0
06005000301	Amador	0	3	46	0	$204,789	$684
06005000302	Amador	0	5	679	0	$335,293	$144
06007000101	Butte	0	906	3,927	-54	$260,971	$3,613
06007000102	Butte	0	0	908	0	$265,572	$0
06007000201	Butte	0	160	463	-10	$255,669	$5,309
06007000900	Butte	264	3,678	7,032	-221	$311,627	$9,777
06007001400	Butte	0	392	1,532	-23	$456,840	$7,008
06007001500	Butte	35	0	813	0	$392,497	$0
06007001600	Butte	3	235	1,397	-14	$454,191	$4,590
06007002200	Butte	711	87	1,374	-5	$272,039	$1,036
06007002300	Butte	290	0	1,226	0	$452,976	$0
06007002500	Butte	35	6	682	0	$168,559	$89
06007002900	Butte	77	438	1,212	-26	$168,964	$3,663
06007003600	Butte	2	0	679	0	$170,783	$0
06009000120	Calaveras	0	0	28	0	$439,611	$40
06011000200	Colusa	0	0	1,923	0	$241,016	$0
06011000400	Colusa	0	0	976	0	$186,787	$0
06013303200	Contra Costa	6	0	4,831	0	$520,547	$0
06013304000	Contra Costa	80	85	980	-5	$558,082	$2,889
06013355104	Contra Costa	38	32	3,691	-2	$1,154,277	$598
06013355106	Contra Costa	0	0	1,584	0	$539,420	$0
06013356001	Contra Costa	0	11	120	-1	$378,292	$2,116
06013356002	Contra Costa	0	3	690	0	$727,407	$213
06013359203	Contra Costa	0	164	782	-10	$639,325	$8,024
06019005503	Fresno	4	0	2,008	0	$390,537	$0

FIPS	County	Projected Housing Units, Group A	Projected Housing Units, Group B	Projected Housing, Total	Change in Housing Units	Pre-Regulation Housing Price	Change in Housing Price
06019005511	Fresno	1,020	0	7,990	0	$520,266	$0
06019005515	Fresno	1,572	0	2,127	0	$745,634	$0
06019005902	Fresno	381	0	3,156	0	$361,981	$0
06019005903	Fresno	141	0	7,654	0	$325,418	$0
06019006401	Fresno	255	0	1,871	0	$336,794	$0
06021010200	Glenn	6	0	1,213	0	$266,724	$0
06021010502	Glenn	0	0	345	0	$224,747	$0
06031000100	Kings	2	0	140	0	$289,567	$0
06033001100	Lake	47	0	629	0	$232,448	$0
06033001200	Lake	59	0	858	0	$189,552	$0
06035040100	Lassen	0	0	297	0	$167,751	$0
06035040200	Lassen	0	0	163	0	$180,282	$0
06039000102	Madera	97	0	696	0	$282,198	$0
06039000105	Madera	1,496	0	4,512	0	$225,329	$0
06039000200	Madera	58	0	3,087	0	$251,806	$0
06039000507	Madera	734	0	1,887	0	$203,327	$0
06039000508	Madera	194	0	1,233	0	$284,385	$0
06039000509	Madera	694	0	1,141	0	$246,820	$0
06039001000	Madera	21	0	194	0	$264,274	$0
06043000100	Mariposa	4	82	785	-5	$287,575	$1,806
06043000200	Mariposa	2	0	586	0	$274,983	$0
06045011100	Mendocino	0	70	1,006	-4	$400,377	$1,680
06047000100	Merced	8	45	102	-3	$200,691	$5,321
06047000303	Merced	0	0	278	0	$79,273	$1
06047000400	Merced	0	0	1,440	0	$295,165	$3
06047000503	Merced	0	125	625	-7	$220,841	$2,647
06047000901	Merced	3	10	111	-1	$188,600	$1,006
06047000903	Merced	0	64	214	-4	$535,107	$9,621
06047001801	Merced	0	86	892	-5	$346,551	$1,998
06047001901	Merced	0	265	426	-16	$214,923	$8,009

FIPS	County	Projected Housing Units, Group A	Projected Housing Units, Group B	Projected Housing, Total	Change in Housing Units	Pre-Regulation Housing Price	Change in Housing Price
06047001902	Merced	147	103	550	-6	$163,304	$1,838
06047002000	Merced	0	19	897	-1	$341,305	$430
06049000200	Modoc	1	0	269	0	$129,552	$0
06053011301	Monterey	239	0	3,136	0	$187,615	$0
06053011400	Monterey	15	0	515	0	$207,516	$0
06053013200	Monterey	0	0	334	0	$1,120,357	$11
06053014103	Monterey	0	677	1,892	-41	$553,777	$11,887
06055200802	Napa	0	0	379	0	$476,820	$0
06055201001	Napa	94	3	800	0	$348,288	$70
06055201002	Napa	1	22	736	-1	$427,399	$755
06055201100	Napa	0	0	185	0	$635,653	$0
06055201400	Napa	0	2	194	0	$925,511	$552
06061020902	Placer	148	0	1,196	0	$328,492	$0
06061021005	Placer	101	0	2,551	0	$595,258	$0
06061021107	Placer	161	0	2,317	0	$473,476	$0
06061021301	Placer	4,532	0	11,455	0	$383,955	$0
06061021303	Placer	1,788	0	11,725	0	$529,146	$0
06061021304	Placer	20	0	453	0	$371,645	$0
06061021402	Placer	28	0	105	0	$474,801	$0
06063000500	Plumas	3	0	448	0	$328,428	$0
06067007206	Sacramento	8	0	382	0	$240,308	$0
06067008005	Sacramento	0	0	656	0	$534,572	$0
06067008600	Sacramento	523	408	3,693	-24	$464,084	$3,075
06067008701	Sacramento	1,158	11,811	37,498	-709	$450,638	$8,515
06067008800	Sacramento	503	56	1,591	-3	$346,657	$734
06067009005	Sacramento	0	0	0	0	$223,129	$0
06067009200	Sacramento	0	1,104	5,477	-66	$291,883	$3,528
06067009315	Sacramento	178	653	11,606	-39	$637,657	$2,151
06067009404	Sacramento	28	104	340	-6	$380,438	$6,986
06067009406	Sacramento	2	18	90	-1	$352,231	$4,205

FIPS	County	Projected Housing Units, Group A	Projected Housing Units, Group B	Projected Housing, Total	Change in Housing Units	Pre-Regulation Housing Price	Change in Housing Price
06069000800	San Benito	109	0	905	0	$807,560	$0
06077004600	San Joaquin	10	0	370	0	$357,954	$0
06077004702	San Joaquin	14	0	1,273	0	$322,583	$0
06077004800	San Joaquin	5	0	41	0	$360,668	$0
06079010000	San Luis Obispo	109	0	2,362	0	$310,099	$0
06079010201	San Luis Obispo	542	0	1,429	0	$412,532	$0
06079010300	San Luis Obispo	634	0	3,130	0	$397,920	$0
06079012702	San Luis Obispo	5	0	1,604	0	$446,977	$0
06083001800	Santa Barbara	13	0	263	0	$124,351	$0
06083001905	Santa Barbara	40	0	587	0	$911,521	$0
06083001906	Santa Barbara	57	0	1,083	0	$616,912	$0
06089010802	Shasta	896	0	6,996	0	$289,904	$0
06089011300	Shasta	154	0	292	0	$191,808	$0
06089011400	Shasta	445	0	2,413	0	$387,784	$0
06089011500	Shasta	83	0	215	0	$285,603	$0
06089011900	Shasta	99	0	316	0	$316,920	$0
06089012200	Shasta	0	0	906	0	$210,487	$0
06089012602	Shasta	25	0	1,178	0	$154,227	$0
06089012701	Shasta	6	0	286	0	$171,591	$0
06089012702	Shasta	1	0	961	0	$219,289	$0
06093001200	Siskiyou	0	0	0	0	$189,377	$0
06095252305	Solano	0	5	534	0	$439,510	$250
06095252309	Solano	97	1,104	2,110	-66	$473,026	$14,847
06095252402	Solano	0	174	609	-10	$283,045	$4,860
06095252502	Solano	0	503	451	-30	$225,615	$15,098
06095252609	Solano	0	0	589	0	$283,631	$0
06095252702	Solano	172	179	1,285	-11	$457,774	$3,831
06095252703	Solano	62	0	204	0	$383,199	$0
06095252706	Solano	0	90	103	-5	$313,713	$16,365
06095252707	Solano	0	11	367	-1	$307,071	$560

FIPS	County	Projected Housing Units, Group A	Projected Housing Units, Group B	Projected Housing, Total	Change in Housing Units	Pre-Regulation Housing Price	Change in Housing Price
06095252904	Solano	90	0	1,005	0	$417,088	$0
06095252907	Solano	4	240	1,574	-14	$485,051	$4,429
06095253202	Solano	389	0	1,832	0	$450,378	$0
06095253300	Solano	1	0	77	0	$415,752	$0
06095253500	Solano	1,203	900	5,186	-54	$366,065	$3,812
06099000101	Stanislaus	3	447	2,104	-27	$426,469	$5,437
06099000102	Stanislaus	1	574	2,028	-34	$579,854	$9,850
06099000508	Stanislaus	0	20	1,273	-1	$362,572	$349
06099002801	Stanislaus	6	356	823	-21	$243,527	$6,309
06099002901	Stanislaus	1	30	231	-2	$354,485	$2,767
06103000100	Tehama	48	4	317	0	$237,883	$167
06103000200	Tehama	37	0	1,715	0	$200,078	$0
06103000300	Tehama	153	0	1,221	0	$241,327	$0
06103000400	Tehama	74	0	1,509	0	$274,256	$0
06103000700	Tehama	464	0	1,076	0	$243,305	$0
06103000800	Tehama	135	0	718	0	$150,434	$0
06103000900	Tehama	87	362	738	-22	$184,728	$5,444
06103001000	Tehama	2	0	1,418	0	$210,936	$0
06103001100	Tehama	568	0	1,485	0	$164,292	$0
06107000100	Tulare	23	0	368	0	$337,761	$0
06107000202	Tulare	0	0	162	0	$257,105	$0
06107000302	Tulare	9	0	181	0	$116,952	$0
06107000600	Tulare	8	0	195	0	$140,442	$0
06107000800	Tulare	15	0	1,171	0	$145,735	$0
06107000900	Tulare	44	0	466	0	$130,682	$0
06107003100	Tulare	14	0	537	0	$120,095	$0
06107003200	Tulare	21	0	675	0	$125,057	$0
06107004200	Tulare	1	0	589	0	$130,351	$0
06107004300	Tulare	75	0	1,434	0	$122,742	$0
06109005201	Tuolumne	5	6	332	0	$308,771	$332

FIPS	County	Projected Housing Units, Group A	Projected Housing Units, Group B	Projected Housing, Total	Change in Housing Units	Pre-Regulation Housing Price	Change in Housing Price
06111000100	Ventura	0	34	420	-2	$366,559	$1,758
06113010506	Yolo	0	4	253	0	$763,015	$747
06115040901	Yuba	26	0	888	0	$282,953	$0
41029001100	Jackson	0	0	0	0		$0
41029001301	Jackson	47	0	126	0		$0
41029001302	Jackson	34	0	91	0		$0
41029001400	Jackson	1	0	2	0		$0
41029002700	Jackson	0	0	0	0		$0
41029002800	Jackson	0	0	0	0		$0
Total		**25,509**	**26,978**	**259,814**	**-1,618**		

Table IV-3: Welfare Impacts of Designation

FIPS	County	Surplus Lost	Annualized Impacts
06001441503	Alameda	$196,607	$17,344
06001451101	Alameda	$295,421	$26,061
06001451201	Alameda	$0	$0
06001451202	Alameda	$4,611,495	$406,815
06005000301	Amador	$78,439	$6,920
06005000302	Amador	$108,685	$9,588
06007000101	Butte	$16,364,906	$1,443,674
06007000102	Butte	$0	$0
06007000201	Butte	$3,027,735	$267,100
06007000900	Butte	$88,974,848	$7,849,156
06007001400	Butte	$11,405,310	$1,006,150
06007001500	Butte	$461,745	$40,734
06007001600	Butte	$5,914,213	$521,738
06007002200	Butte	$8,825,428	$778,559
06007002300	Butte	$3,923,512	$346,123
06007002500	Butte	$408,947	$36,076
06007002900	Butte	$6,042,183	$533,027
06007003600	Butte	$16,671	$1,471
06009000120	Calaveras	$2,873	$253
06011000200	Colusa	$0	$0
06011000400	Colusa	$0	$0
06013303200	Contra Costa	$69,695	$6,148
06013304000	Contra Costa	$2,957,001	$260,860
06013355104	Contra Costa	$2,988,807	$263,666
06013355106	Contra Costa	$4,733	$418
06013356001	Contra Costa	$155,590	$13,726
06013356002	Contra Costa	$124,308	$10,966
06013359203	Contra Costa	$4,772,730	$421,039
06019005503	Fresno	$37,504	$3,309
06019005511	Fresno	$13,001,144	$1,146,931
06019005515	Fresno	$22,912,350	$2,021,275
06019005902	Fresno	$3,582,749	$316,062
06019005903	Fresno	$1,301,505	$114,816
06019006401	Fresno	$2,111,814	$186,299
06021010200	Glenn	$62,969	$5,555
06021010502	Glenn	$0	$0
06031000100	Kings	$18,943	$1,671

FIPS	County	Surplus Lost	Annualized Impacts
06033001100	Lake	$460,436	$40,619
06033001200	Lake	$412,029	$36,348
06035040100	Lassen	$0	$0
06035040200	Lassen	$0	$0
06039000102	Madera	$994,380	$87,722
06039000105	Madera	$12,117,652	$1,068,991
06039000200	Madera	$1,084,857	$95,704
06039000507	Madera	$7,595,144	$670,026
06039000508	Madera	$2,353,787	$207,646
06039000509	Madera	$7,290,191	$643,124
06039001000	Madera	$246,022	$21,704
06043000100	Mariposa	$1,661,922	$146,611
06043000200	Mariposa	$19,340	$1,706
06045011100	Mendocino	$1,992,384	$175,764
06047000100	Merced	$730,656	$64,457
06047000303	Merced	$482	$43
06047000400	Merced	$5,968	$527
06047000503	Merced	$2,012,984	$177,581
06047000901	Merced	$182,481	$16,098
06047000903	Merced	$2,323,294	$204,956
06047001801	Merced	$2,108,718	$186,026
06047001901	Merced	$5,759,870	$508,122
06047001902	Merced	$2,566,309	$226,394
06047002000	Merced	$426,248	$37,603
06049000200	Modoc	$4,412	$389
06053011301	Monterey	$2,258,272	$199,220
06053011400	Monterey	$112,543	$9,928
06053013200	Monterey	$2,244	$198
06053014103	Monterey	$26,854,790	$2,369,068
06055200802	Napa	$0	$0
06055201001	Napa	$1,162,912	$102,589
06055201002	Napa	$586,196	$51,713
06055201100	Napa	$1,376	$121
06055201400	Napa	$125,270	$11,051
06061020902	Placer	$2,462,844	$217,266
06061021005	Placer	$2,143,530	$189,097
06061021107	Placer	$2,593,563	$228,798
06061021301	Placer	$74,583,712	$6,579,603

FIPS	County	Surplus Lost	Annualized Impacts
06061021303	Placer	$37,184,144	$3,280,299
06061021304	Placer	$322,353	$28,437
06061021402	Placer	$552,806	$48,767
06063000500	Plumas	$38,974	$3,438
06067007206	Sacramento	$72,942	$6,435
06067008005	Sacramento	$0	$0
06067008600	Sacramento	$16,254,806	$1,433,961
06067008701	Sacramento	$304,224,384	$26,837,972
06067008800	Sacramento	$5,781,398	$510,022
06067009005	Sacramento	$0	$0
06067009200	Sacramento	$21,195,492	$1,869,817
06067009315	Sacramento	$24,236,570	$2,138,094
06067009404	Sacramento	$2,240,921	$197,689
06067009406	Sacramento	$311,550	$27,484
06069000800	San Benito	$2,560,372	$225,870
06077004600	San Joaquin	$91,315	$8,056
06077004702	San Joaquin	$118,815	$10,482
06077004800	San Joaquin	$49,089	$4,331
06079010000	San Luis Obispo	$1,020,303	$90,009
06079010201	San Luis Obispo	$6,413,119	$565,751
06079010300	San Luis Obispo	$7,036,744	$620,765
06079012702	San Luis Obispo	$60,481	$5,336
06083001800	Santa Barbara	$43,395	$3,828
06083001905	Santa Barbara	$969,996	$85,571
06083001906	Santa Barbara	$929,006	$81,955
06089010802	Shasta	$10,167,456	$896,949
06089011300	Shasta	$1,282,321	$113,123
06089011400	Shasta	$6,053,673	$534,041
06089011500	Shasta	$878,916	$77,536
06089011900	Shasta	$1,052,139	$92,817
06089012200	Shasta	$0	$0
06089012602	Shasta	$173,961	$15,346
06089012701	Shasta	$42,154	$3,719
06089012702	Shasta	$12,282	$1,083
06093001200	Siskiyou	$0	$0
06095252305	Solano	$101,044	$8,914
06095252309	Solano	$28,771,992	$2,538,199
06095252402	Solano	$1,912,869	$168,749

FIPS	County	Surplus Lost	Annualized Impacts
06095252502	Solano	$7,993,725	$705,188
06095252609[88]	Solano		
06095252702	Solano	$6,180,205	$545,203
06095252703	Solano	$714,879	$63,065
06095252706	Solano	$1,737,134	$153,246
06095252707	Solano	$207,615	$18,315
06095252904	Solano	$1,039,890	$91,737
06095252907	Solano	$6,210,481	$547,874
06095253202	Solano	$4,948,575	$436,552
06095253300	Solano	$6,380	$563
06095253500	Solano	$27,448,252	$2,421,421
06099000101	Stanislaus	$9,925,463	$875,601
06099000102	Stanislaus	$16,931,104	$1,493,623
06099000508	Stanislaus	$374,375	$33,027
06099002801	Stanislaus	$5,394,705	$475,908
06099002901	Stanislaus	$560,343	$49,432
06103000100	Tehama	$462,677	$40,816
06103000200	Tehama	$331,791	$29,270
06103000300	Tehama	$1,443,258	$127,321
06103000400	Tehama	$730,181	$64,415
06103000700	Tehama	$4,825,011	$425,651
06103000800	Tehama	$1,038,598	$91,623
06103000900	Tehama	$5,359,834	$472,832
06103001000	Tehama	$18,261	$1,611
06103001100	Tehama	$4,566,380	$402,835
06107000100	Tulare	$264,097	$23,298
06107000202	Tulare	$284	$25
06107000302	Tulare	$76,448	$6,744
06107000600	Tulare	$80,589	$7,109
06107000800	Tulare	$117,823	$10,394
06107000900	Tulare	$373,869	$32,982
06107003100	Tulare	$89,185	$7,868
06107003200	Tulare	$163,792	$14,449
06107004200	Tulare	$4,430	$391
06107004300	Tulare	$653,152	$57,620

[88] Tract was already completely urbanized in 2004.

FIPS	County	Surplus Lost	Annualized Impacts
06109005201	Tuolumne	$406,103	$35,825
06111000100	Ventura	$743,051	$65,550
06113010506	Yolo	$228,443	$20,153
06115040901	Yuba	$396,585	$34,986
41029001100	Jackson	$0	$0
41029001301	Jackson	$705,709	$62,256
41029001302	Jackson	$509,678	$44,963
41029001400	Jackson	$11,202	$988
41029002700	Jackson	$0	$0
41029002800	Jackson	$0	$0
Total		**$965,429,015**	**$85,166,927**

Table IV-4: Descending Welfare Impacts of Designation

FIPS	County	Surplus Lost
06067008701	Sacramento	$304,224,384
06007000900	Butte	$88,974,848
06061021301	Placer	$74,583,712
06061021303	Placer	$37,184,144
06095252309	Solano	$28,771,992
06095253500	Solano	$27,448,252
06053014103	Monterey	$26,854,790
06067009315	Sacramento	$24,236,570
06019005515	Fresno	$22,912,350
06067009200	Sacramento	$21,195,492
06099000102	Stanislaus	$16,931,104
06007000101	Butte	$16,364,906
06067008600	Sacramento	$16,254,806
06019005511	Fresno	$13,001,144
06039000105	Madera	$12,117,652
06007001400	Butte	$11,405,310
06089010802	Shasta	$10,167,456
06099000101	Stanislaus	$9,925,463
06007002200	Butte	$8,825,428
06095252502	Solano	$7,993,725
06039000507	Madera	$7,595,144
06039000509	Madera	$7,290,191
06079010300	San Luis Obispo	$7,036,744
06079010201	San Luis Obispo	$6,413,119
06095252907	Solano	$6,210,481
06095252702	Solano	$6,180,205
06089011400	Shasta	$6,053,673
06007002900	Butte	$6,042,183
06007001600	Butte	$5,914,213
06067008800	Sacramento	$5,781,398
06047001901	Merced	$5,759,870
06099002801	Stanislaus	$5,394,705
06103000900	Tehama	$5,359,834
06095253202	Solano	$4,948,575
06103000700	Tehama	$4,825,011
06013359203	Contra Costa	$4,772,730
06001451202	Alameda	$4,611,495
06103001100	Tehama	$4,566,380
06007002300	Butte	$3,923,512
06019005902	Fresno	$3,582,749
06007000201	Butte	$3,027,735
06013355104	Contra Costa	$2,988,807

FIPS	County	Surplus Lost
06013304000	Contra Costa	$2,957,001
06061021107	Placer	$2,593,563
06047001902	Merced	$2,566,309
06069000800	San Benito	$2,560,372
06061020902	Placer	$2,462,844
06039000508	Madera	$2,353,787
06047000903	Merced	$2,323,294
06053011301	Monterey	$2,258,272
06067009404	Sacramento	$2,240,921
06061021005	Placer	$2,143,530
06019006401	Fresno	$2,111,814
06047001801	Merced	$2,108,718
06047000503	Merced	$2,012,984
06045011100	Mendocino	$1,992,384
06095252402	Solano	$1,912,869
06095252706	Solano	$1,737,134
06043000100	Mariposa	$1,661,922
06103000300	Tehama	$1,443,258
06019005903	Fresno	$1,301,505
06089011300	Shasta	$1,282,321
06055201001	Napa	$1,162,912
06039000200	Madera	$1,084,857
06089011900	Shasta	$1,052,139
06095252904	Solano	$1,039,890
06103000800	Tehama	$1,038,598
06079010000	San Luis Obispo	$1,020,303
06039000102	Madera	$994,380
06083001905	Santa Barbara	$969,996
06083001906	Santa Barbara	$929,006
06089011500	Shasta	$878,916
06111000100	Ventura	$743,051
06047000100	Merced	$730,656
06103000400	Tehama	$730,181
06095252703	Solano	$714,879
41029001301	Jackson	$705,709
06107004300	Tulare	$653,152
06055201002	Napa	$586,196
06099002901	Stanislaus	$560,343
06061021402	Placer	$552,806
41029001302	Jackson	$509,678
06103000100	Tehama	$462,677
06007001500	Butte	$461,745
06033001100	Lake	$460,436

FIPS	County	Surplus Lost
06047002000	Merced	$426,248
06033001200	Lake	$412,029
06007002500	Butte	$408,947
06109005201	Tuolumne	$406,103
06115040901	Yuba	$396,585
06099000508	Stanislaus	$374,375
06107000900	Tulare	$373,869
06103000200	Tehama	$331,791
06061021304	Placer	$322,353
06067009406	Sacramento	$311,550
06001451101	Alameda	$295,421
06107000100	Tulare	$264,097
06039001000	Madera	$246,022
06113010506	Yolo	$228,443
06095252707	Solano	$207,615
06001441503	Alameda	$196,607
06047000901	Merced	$182,481
06089012602	Shasta	$173,961
06107003200	Tulare	$163,792
06013356001	Contra Costa	$155,590
06055201400	Napa	$125,270
06013356002	Contra Costa	$124,308
06077004702	San Joaquin	$118,815
06107000800	Tulare	$117,823
06053011400	Monterey	$112,543
06005000302	Amador	$108,685
06095252305	Solano	$101,044
06077004600	San Joaquin	$91,315
06107003100	Tulare	$89,185
06107000600	Tulare	$80,589
06005000301	Amador	$78,439
06107000302	Tulare	$76,448
06067007206	Sacramento	$72,942
06013303200	Contra Costa	$69,695
06021010200	Glenn	$62,969
06079012702	San Luis Obispo	$60,481
06077004800	San Joaquin	$49,089
06083001800	Santa Barbara	$43,395
06089012701	Shasta	$42,154
06063000500	Plumas	$38,974
06019005503	Fresno	$37,504
06043000200	Mariposa	$19,340
06031000100	Kings	$18,943

FIPS	County	Surplus Lost
06103001000	Tehama	$18,261
06007003600	Butte	$16,671
06089012702	Shasta	$12,282
41029001400	Jackson	$11,202
06095253300	Solano	$6,380
06047000400	Merced	$5,968
06013355106	Contra Costa	$4,733
06107004200	Tulare	$4,430
06049000200	Modoc	$4,412
06009000120	Calaveras	$2,873
06053013200	Monterey	$2,244
06055201100	Napa	$1,376
06047000303	Merced	$482
06107000202	Tulare	$284
06001451201	Alameda	$0
06007000102	Butte	$0
06011000200	Colusa	$0
06011000400	Colusa	$0
06021010502	Glenn	$0
06035040100	Lassen	$0
06035040200	Lassen	$0
06055200802	Napa	$0
06067008005	Sacramento	$0
06089012200	Shasta	$0
41029001100	Jackson	$0
41029002700	Jackson	$0
41029002800	Jackson	$0
06067009005	Sacramento	$0
06093001200	Siskiyou	$0
06095252609	Solano	
Total		**$965,429,015**

Table IV-5: County-Level Welfare Impacts

County	Surplus Lost	Aggregate Household Income[89]	Percent Impacts
	(1)	(2)	(1)/(2)
Sacramento	$374,318,063	$29,251,435,190	1.3%
Butte	$145,365,498	$4,037,796,165	3.6%
Placer	$119,842,952	$7,885,833,705	1.5%
Solano	$87,273,040	$9,634,592,590	0.9%
Fresno	$42,947,066	$13,941,010,815	0.3%
Stanislaus	$33,185,991	$8,592,010,640	0.4%
Madera	$31,682,033	$2,000,722,390	1.6%
Monterey	$29,227,849	$8,912,372,005	0.3%
Shasta	$19,662,901	$3,300,896,980	0.6%
Tehama	$18,775,990	$1,005,212,010	1.9%
Merced	$16,117,011	$3,395,643,985	0.5%
San Luis Obispo	$14,530,647	$5,923,985,685	0.2%
Contra Costa	$11,072,864	$33,142,504,810	0.0%
Alameda	$5,103,523	$43,748,171,315	0.0%
San Benito	$2,560,372	$1,259,625,130	0.2%
Mendocino	$1,992,384	$1,897,817,975	0.1%
Santa Barbara	$1,942,397	$10,346,429,480	0.0%
Napa	$1,875,754	$3,705,704,915	0.1%
Tulare	$1,823,668	$5,834,502,460	0.0%
Mariposa	$1,681,262	$339,346,600	0.5%
Jackson	$1,226,589	$4,010,915,260	0.0%
Lake	$872,465	$1,097,680,635	0.1%
Ventura	$743,051	$21,038,425,910	0.0%
Tuolumne	$406,103	$1,207,784,510	0.0%
Yuba	$396,585	$956,250,415	0.0%
San Joaquin	$259,220	$11,038,363,665	0.0%
Yolo	$228,443	$3,682,320,355	0.0%
Amador	$187,124	$802,631,575	0.0%
Glenn	$62,969	$421,040,760	0.0%
Plumas	$38,974	$461,727,990	0.0%
Kings	$18,943	$1,928,563,340	0.0%
Modoc	$4,412	$183,189,940	0.0%
Calaveras	$2,873	$994,743,790	0.0%
Colusa	$0	$314,948,545	0.0%
Lassen	$0	$492,114,670	0.0%
Siskiyou	$0	$886,416,435	0.0%
Total	**$965,429,015**	**$247,672,732,640**	**0.4%**

[89] Source: 2000 Census. Figures have been inflated to 2005 dollars using the consumer price index.

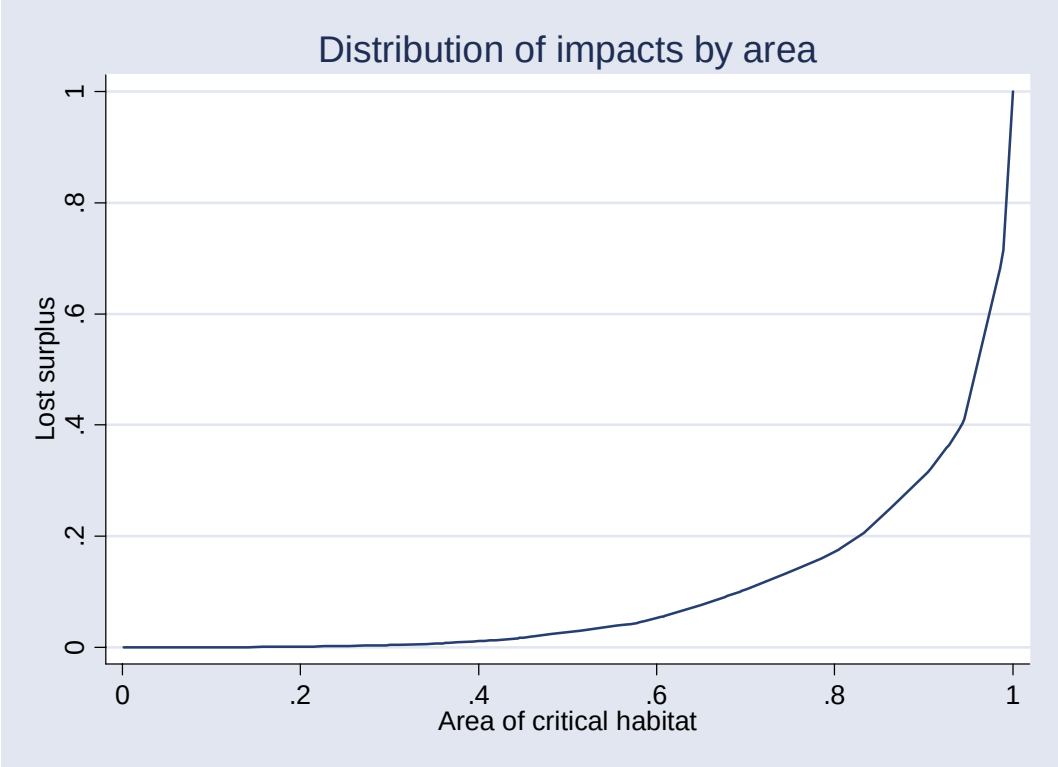

Figure 1: Distribution of Impacts

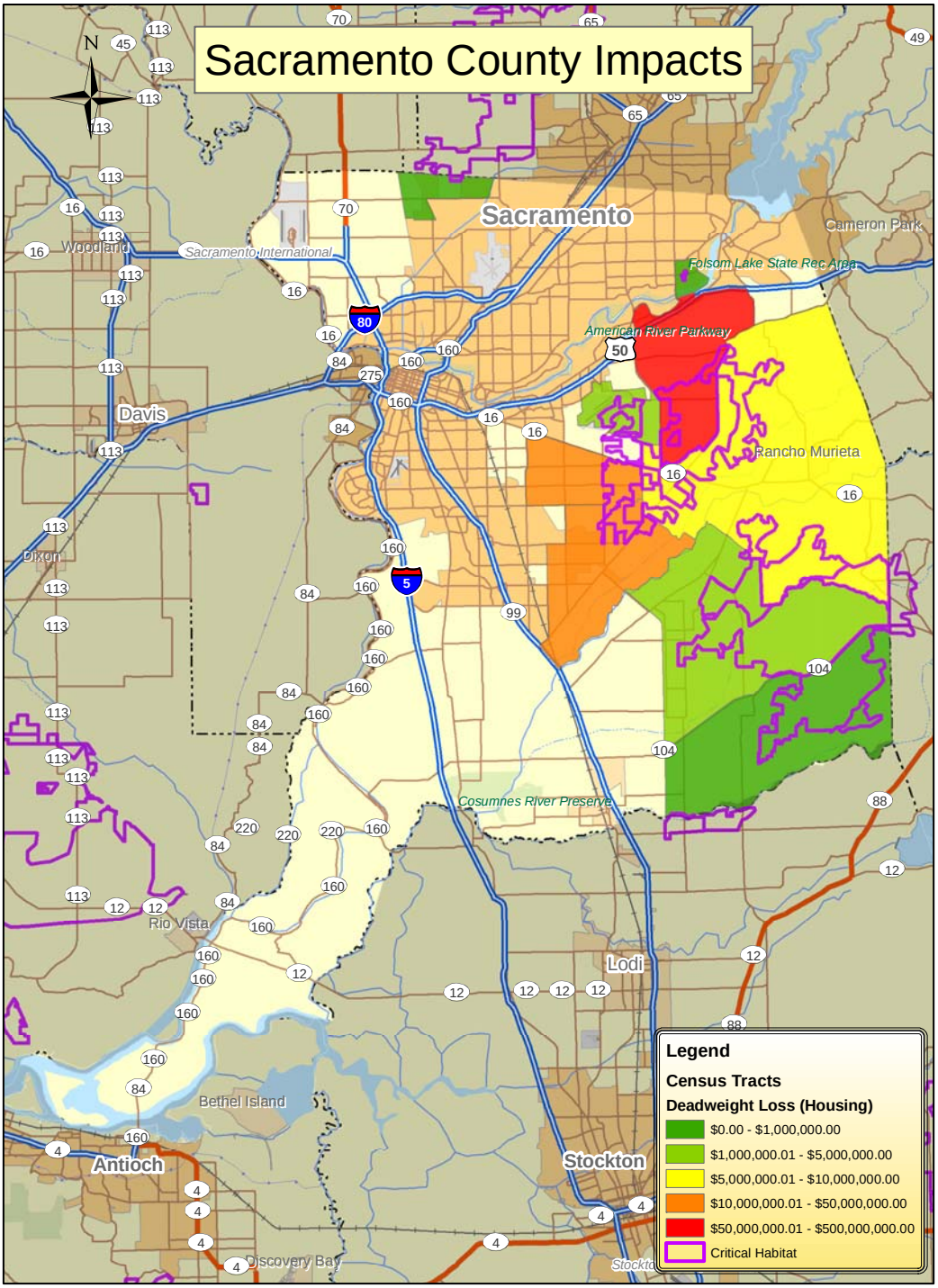

Figure 2: Sacramento County Impacts

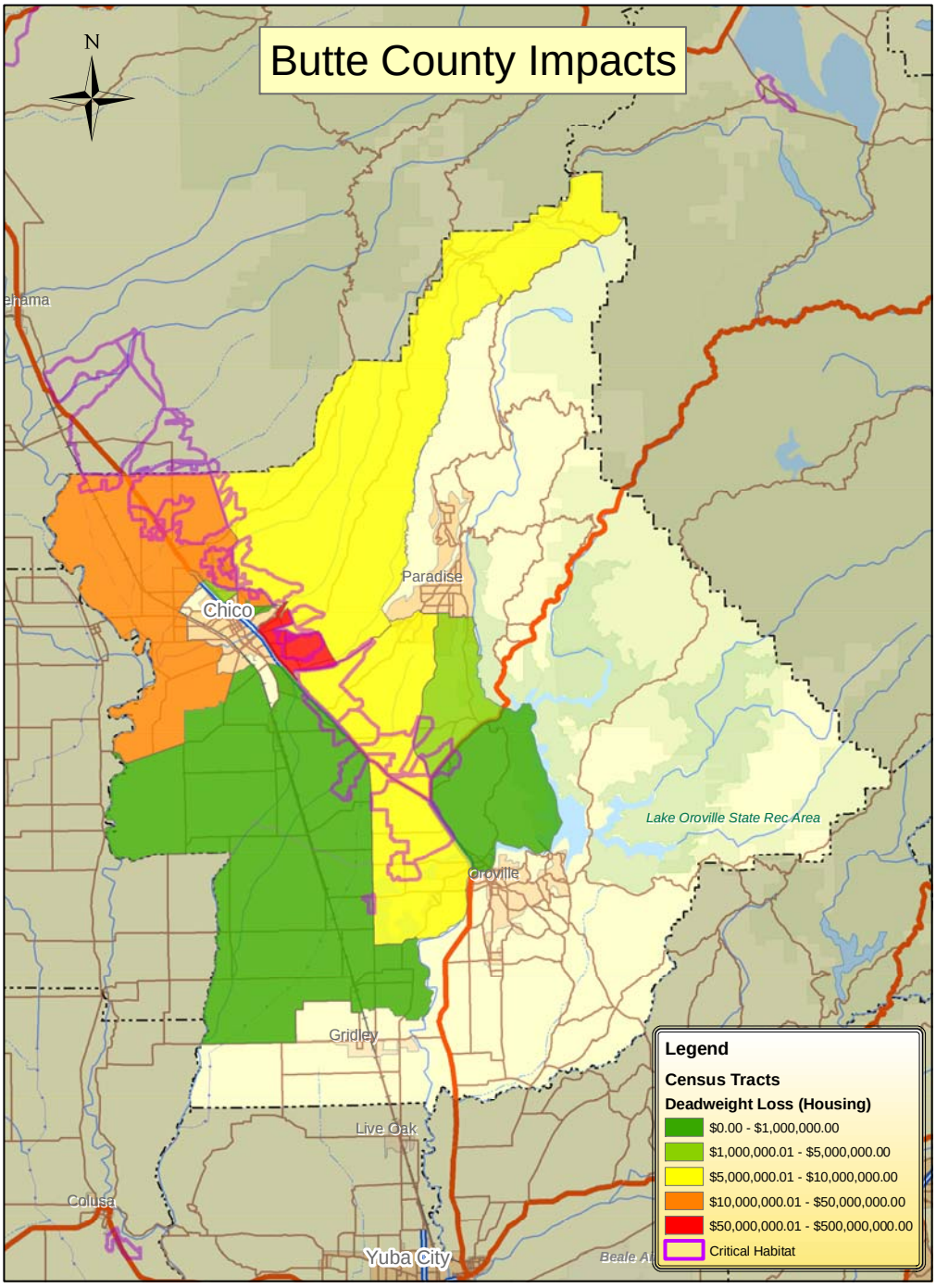

Figure 3: Butte County Impacts

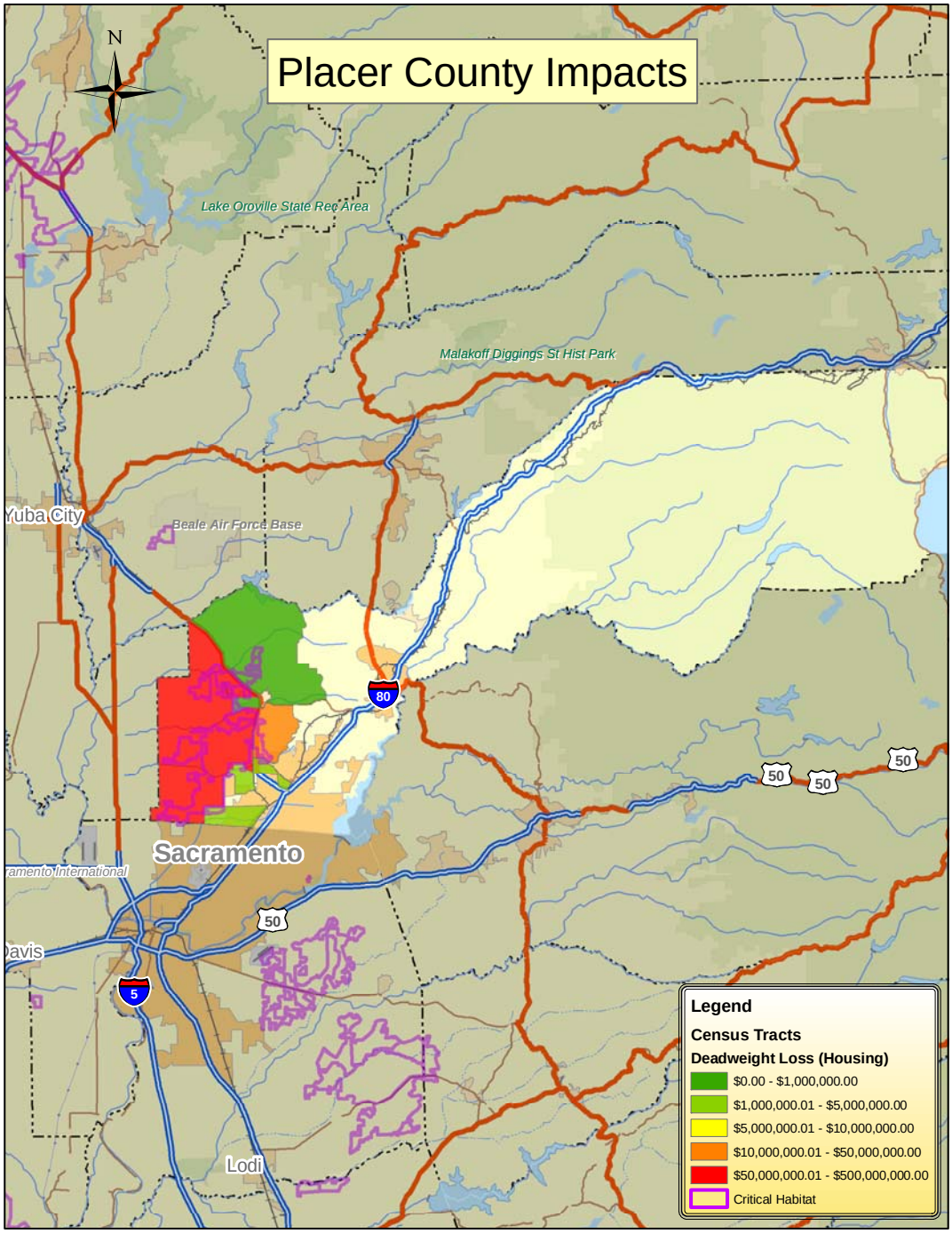

Figure 4: Placer County Impacts

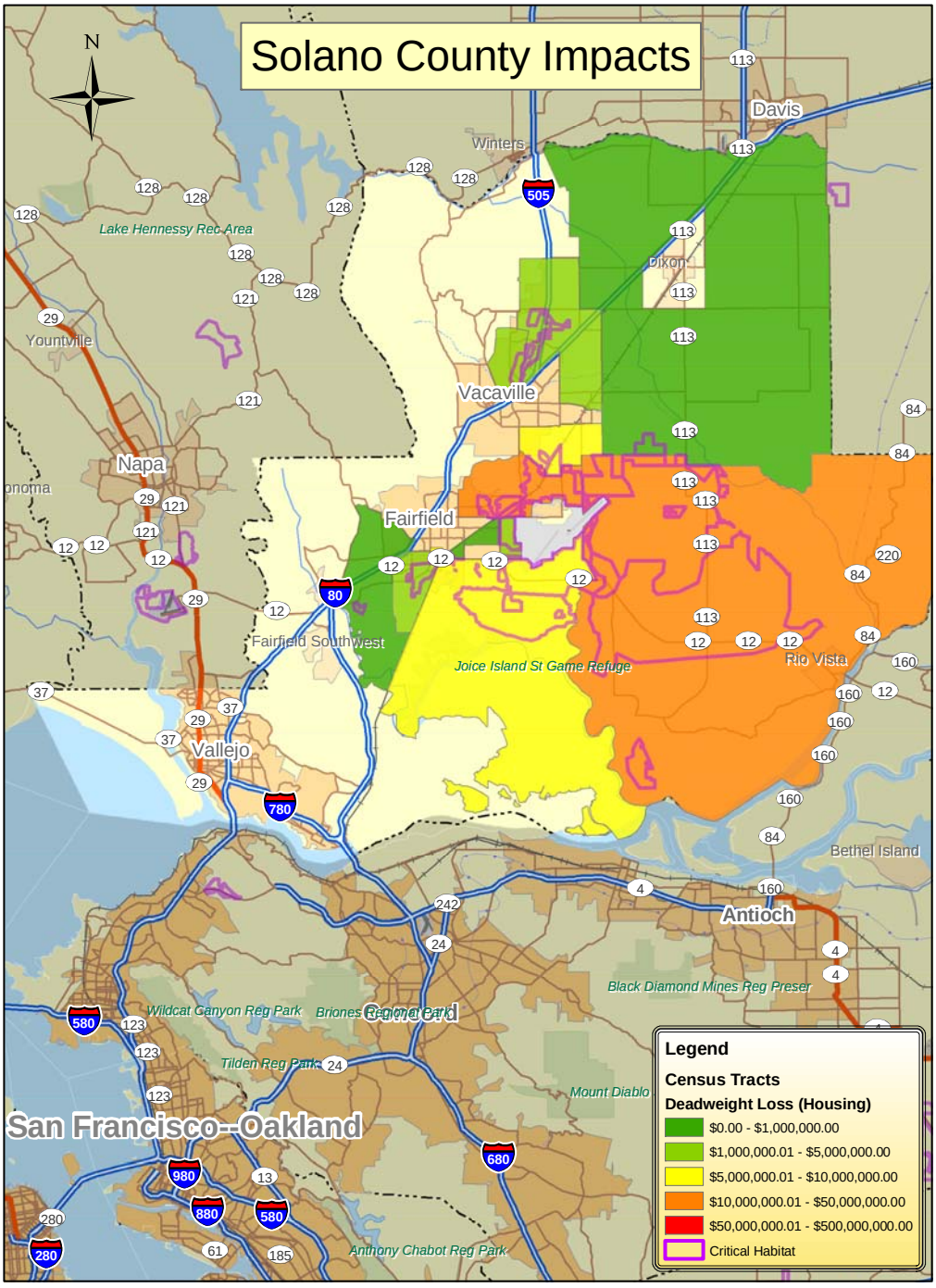

Figure 5: Solano County Impacts

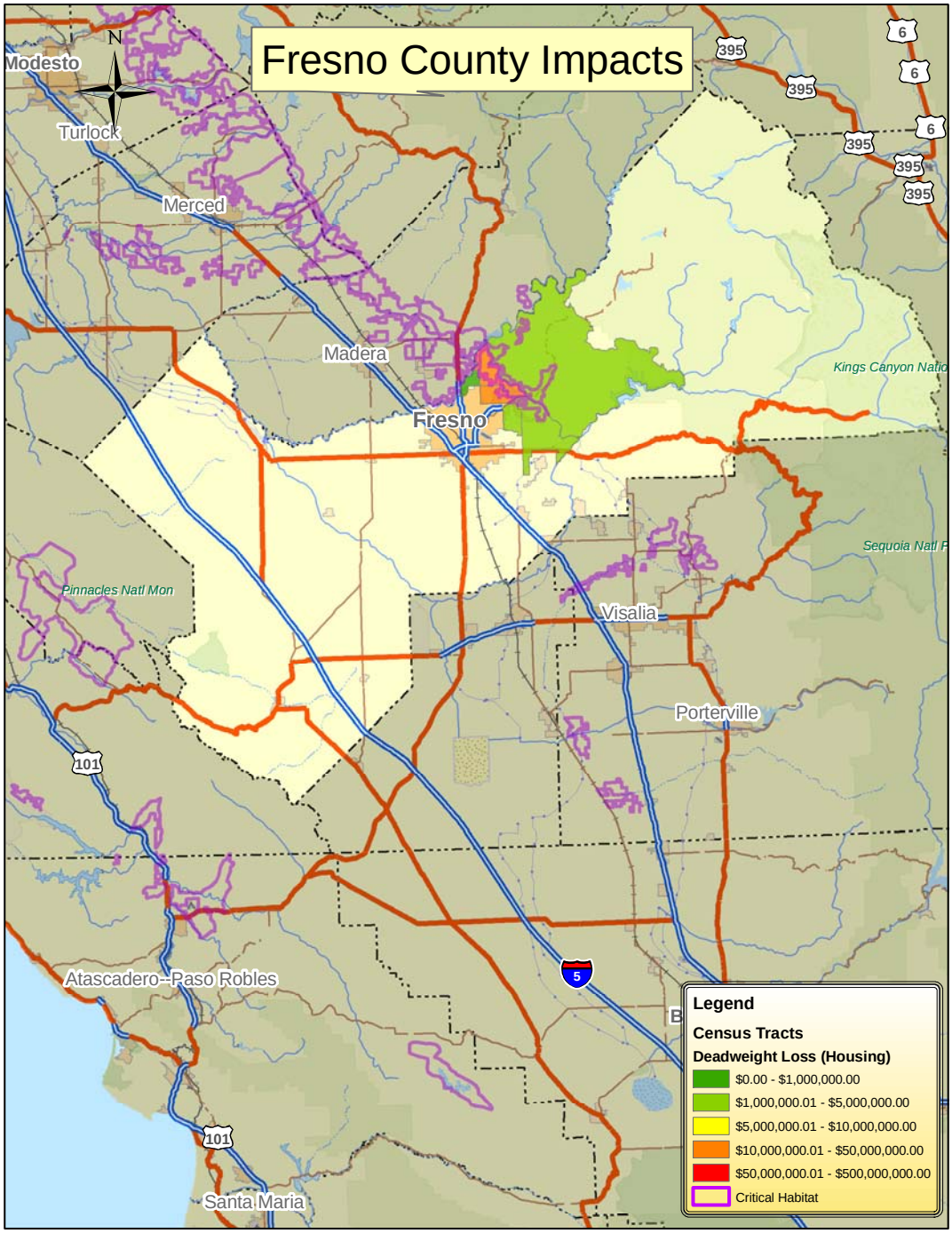

Figure 6: Fresno County Impacts

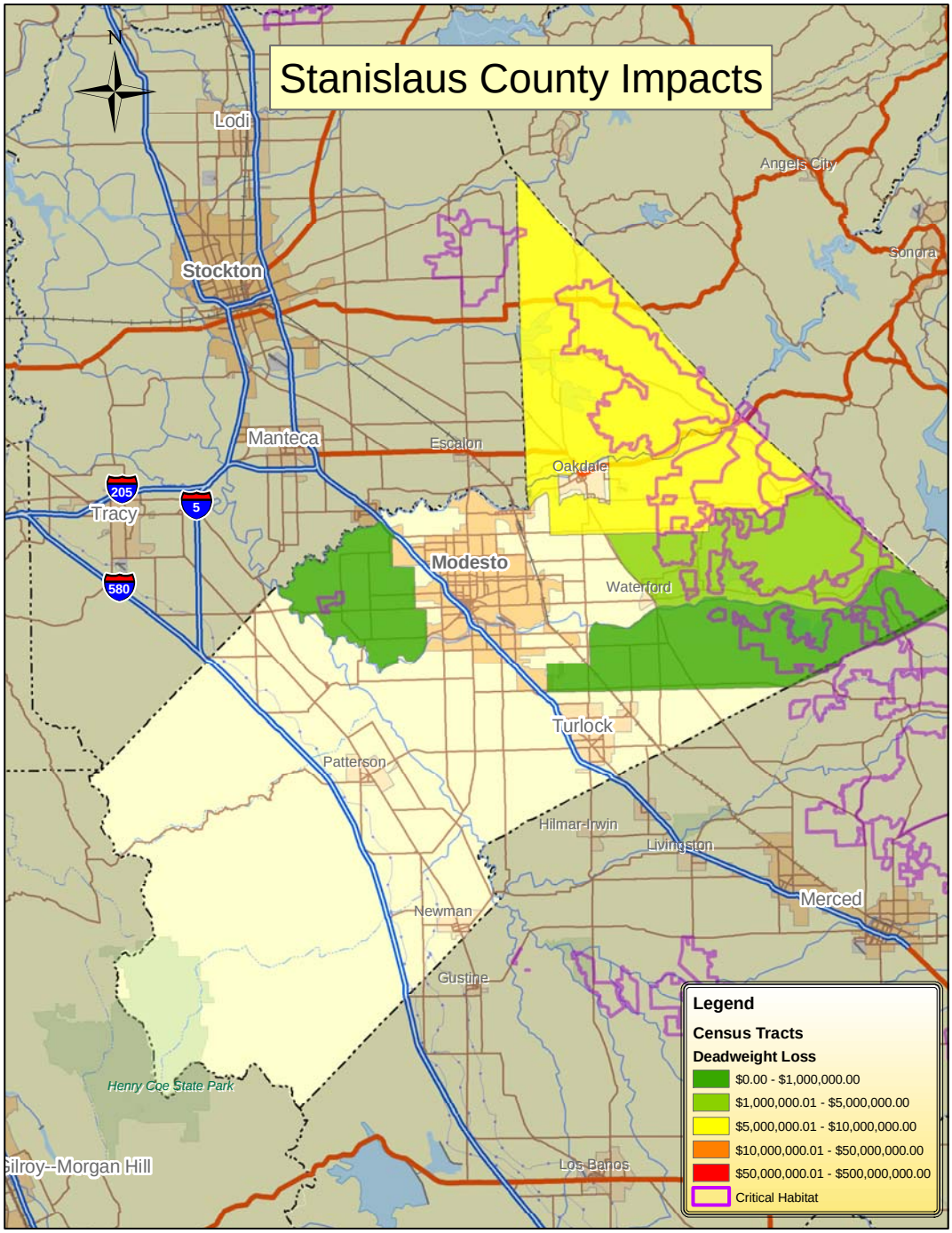

Figure 7: Stanislaus County Impacts

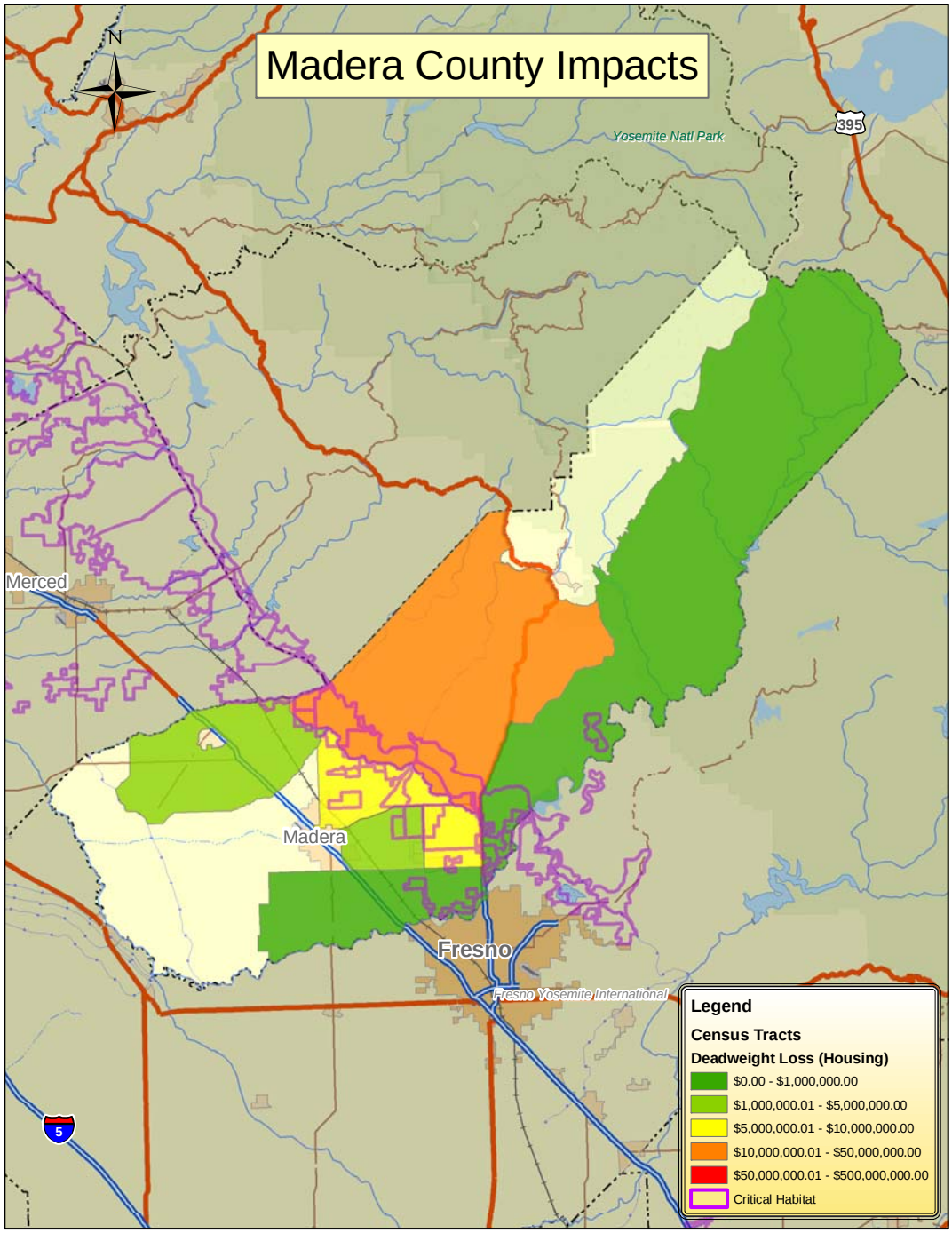

Figure 8: Madera County Impacts

Figure 9: Monterey County Impacts

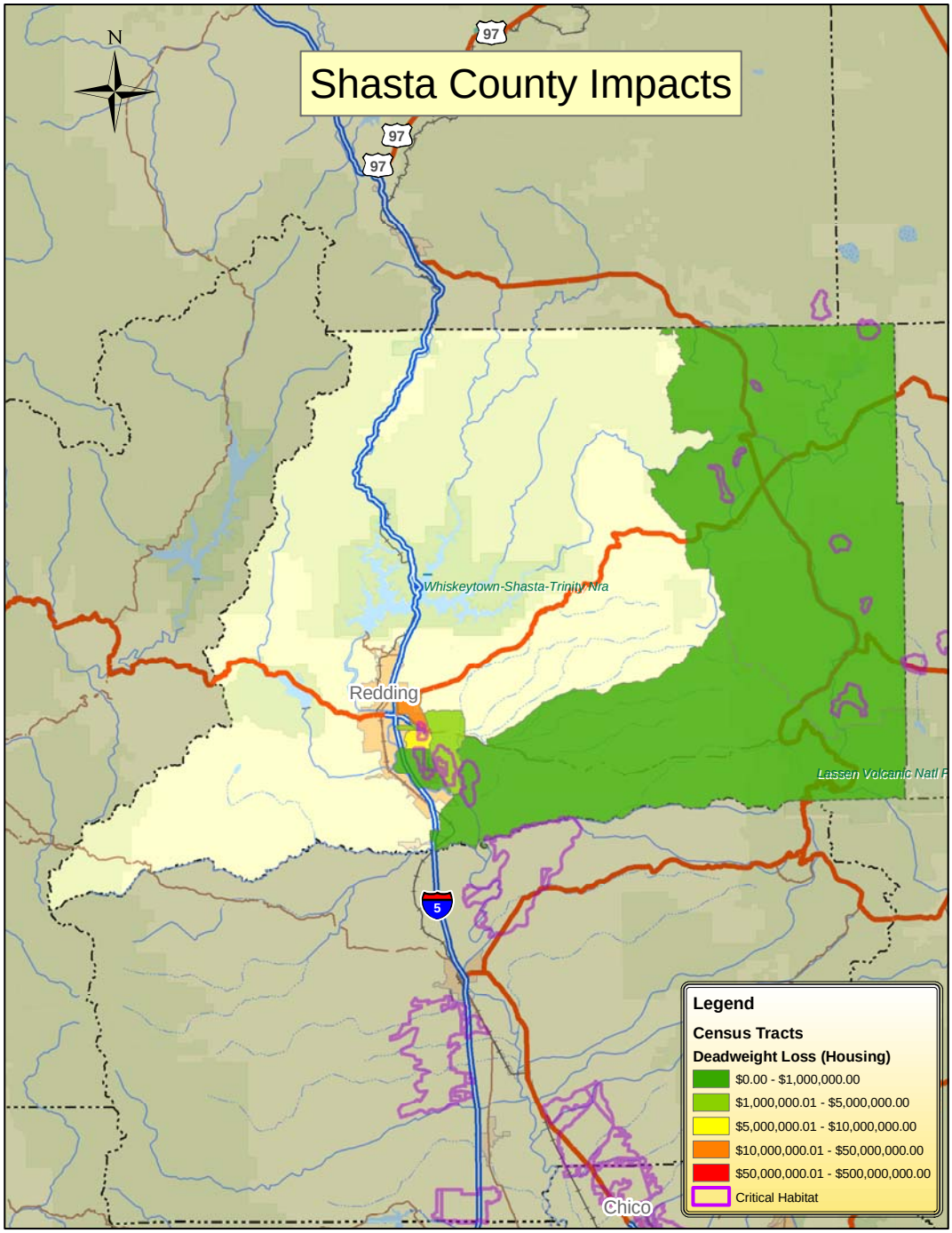

Figure 10: Shasta County Impacts

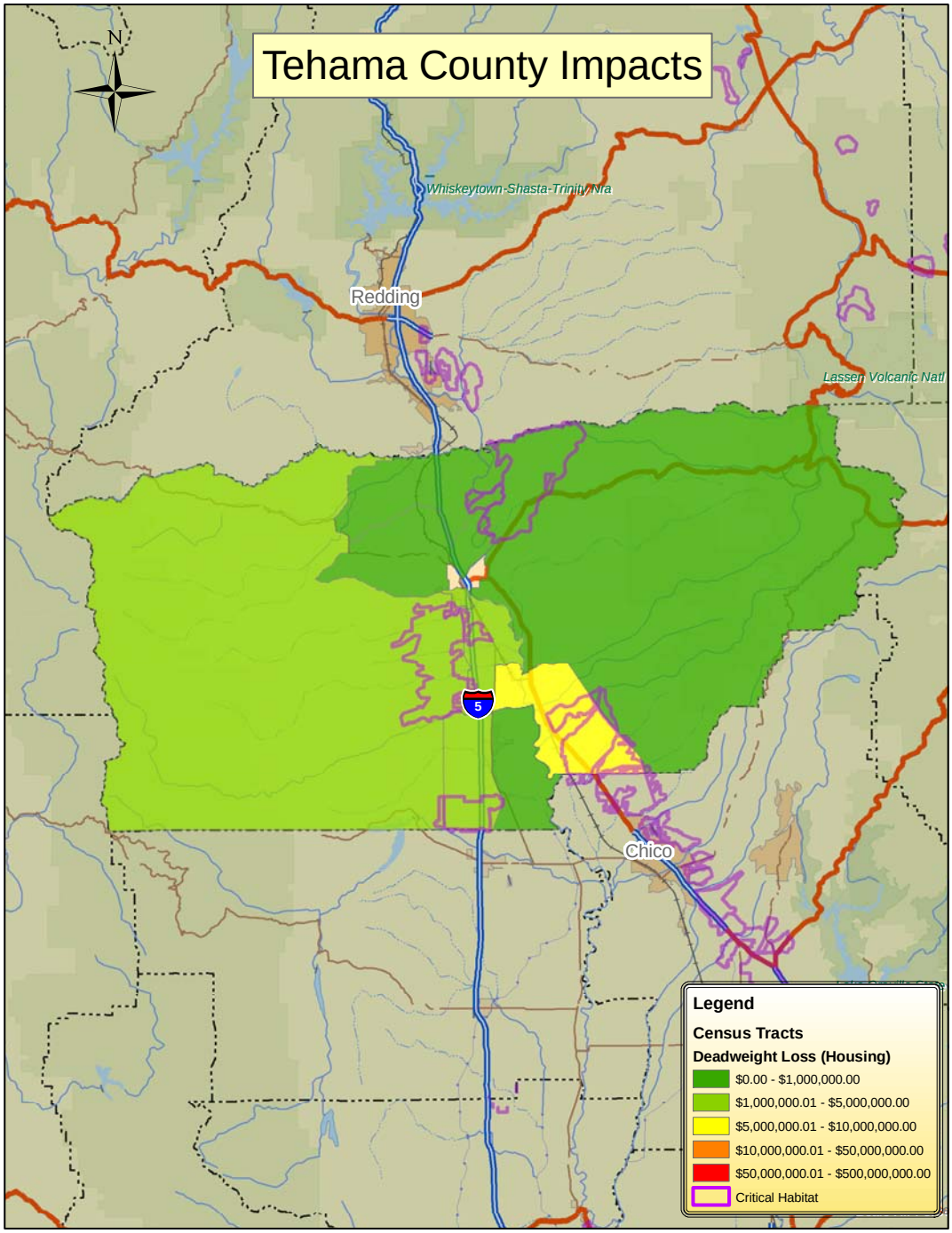

Figure 11: Tehama County Impacts

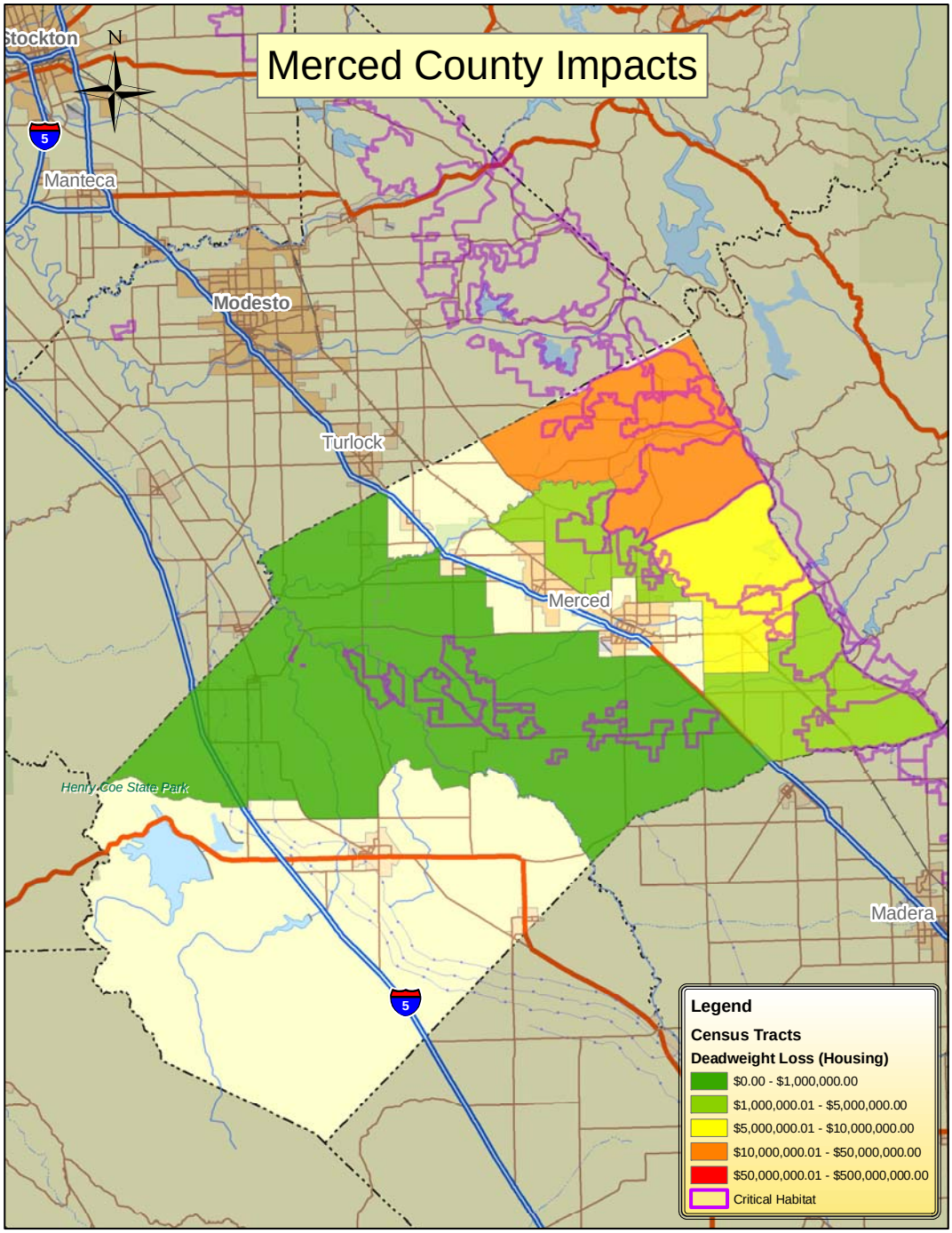

Figure 12: Merced County Impacts, Including UC Merced

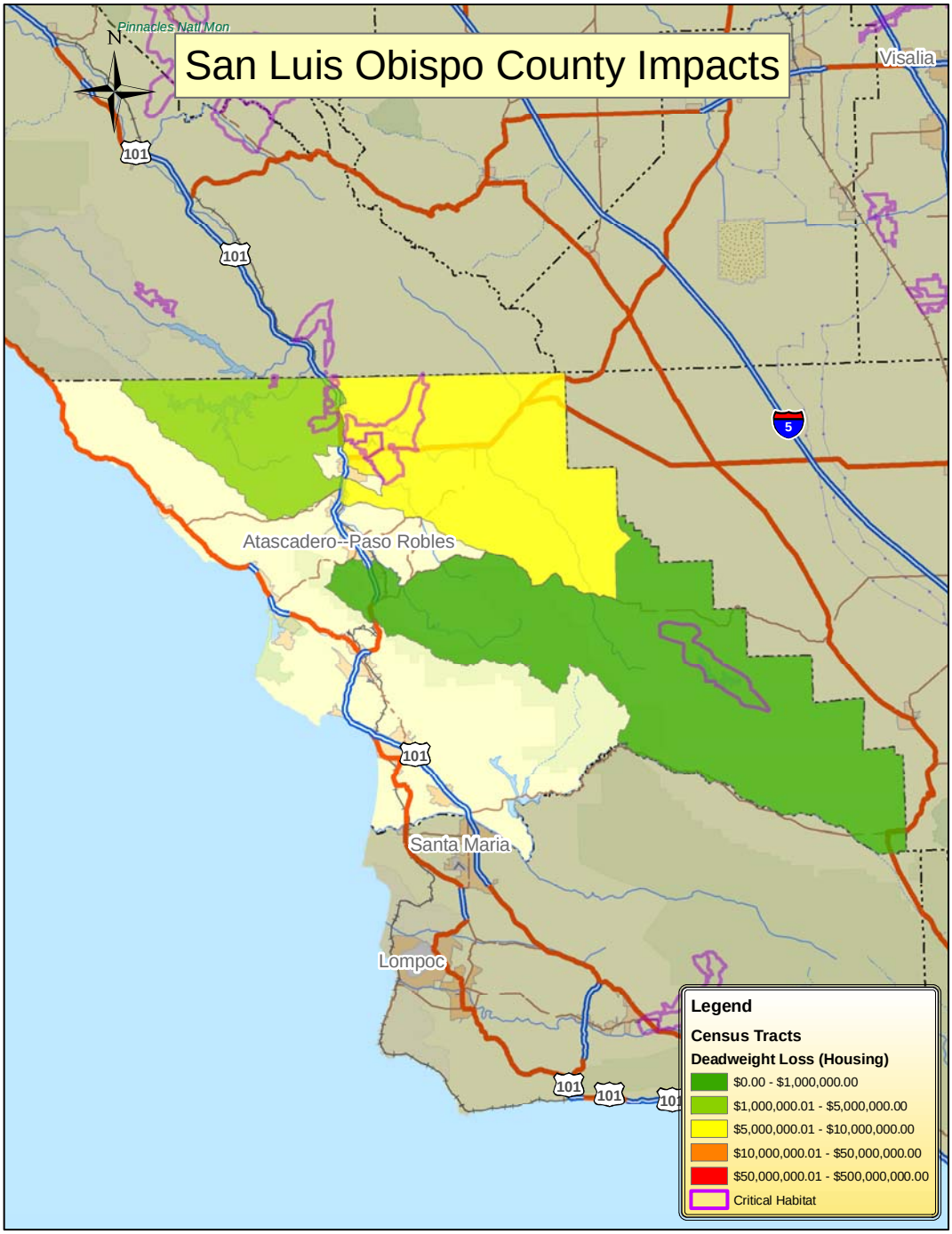

Figure 13: San Luis Obispo County Impacts

V ECONOMIC IMPACTS ON PUBLIC PROJECTS AND ACTIVITIES

This section reviews the potential economic impacts on transportation projects, the energy industry, and the development of the University of California, Merced campus as a result of critical habitat designation. In addition, the possible impacts to activities by the Department of the Defense, the Bureau of Land Management, the Bureau of Reclamation, the Forestry Service, the Fish and Wildlife Service, and the Bureau of Indian Affairs are examined.

V.1 ECONOMIC IMPACTS ON TRANSPORTATION PROJECTS

The Federal Highway Administration (FHA) and the California Department of Transportation maintain GIS databases of current and predicted transportation projects. The FHA data, known as the National Highway Planning Network, includes information for interstates, principal arterials, and rural minor arterials.[90] The California Department of Transportation source, known as the California Transportation Investment Tool (CTIS Tool), incorporates information about projects overseen by the State Transportation Improvement Program, the State Highway Operations and Protection Program, the Interregional Transportation Strategic Plan, the California Aviation System Plan, and various regional transportation planning organizations.[91] Developed to assist transportation planners, the CTIS Tool is a Geographic Information System that displays the mapped location, as well as the timeframe and cost of the projects. Version 1.3.2 was used for this analysis; version 2.0 should be released in Spring 2005.[92]

The data layers contained in the CTIS Tool were mapped onto the habitat boundary files provided by the Service to determine the number of proposed acres affected by each transportation project. Table V-1: California Highway Projects Intersecting Critical Habitatdisplays the highway number, miles of impacted acres, total project cost (in 2004 dollars), and county location of the eight California projects that cross habitat units.[93] The capital costs of all of the impacted projects total $145 million, in 2004 dollars. A total of 14.4 miles of California highway projects overlap with critical habitat units. No impacts were identified from the overlap of the FHA data and the critical habitat maps. To determine the effects of designation, the impacts of mitigation requirements were calculated. For the analysis, only projects with a start date of 2005 or later were considered.[94]

---

[90] U.S. Department of Transportation, Federal Highway Administration, http://www.fhwa.dot.gov/planning/nhpn/

[91] California Department of Transportation, Office of State Planning, http://www.dot.ca.gov/hq/tpp/offices/osp/ctis.htm

[92] Version 1.3.2 is current through 2001. This analysis will be updated once Version 2.0 is released.

[93] Values were inflated to 2004 dollars by using the Producer Price Indexes for Construction Materials and Components, recorded in Table B-65 of the Economic Report of the President, published in February 2005.

[94] Start date of a project was determined by the "Line_yr" variable, which represents the "year the funding is expected to be awarded for expenditures". The "Total_Cost" variable equals the total funds set aside for the project. The "Doc_Year" identifies the year the transportation project was approved, and therefore, the base year from which the project costs are inflated to 2004 dollars (CTIS Data Dictionary, 2000).

It was assumed that each highway project would require a 250-foot buffer to each side of the structure, thereby increasing the width of the project by 500 feet.[95] Applying this premise increased the amount of critical habitat impacted by transportation projects. For example, if 1 mile of freeway crossed critical habitat, a total area of 60.6 acres would be impacted.[96] After determining the areas impacted by the transportation projects, it was assumed that 7 percent would be "wet" vernal pool land. It was determined if the transportation project crossed Group A and / or Group B habitat. Using a price of $105,000 per acre, and mitigation ratios of 2:1 and 3:1 for Group A and B habitat, respectively, the cost of designation on transportation projects was estimated.[97] Table V-2 displays the results of the analysis for the eight highway projects that intersect critical habitat. The cost of mitigation for the projects totals $16.9 million.

The FHA dataset was also used for the analysis of the impacts to transportation projects located in Jackson County. There are no FHA planned projects in the area. Since the CTIS Tool is specific to projects located in California, the Rogue Valley MPO, the transportation planning entity for Jackson County, provided information about the infrastructure updates scheduled for 2005 through 2030.[98] There were no identified impacts to the highway structures that traverse Jackson County.

V.2 Economic 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:[99]

- 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

---

[95] State law requires 250-yard wide extensions on either side of new utility projects. This requirement is assumed to apply to transportation projects, although only 250 feet buffers are used.

[96] Total acres = 1 mile X 5,280 feet / mile X 500 feet X 1 acre / 43,560 square feet = 60.6 acres.

[97] Mitigation ratio and per-acre cost obtained from conversations with Service staff.

[98] Information about the planned transportation projects can be found in the "Regional Transportation Plan 2005-2030," available for download at www.rvmpo.org.

[99] U.S. Office of Management and Budget, "Memorandum For Heads Of Executive Departments And Agencies, And Independent Regulatory Agencies," July 13, 2001.

- Other similarly adverse outcomes.

Table V-3: Proposed Energy Facilities in Counties Affected By Regulation lists the 17 energy production facilities that are planned or under construction in the counties with critical habitat. A GIS analysis was used to compute their proximity to the nearest critical habitat designation.[100] Fifteen of those plants are at least one mile from proposed critical habitat and are judged to be at low risk of disruption.

One facility, the Sacramento Municipal Utility District's Cosumnes plant, is approximately one mile from critical habitat. However, the project has already begun construction and completed the permitting and environmental review processes required under State and Federal law. Specifically, the District has already completed a consultation with the Service in order to mitigate potential impacts to existing vernal pools.[101] As such, any costs of mitigation form part of the regulatory baseline and critical habitat designation is projected to have no additional impact on this project.

The Roseville Combined Cycle plant is a natural gas-fired, 125 megawatt facility in Roseville, CA. The facility site and surrounding lands fall within the #12 vernal pool fairy shrimp critical habitat designation. The plant's environmental impact statement was prepared in the time between the Service's initial publication of proposed critical habitat designations and the preparation of this analysis, and specifically addresses the issues of vernal pool conservation, preservation, and mitigation.[102] Since construction and mitigation have already begun, these costs are sunk and form part of the regulatory baseline. Critical habitat designation is expected to have no additional impact on this project.

V.3 University of California, Merced

In 1995, the University of California, which administers the State's system of major research universities, selected Merced County as its preferred location for its tenth campus. The campus was expected to open in 2004. Over the last several years, a broad planning effort has been undertaken to determine the preferred location, size, design, and financing for both the core campus and the associated university community. The proposed campus would be 2,000 acres in size, and comprised of a Main Campus (910 acres), Merced Irrigation District canals and easements (70 acres), a Campus Land Reserve (340 acres), and a Campus Natural Reserve (750 acres).

The Main Campus would consist of an academic core, student support services, student and faculty housing, campus support, on-campus research facilities, athletic and recreation facilities, and parking. The Campus Land Reserve is proposed for future

---

[100] Because some plants are only in the planning stages, precise location information was not available for all plants. Whenever possible, plant locations were geocoded to the nearest intersection or city block. While this may cause this section's estimates to differ slightly from the ultimate facility locations, it should not affect the results.

[101] "Commission Decision," SMUD Cosumnes Power Plant Project, September 10, 2003. California Energy Commission: CEC docket number 01-AFC-19.

[102] "Final Staff Assessment", Roseville Energy Park, November 30, 2004. California Energy Commission: CEC docket number 03-AFC-1.

growth of the University facility. The Campus Natural Reserve would be preserved and managed to maintain and enhance its natural environmental functions and values.

Over 92 acres of waters of the United States would be directly impacted by these projects. A stormwater management system will be designed, constructed, and operated to avoid and minimize alteration of natural hydrologic regimes, increases in sediment and nutrient loading, and introduction of pesticide or other hazardous material in runoff. This system will be established to avoid and minimize indirect effects on aquatic systems in areas outside the Campus that may support listed species.[103]

Preliminary estimates of mitigation costs for an early campus and community development prototype calculated the wetlands mitigation costs at about $135,000 per wetted acre affected. At this unit cost, total mitigation costs associated with the current estimate of wetted vernal pool loss would be about $10 million. These costs would be payable over the course of University of California development and are not in present value dollars. These estimates were based on very approximate and preliminary assumptions.[104] Additional costs due to regulation may be incurred by the construction of the stormwater runoff system.

The actual mitigation and other costs associated with campus and community development will be determined over the next few years, as the Merced County Natural Community Conservation Plan / Habitat Conservation Plan is developed.

V.4 Economic Impacts on Public Lands

This section describes potential impacts of designation on lands administered by the Federal government. The analysis is divided among the various Federal agencies that are impacted, since each may potentially have its own set of development requirements and costs associated with designation.

An overall breakdown by agency and department of overlap between critical habitat and Federal lands is given in Table V-6: Impacted Federal lands by Agency and Department. The largest areas of overlap are administered by the Bureau of Land Management (BLM), the National Forest Service, and the Service. Because these lands are primarily wilderness, with little potential for development, designation is often a compatible use and its impact may be minimal. These cases are discussed in further detail below.

Figures on the number of consultations and average time of consultation are calculated from a computer database of vernal pool biological opinions obtained from the Service.

V.4.1 Impact on the Department of Defense

Critical habitat intersects four Air Force and three Army sites totaling 12,247 acres. Three of those bases are closed and are not expected to be impacted by designation insofar as no new military construction is anticipated. For the remaining land, it is

---

[103] US Fish and Wildlife Service, Final Biological Opinion on the Proposed University of California Merced Campus, Phase 1 and Campus Buildout, August 19, 2002.

[104] Economic & Planning Systems, Inc., Preliminary UC Merced Habitat Conservation Cost Estimate, March 14, 2000.

important to note that the Department of Defense reviewed and commented on the proposed boundaries. At its request, the Service excluded areas of critical habitat that could affect military readiness. Remaining intersections between critical habitat and Defense land are in areas where the Department considers designation unlikely to be disruptive. Net of these exclusions, overall impacts of designation on Defense are expected to be minimal.

V.4.2 Impact on the Bureau of Land Management

Critical habitat affects roughly 33,989 acres of land administered by the BLM. Nearly all is land in the public domain. Service records list no consultations performed for the BLM. Because public domain land is often highly remote and development pressures are low, few, if any, future consultations are envisioned in these areas. The total expected cost of designation to the BLM is zero.

V.4.3 Impact on the Bureau of Reclamation

Critical habitat intersects 22 acres of land overseen by the Bureau of Reclamation (BR) near Millerton Lake. An additional 640 acres of public domain land in Jackson County, Oregon, also overlap with critical habitat. An overview of the Service's biological opinions as they pertain to the Bureau of Reclamation is given in Table V-5: Consultations for the Bureau of Reclamation. Consultation for BR projects took an average of 106.25 days, based on the 10 consultations on record. Personal conversations with BR staff indicate that there is no expectation of formal consultations due to the designation.[105]

V.4.4 Impact on the Forestry Service

Critical habitat intersects a total of 78,471 acres of national forest and wilderness. Because uses are compatible with the preservation of vernal pools, designation is not expected to have an impact on the Forestry Service.

V.4.5 Impact on the Fish and Wildlife Service

Designation is not expected to impact the Service.

V.4.6 Impact on the Bureau of Indian Affairs

There is no intersection between critical habitat and tribal lands and there are no anticipated economic effects due to designation.

[105] Personal conversation with David Young, Biologist, mid-Pacific division, Bureau of Reclamation.

Table V-1: California Highway Projects Intersecting Critical Habitat

County	Caltrans District	Highway Route	Project Length (miles)	Project Start Year	Total Cost, (thousands) [106]	Agency	Impacted CH, "A" (miles)	Impacted CH, "B" (miles)
Butte	3	70	16.5	2018	$11,546	Butte County	-	2.88
Butte	3	99	5.0	2018	$6,477	Caltrans	0.86	-
Butte	3	99	5.2	2018	$2,428	Caltrans	2.73	-
Madera	6	41	3.0	2013	$4,082	Caltrans	1.57	-
Lassen	2	44	22.2	2012	$11,662	Caltrans	0.08	-
Tehama	2	99	5.1	2012	$6,997	Caltrans	-	4.56
Contra Costa	4	4	4.9	2007	$90,148	Metropolitan Transportation Commission	-	1.59
Lassen	2	44	22.2	2006	$11,662	Caltrans	0.08	-
Total	**-**	**-**	**84**	**-**	**$145,002**	**-**	**5.32**	**9.04**

Sources:

(1) California Transportation Investment Tool, Version 1.3.2, California Department of Transportation, Office of State Planning, http://www.dot.ca.gov/hq/tpp/offices/osp/ctis.htm.

(2) Critical Habitat Boundary Files, U.S. Fish and Wildlife Service.

[106] Values in 2004 dollars.

Table V-2: Economic Impacts of Designation on California Transportation Projects

County	Highway Route	Project Length (miles)	Project Start Year	Total Cost, (thousands) [107]	Impacted CH, "A" (miles)	Impacted CH, "B" (miles)	Additional Costs due to Designation, (thousands)
Butte	70	16.5	2018	$11,546	-	2.88	$3,852
Butte	99	5.0	2018	$6,477	0.86	-	$769
Butte	99	5.2	2018	$2,428	2.73	-	$2,436
Madera	41	3.0	2013	$4,082	1.57	-	$1,399
Lassen	44	22.2	2012	$11,662	0.08	-	$70
Tehama	99	5.1	2012	$6,997	-	4.56	$6,094
Contra Costa	4	4.9	2007	$90,148	-	1.59	$2,129
Lassen	44	22.2	2006	$11,662	0.08	-	$105
Totals	-	84	-	$145,002	5.32	9.04	$16,853

Sources:

(1) California Transportation Investment Tool, Version 1.3.2, California Department of Transportation, Office of State Planning, http://www.dot.ca.gov/hq/tpp/offices/osp/ctis.htm.

(2) Critical Habitat Boundary Files, U.S. Fish and Wildlife Service.

[107] Values in 2004 dollars.

Table V-3: Proposed Energy Facilities in Counties Affected By Regulation

Plant	Status	Capacity (MW)	City	County	Nearest CHD (miles)
Kings River	Pre-construction	97	Fresno	Fresno	12.18
SMUD Cosumnes	Construction	500	Herald	Sacramento	1.03
Walnut Energy Center	Construction	250	Turlock	Stanislaus	14.08
Ripon Simple Cycle	Construction	95	Ripon	San Joaquin	5.52
Morro Bay	On Hold	1,200	Morro Bay	San Luis Obispo	21.10
Tesla Combined Cycle	On Hold	1,120	Tracy	Alameda	7.03
East Altamont	On Hold	1,100	Byron	Alameda	1.89
Contra Costa	On Hold	530	Antioch	Contra Costa	7.32
Three Mountain	On Hold	500	Burney	Shasta	1.79
Russell City	On Hold	600	Hayward	Alameda	12.14
San Joaquin Valley	On Hold	1,087	San Joaquin	Fresno	24.70
Valero Cogen.	On Hold	51	Benicia	Solano	5.92
Roseville Combined Cycle	12-mo. AFC	160	Roseville	Placer	0.00
Avenal Combined Cycle	12-mo. AFC	600	Avenal	Kings	30.98
San Joaquin Valley	Amendment	n/a	San Joaquin	Fresno	24.70
East Altamont	Amendment	n/a	Byron	Alameda	1.89
SMUD Cosumnes (Phase 2)	6-mo. AFC	500	Herald	Sacramento	1.03

Source: California Energy Commission, Energy Facilities Siting / Licensing Process. http://www.energy.ca.gov/sitingcases/index.html

Table V-4: Consultations for the Armed Services

Project	Consultation Time (Days)
Amend Beale AFB Vernal Pool Restoration Project	84
B.T. Collins Army Reserve Training Center Mitigation	N / A
Burke Housing, Travis AFB, Vernal Pool fund	111
Castle AFB Skeet Range, Atwater, Merced City	6
Data Gap 5 Draft Magpie Creek and Don Julio Creek	16
Data Gap 5 Field Sampling, Vernal Pool Surface…	3
Landfill 2, Travis AFB	23
Mather AFB Landfills	N / A
McClellan AFB Radiological Survey Amendment	42
McClellan AFB Vernal Pool Restoration Plan	36
McClellan Air Force Base Closure, Sacramento County	28
Radiological Surveys at McClellan AFB, Sacramento…	53
Request for Formal Consultation-Vernal Pool…	288
Review of Beale AFB Conceptual Vernal Pool R & M	17
Vernal Pool Restoration Project	194
Vernal Pool Species at Travis AFB	131
Average	**74**

Source: Service consultation record.

Notes: Project names terminating in ellipses and consultation times marked “N / A” could not be obtained from Service records due to missing data.

Table V-5: Consultations for the Bureau of Reclamation

Project	Consultation Time (Days)	Formal?
CVP Friant and Cross Valley Division Water…	30	No
Grassland Bypass Project	224	No
Hidden and Buchanan Units…	12	No
Long-term contract renewals for Friant…	46	No
Los Vaqueros	N / A	No
Mendota Wildlife Area Water Conveyance Facilities	31	No
Sacramento County water contracts	N / A	N / A
Temporary Water Service Contractors within Friant	50	N / A
Review of Warren Act Contract with City of Roseville	233	N / A
Average	106	

Source: Service consultation record.

Notes: Project names terminating in ellipses and consultation times marked “N / A” could not be obtained from Service records due to missing data.

Table V-6: Impacted Federal lands by Agency and Department

Agency (Department)	Area	Affected Acreage
Air Force (DOD)	Beale Air Force Base	301.44
	Mather Air Force Base (Closed)	1,686.94
	McClellan Air Force Base (Closed)	51.59
	Travis Air Force Base	2,713.82
	Subtotal	4,753.79
Army (DOD)	Camp Roberts Military Reservation	360.10
	Fort Ord Military Reservation (Closed)	6,873.34
	Hunter-Liggett Military Reservation	259.84
	Subtotal	7,493.28
Bureau of Reclamation (BOR)	Millerton Lake	22.39
National Forest (FS)	Lassen National Forest	21,244.24
	Los Padres National Forest	34,720.48
	Shasta National Forest	3,943.25
	Subtotal	59,907.97
National Wildlife Refuge (FWS)	Don Edwards San Francisco Bay National Wildlife Refuge	21.00
	Merced National Wildlife Refuge	65.20
	Pixley National Wildlife Refuge	3,639.46
	Sacramento National Wildlife Refuge	10.75
	San Joaquin River National Wildlife Refuge	746.26
	San Luis National Wildlife Refuge	241.27
	Subtotal	4,723.94
Public Domain Land (BLM)		32,285.08
Wilderness (FS)	San Rafael Wilderness	48.00
	Sespe Wilderness	18,516.02
	Subtotal	18,564.02
Wilderness Study Area (BLM)	Timbered Crater Wilderness Study Area	1,613.38
Wildlife Management Area (FWS)	Grasslands Wildlife Management Area	21,492.00
	Willow Creek-Lurline Wildlife Management Area	0.86
	Subtotal	21,492.86
Total		**150,856.71**

Source: GIS analysis.

VI OTHER PRIVATE ACTIVITIES

This section reviews the economic impacts from habitat designation on the mining, agricultural, forestry, and grazing industries.

VI.1 MINING

A review of the consultation database provided by the Service showed no documented consultations with mining organizations since the listing of the vernal pool species in September of 2002. The 2002 preliminary data from the U.S. Geological Survey showed three new mining locations within the 35 California counties that contain critical habitat. Specifically, in Tulare County, a new alluvial sand and gravel mine operated by RMC Pacific Materials was granted a permit in 2002. The permit for an additional construction aggregate mine also in Tulare County and owned by the Kaweah River Rock Company, was reviewed in 2002. RMC Pacific Materials also applied for a permit in Fresno County to begin mining crushed stone. It has not been determined whether these three mines exist on proposed critical habitat. Based on discussion with Service staff and the review of the consultation database, at this time it is determined that there will be no economic impacts on the mining industry.[108]

VI.2 GRAZING

Since grazing cattle is considered a complementary activity for vernal pool preservation, it is determined that there will be no economic impacts to this industry from habitat designation.

VI.3 FORESTRY

There were no documented consultations between the Service and forestry management entities either before or after the listing of the vernal pool species. Further, since vernal pools typically do not exist in forested areas, there are no predicted economic effects to the forestry industry.

VI.4 AGRICULTURE

A review of the consultation record provided by the Service showed no documented consultations for agricultural activities since the listing of the vernal pools species. As a discussion with a representative of the agricultural community indicated, there are potential economic impacts to the agricultural sector. For example, the designation of critical habitat on farmland may reduce the value of the plot, which could limit the borrowing potential of the farm owner. The expansion of farming operations could also be constrained if owners are prevented from installing processing plants or additional harvesting machinery. Additionally, there are two situations that could result in the creation of a Federal nexus: the receipt of Federal farming subsidies and the regulation of agricultural run-off, through the recent extension of the Clean Water Act.

[108] Communication with U.S. Fish and Wildlife Service, April 8, 2005.

Using GIS data, it was determined that critical habitat overlaps with 14,956 acres of prime farmland, or 1.2 percent of all proposed habitat acreage. This overlap also represents 0.3 percent of all of the prime farmland in California. It is assumed that not all of this land would be under cultivation and the economic impacts are predicted to the industry are predicted to be minimal. At this time, the aggregate economic impacts to this industry as a result of critical habitat designation have not been determined.

VII REGIONAL ECONOMIC IMPACTS

VII.1 METHODOLOGY

The distributional effects of critical habitat designation are quantified using IMPLAN Economic Modeling Software.[109] 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, Stanford, U.C. Berkeley, and numerous private consulting companies.[110]

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.[111] 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.[112] In the table and discussion that follow, the sum of indirect and induced effects are referred to as secondary effects.

Critical habitat designation reduces the construction of new housing, as described in Section IV. IMPLAN is used to describe how this decrease in new home construction results in a decrease in the demand for inputs from other industries. The change in final demand for new housing construction is calculated as the product of building costs per house multiplied the change in number of houses built. The calculation of building costs for each census tract is described in Section IV.2.

---

[109] MIG, Inc., IMPLAN Professional Version v.2.0.1024, 1997-2004.

[110] http://www.implan.com/references.html

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

[112] Direct impacts – the direct purchases by the facility under study – and indirect impacts –the purchases made by the firms supplying the facility – are captured in the standard input-output model. Induced impacts – purchases by employees of the facility and indirect firms – are captured when the model is "closed" with respect to households. The version of IMPLAN used here is closed.

Sacramento, Solano, and Butte were selected for IMPLAN analysis. The change in final demand for residential construction in these counties represented greater than or equal to 0.41% of the county's pre-designation industry revenue.[113] The change in building costs are aggregated for the three counties and annualized.[114] Note that in this analysis, the direct effects are the costs associated with the construction of new homes which is different from the price paid by homebuyers for a new home. Restricting the supply of new homes may increase revenue to home sellers, but it will decrease the demand for inputs needed to construct new homes.

In addition to the IMPLAN model of the impacts on new home construction, the distributional impacts of CHD resulting from mitigation costs and a change in home prices are discussed below.

VII.2 RESULTS

The table below demonstrates that the secondary impacts from decreased new home construction are small relative to the industry output of the three-county region. Critical habitat designation of vernal pool species has little effect on the regional economy. Total annual industry output is reduced by approximately $17 million directly and another $12 million indirectly. These combined reductions represent only 0.03 percent of the region's output. Included among the most affected industries are wholesale trade and architectural/engineering services.

Note that mitigation costs are not accounted for in this analysis. Mitigation costs, principally land acquisition costs, are incurred by the individuals or businesses developing the land. If the land developers do not currently own the land, these costs may be borne by the landowners through a decrease in land price. The mitigation expenditures are a transfer to a conservation bank, i.e., a transfer from one landowner to another or a transfer from a land developer to a landowner. At the census tract level of examination, mitigation expenditures flow out of the census tract and are a cost to producers. Regionally, mitigations costs are a transfer that would have minimal distributional effects.

In IMPLAN, the decrease in dollars spent on new housing construction results in decreased spending by the employees in the construction industry. IMPLAN allocates a large portion of this decrease in spending to "owner-occupied dwellings" and "real estate." Note that another larger group of consumers may increase spending in "owner-occupied dwelling" as the supply of housing is restricted and home prices increase. This group of consumers may be diverting money from entertainment, travel, or other industries in response to higher mortgage payments. These dollars flow to home sellers, who in turn may spend more on entertainment, travel, or other activities. In this regard,

[113] The fourth highest was Stanislaus, where impacts were only 0.12% of pre-designation revenue.

[114] For simplicity, costs were annualized by dividing total costs by 20. Impacts are incurred throughout the twenty-year timeframe, and the total change in building costs divided by 20 is the average annual foregone revenue to new home construction.

the diversion of one group of consumer expenditures to new housing may result in another group of consumers spending more on other activities.

Table VII-1: Distributional Effects of Critical Habitat Designation in Sacramento, Solano, and Butte.

Industry[115]	Study Area Data: Industry Output	Model Results: Direct Effects	Model Results: Secondary Effects[116]	Impacts as a Percent of Output
	(1)	(2)	(3)	(4)=((2)+(3))/(1)
New residential 1-unit structures- nonfarm	2,660,255,000	-17,106,996	0	-0.64%
Wholesale trade	3,344,565,000	0	-900,876	-0.03%
Owner-occupied dwellings	4,731,130,000	0	-736,774	-0.02%
Motor vehicle and parts dealers	1,447,393,000	0	-508,589	-0.04%
Real estate	4,235,851,000	0	-491,378	-0.01%
Architectural and engineering services	1,005,748,000	0	-486,932	-0.05%
Food and beverage stores	1,463,249,000	0	-381,975	-0.03%
General merchandise stores	756,993,000	0	-356,909	-0.05%
Truck transportation	783,744,000	0	-325,790	-0.04%
Food services and drinking places	2,473,971,000	0	-324,674	-0.01%
Offices of physicians- dentists- and other health	2,478,826,000	0	-307,291	-0.01%
Monetary authorities and depository credit interme	1,755,281,000	0	-301,017	-0.02%
Wood kitchen cabinet and countertop manufacturing	97,166,000	0	-246,794	-0.25%
Insurance carriers	3,265,570,000	0	-239,948	-0.01%
Hospitals	2,088,135,000	0	-237,686	-0.01%
Building material and garden supply stores	672,719,000	0	-223,296	-0.03%
Telecommunications	3,325,191,000	0	-217,947	-0.01%
Health and personal care stores	422,402,000	0	-202,058	-0.05%
Legal services	923,111,000	0	-199,549	-0.02%
Management of companies and enterprises	1,370,527,000	0	-195,277	-0.01%
Miscellaneous store retailers	386,567,000	0	-189,220	-0.05%
Clothing and clothing accessories stores	437,047,000	0	-171,236	-0.04%
Nondepository credit intermediation and related a	1,235,010,000	0	-162,985	-0.01%
Petroleum refineries	1,585,216,000	0	-147,661	-0.01%
Other State and local government enterprises	798,126,000	0	-143,714	-0.02%
Employment services	855,988,000	0	-135,430	-0.02%
Electronics and appliance stores	354,856,000	0	-129,280	-0.04%
Automotive repair and maintenance- except car wash	1,178,281,000	0	-126,823	-0.01%

[115] Only industries with "Total Effects" greater than $100,000 are listed in this table.

[116] "Secondary Effects" include indirect and induced effects.

Industry[115]	Study Area Data: Industry Output	Model Results: Direct Effects	Model Results: Secondary Effects[116]	Impacts as a Percent of Output
Gasoline stations	362,357,000	0	-124,420	-0.03%
Furniture and home furnishings stores	333,409,000	0	-119,173	-0.04%
Machinery and equipment rental and leasing	402,446,000	0	-112,514	-0.03%
Nonstore retailers	263,240,000	0	-105,609	-0.04%
State and local government electric utilities	759,293,000	0	-105,234	-0.01%
Total, All Industries[117]	**101,767,817,000**	**-17,106,996**	**-12,173,950**	**-0.03%**

Source: IMPLAN Output.

[117] Includes industries with impacts less than $100,000 in addition to the industries listed above.

VIII ECONOMIC IMPACTS ON SMALL BUSINESSES

According to the Regulatory Flexibility Act, as amended by the Small Business Regulatory Enforcement Fairness Act, an agency has to determine whether proposed legislation will have a "significant economic impact on a substantial number of small entities."[118] There are three categories of entities: small business, small government, and small nonprofit organizations. The impacts on non-profits and small governments are expected to be negligible and are not examined in this analysis.

The effects of CHD on small businesses in new home construction, however, are examined. In some census tracts, the quantity of new housing decreases as a result of CHD. This results in decreased revenue to home construction. The impact to the new home construction industry is characterized as the decrease in the number of housing units multiplied by the average building cost per housing unit. The change in building costs is calculated for each census tract and then summed by county. This is conservative, as some construction firms may actually gain from an increase in housing price when the supply of housing is restricted.[119] In this analysis, the total but-for revenue is equivalent to building costs per house multiplied by the pre-regulation projected number of housing units. Table VIII-1: Impact of CHD on New Home Construction Revenue summarizes the revenue loss by county.

To isolate the revenue losses attributable to small businesses we examined the share of new housing construction permits reported in Sacramento County. As shown in Table VIII-2: Sacramento Building Permits For Single Family Dwellings, By Contractor, small businesses accounted for 22.4 % of permits in 2004.

To estimate the number of affected small businesses, the number of houses built per small firm was calculated. Next, the number of housing units lost to small businesses was calculated as the percent housing permits to small firms multiplied by the change in housing units from CRA's housing model. Then, the number of lost housing units attributable to small firms was divided by the average number of houses per small firm. This provides an estimate of the number of affected small businesses. These calculations are presented in Table VIII-3 and Table VIII-4. As shown in the table, the number of small firms affected annually ranges from approximately 3 in Sacramento County to less than one in most of those listed. Counties not listed are not projected to include any small business losses. Consequently, an equivalent of approximately 6 small firms are projected to suffer annual revenue losses equal to their expected annual revenues. These firms would be forced to close assuming that work in other construction projects such as remodeling and expansion was not available. In view of expected home price increases, demand for these projects is likely to increase.

---

[118] 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.

[119] On one hand, there a fewer homes for construction companies to build; on the other, if construction companies are selling the houses to consumers, rather than being hired by another company, then they will obtain the benefits of increased price.

Table VIII-1: Impact of CHD on New Home Construction Revenue

County	Annual Pre-Regulation Revenue	Annual Change in Revenue	Annual Change in Housing Units
Sacramento	$2,761,740,751	-$11,472,028	-42
Butte	$411,311,602	-$3,172,289	-18
Solano	$592,356,242	-$2,462,680	-10
Stanislaus	$869,921,163	-$1,043,705	-4
Monterey	$524,234,525	-$451,024	-2
Contra Costa	$1,404,125,958	-$362,971	-1
Merced	$297,345,305	-$338,072	-2
Tehama	$100,200,792	-$177,231	-1
Mendocino	$114,029,460	-$41,179	0
Mariposa	$19,403,429	-$38,327	0
Ventura	$1,552,355,564	-$21,010	0
Napa	$94,968,597	-$17,822	0
Amador	$14,151,943	-$4,138	0
Yolo	$336,202,280	-$3,615	0
Tuolumne	$75,690,230	-$3,029	0
Alameda	$1,840,515,586	-$3,016	0
Calaveras	$81,351,998	-$30	0
San Joaquin	$1,134,421,990	$0	0
Plumas	$9,699,943	$0	0
Madera	$269,866,011	$0	0
Colusa	$66,443,773	$0	0
San Luis Obispo	$640,255,341	$0	0
Shasta	$278,097,953	$0	0
Tulare	$532,238,043	$0	0
Siskiyou	$45,664,427	$0	0
Modoc	$19,426,038	$0	0
Yuba	$113,175,724	$0	0
Fresno	$1,592,435,958	$0	0
Lake	$128,159,872	$0	0
Kings	$112,763,999	$0	0
Santa Barbara	$751,545,393	$0	0
Lassen	$30,404,916	$0	0
Placer	$1,019,646,827	$0	0
Glenn	$69,806,673	$0	0
San Benito	$70,854,432	$0	0

Table VIII-2: Sacramento Building Permits For Single Family Dwellings, By Contractor[120]

Firm	Number of Permits	Percent of All Permits	Cumulative Percentile	Size Category[121]
	(1)	(2)=(1) / sum((1))	(3)	(4)
1.	117	19.60%	19.60%	Large
2.	62	10.39%	29.98%	Large
3.	57	9.55%	39.53%	Large
4.	45	7.54%	47.07%	Large
5.	39	6.53%	53.60%	Large
6.	32	5.36%	58.96%	Large
7.	27	4.52%	63.48%	Large
8.	23	3.85%	67.34%	Small/Unknown
9.	22	3.69%	71.02%	Large
10.	20	3.35%	74.37%	Large
11.	19	3.18%	77.55%	Small/Unknown
12.	18	3.02%	80.57%	Large
13.	16	2.68%	83.25%	Large
14.	13	2.18%	85.43%	Small/Unknown
15.	10	1.68%	87.10%	Small/Unknown
16.	7	1.17%	88.27%	Small/Unknown
17.	4	0.67%	88.94%	Large
18.	4	0.67%	89.61%	Large
19.	3	0.50%	90.12%	Small/Unknown
20.	2	0.34%	90.45%	Small/Unknown
21.	2	0.34%	90.79%	Small/Unknown
22.	2	0.34%	91.12%	Small/Unknown
23.	2	0.34%	91.46%	Small/Unknown
24.	2	0.34%	91.79%	Small/Unknown
25.	1	0.17%	91.96%	Small/Unknown
26.	1	0.17%	92.13%	Small/Unknown
27.	1	0.17%	92.29%	Small/Unknown
28.	1	0.17%	92.46%	Small/Unknown
29.	1	0.17%	92.63%	Small/Unknown
30.	1	0.17%	92.80%	Small/Unknown

[120] Does not include owner additions or remodels. Data are from the final week of each month, April, 2004-April, 2005.

[121] Revenue figures were obtained from internet searches for company sales revenue. We are assuming any company whose data we were unable to attain is small. This is very conservative.

Firm	Number of Permits	Percent of All Permits	Cumulative Percentile	Size Category[121]
31.	1	0.17%	92.96%	Small/Unknown
32.	1	0.17%	93.13%	Small/Unknown
33.	1	0.17%	93.30%	Small/Unknown
34.	1	0.17%	93.47%	Small/Unknown
35.	1	0.17%	93.63%	Small/Unknown
36.	1	0.17%	93.80%	Small/Unknown
37.	1	0.17%	93.97%	Small/Unknown
38.	1	0.17%	94.14%	Small/Unknown
39.	1	0.17%	94.30%	Small/Unknown
40.	1	0.17%	94.47%	Small/Unknown
41.	1	0.17%	94.64%	Small/Unknown
42.	1	0.17%	94.81%	Small/Unknown
43.	1	0.17%	94.97%	Small/Unknown
44.	1	0.17%	95.14%	Small/Unknown
45.	1	0.17%	95.31%	Small/Unknown
46.	1	0.17%	95.48%	Small/Unknown
47.	1	0.17%	95.64%	Small/Unknown
48.	1	0.17%	95.81%	Small/Unknown
49.	1	0.17%	95.98%	Small/Unknown
50.	1	0.17%	96.15%	Small/Unknown
51.	1	0.17%	96.31%	Small/Unknown
52.	1	0.17%	96.48%	Small/Unknown
53.	1	0.17%	96.65%	Small/Unknown
54.	1	0.17%	96.82%	Small/Unknown
55.	1	0.17%	96.98%	Small/Unknown
56.	1	0.17%	97.15%	Small/Unknown
57.	1	0.17%	97.32%	Small/Unknown
58.	1	0.17%	97.49%	Small/Unknown
59.	1	0.17%	97.65%	Small/Unknown
60.	1	0.17%	97.82%	Small/Unknown
61.	1	0.17%	97.99%	Small/Unknown
62.	1	0.17%	98.16%	Small/Unknown
63.	1	0.17%	98.32%	Small/Unknown
64.	1	0.17%	98.49%	Small/Unknown
65.	1	0.17%	98.66%	Small/Unknown
66.	1	0.17%	98.83%	Small/Unknown
67.	1	0.17%	98.99%	Small/Unknown

Firm	Number of Permits	Percent of All Permits	Cumulative Percentile	Size Category[121]
68.	1	0.17%	99.16%	Small/Unknown
69.	1	0.17%	99.33%	Small/Unknown
70.	1	0.17%	99.50%	Small/Unknown
71.	1	0.17%	99.66%	Small/Unknown
72.	1	0.17%	99.83%	Small/Unknown
73.	1	0.17%	100.00%	Small/Unknown
Total	**597**	**100.0%**		
Small Businesses	**134**	**22.4%**		

Source: Department of Building Inspection, Municipal Services Agency, Sacramento County

Table VIII-3: Small Business Impacts From Residential Construction

County[122]	Proportion Of Houses Built By Small Businesses	Annual Revenue	Annual Housing Units	Average Building Cost	Annual Average Revenue Per Small Business
	(1)	(2)	(3)	(4)=(2)/(3)	(5)
Sacramento	22%	$2,761,740,751	11,246	$245,581	$732,785
Butte	22%	$411,311,602	2,377	$173,012	$656,858
Solano	22%	$592,356,242	2,421	$244,664	$724,815
Stanislaus	22%	$869,921,163	4,393	$198,044	$701,962
Monterey	22%	$524,234,525	2,289	$228,978	$716,285
Contra Costa	22%	$1,404,125,958	3,747	$374,740	$797,592
Merced	22%	$297,345,305	1,729	$171,948	$700,599
Tehama	22%	$100,200,792	586	$171,115	$589,328

Table VIII-4: Small Business Impacts From Residential Construction

County	Annual Houses Built Per Small Business	Annualized Change In Number Houses	Annualized Change In Number Of Houses To Small Businesses	Number Of Affected Small Businesses
	(6)=(5)/(4)	(7)	(8)=(1)*(7)	(9)=(8)/(6)
Sacramento	2.98	-42	-9.5	-3.2
Butte	3.80	-18	-4.0	-1.0
Solano	2.96	-10	-2.2	-0.7
Stanislaus	3.54	-4	-1.0	-0.3
Monterey	3.13	-2	-0.5	-0.1
Contra Costa	2.13	-1	-0.2	-0.1
Merced	4.07	-2	-0.5	-0.1
Tehama	3.44	-1	-0.2	-0.1
Total				**-5.6**

Sources:

(1) From Table VIII-1: Impact of CHD on New Home Construction Revenue, based on data from Department of Building Inspection, Municipal Services Agency, Sacramento County.

(2) CRA housing model.

(3) CRA housing model.

[122] Table lists most-affected counties. In counties with smaller impacts, designation has negligible effects on small businesses.

(5) RMA data on revenue by size class and D&B data on number of firms in each size class.

(7) CRA housing model.

IX WELFARE IMPACTS OF CRITICAL HABITAT DESIGNATION

The model of urban growth and the markets for land and improvements to land is adapted from the standard Alonso-Muth-Mills model of urban economics. The approach taken in this study is a partial equilibrium analysis for various portions of the overall critical habitat. Given the relatively small land and housing price changes resulting from critical habitat, together with the localized nature of housing supply and demand, the use of a partial equilibrium approach seems justified.

At each location, the housing developer is assumed to solve the following maximization problem:

$$\max_{H,L,\lambda} pH - k(H) + \lambda(\bar{N} - HL)$$

where p is the price of housing (taken as constant by an individual developer), H is the number of housing units constructed, k is the cost of building H units of housing, L is the amount of land per housing unit, and $\bar{N}$ is the amount of developable land at the location. Landowners earn rents equal to λ, which is determined in equilibrium. The profit-maximization conditions for the developer's problem are as follows:

$$H: p(H,L) - k_H - \lambda L = 0$$
$$L: p_L - \lambda = 0$$
$$\lambda: \bar{N} - HL = 0$$

The second term indicates that the price of land will equal the consumer's marginal valuation of lot size in equilibrium. Rearranging the first two equations, it follows that

$$p_L = \frac{p - k_H}{L}.$$

This expression implies that the intensive margin value of land (p_L) will equal the extensive margin value of land ($\frac{p - k_H}{L}$) when the quantity of developable land is fixed by geography or regulation. In this scenario, further limitations on the stock of developable land will drive up the price of land and will increase the price of housing. Comparative statics results for this case are as follows:

$$\frac{dH}{d\bar{N}} = \frac{-LHp_{LL}}{|A|} > 0$$
$$\frac{dL}{d\bar{N}} = \frac{Hk_{HH} - Hp_H}{|A|} > 0$$
$$\frac{d\lambda}{d\bar{N}} = \frac{(k_{HH} - p_H)Hp_{LL}}{|A|} > 0$$

where

$$A = \begin{bmatrix} p_H - k_{HH} & 0 & -L \\ 0 & Hp_{LL} & -H \\ -L & -H & 0 \end{bmatrix}$$

and

$$\left|A\right| = H^2 k_{HH} - p_H H^2 - L^2 H p_{LL} > 0 .$$

When the housing stock is also controlled by regulation, the developer's profit maximization problem becomes

$$\max_{H,L,\lambda,\mu} pH - k(H) + \lambda(\bar{N} - HL) + \mu(\bar{H} - H) .$$

The first-order conditions for this problem are

$$\begin{aligned} p(H,L) - k_H - \lambda L - \mu &= 0 \\ p_L - \lambda &= 0 \\ \bar{N} - HL &= 0 \\ \bar{H} - H &= 0 \end{aligned}$$

The equivalent comparative statics with respect to the land constraint are

$$\begin{aligned} \frac{dH}{d\bar{N}} &= 0 \\ \frac{dL}{d\bar{N}} &= \frac{1}{H^2} > 0 \\ \frac{d\lambda}{d\bar{N}} &= \frac{p_{LL}}{H^2} < 0 \\ \frac{d\mu}{d\bar{N}} &= \frac{-Lp_{LL}}{H} > 0 \end{aligned}$$

Similar results can be obtained with respect to the housing constraint.

The first result of interest is to compare the two models to identify a test for rationing of new housing. From the first order conditions in the housing-rationed scenario, we see that

$$\lambda = p_L > \frac{p - k_H}{L} \text{ if } \mu > 0 .$$

Thus, when housing is rationed the intensive margin value of land will be less than the extensive margin value. A comparison of p_L and $\frac{p - k_H}{L}$ is equivalent to a test for rationing of the housing stock.

In the empirical analysis, two special cases of these scenarios are used to measure the impacts of critical habitat designation. In the first approach, housing is assumed to be rationed and lot size fixed. Since density cannot adjust and the stock of land is fixed, on-site avoidance requirements can only be accommodated by reducing the housing stock. The second approach makes the opposite assumption that avoidance requirements have no effect on the housing stock, and critical habitat is accommodated entirely through densification. As shown in the comparative statics results, a combination of these two responses may well occur in reality. Understanding impacts in the extreme cases helps to bracket actual welfare changes.

In the event where housing is rationed by regulation and lot size is fixed, the housing market equilibrium can be described with the aid of the following figure:

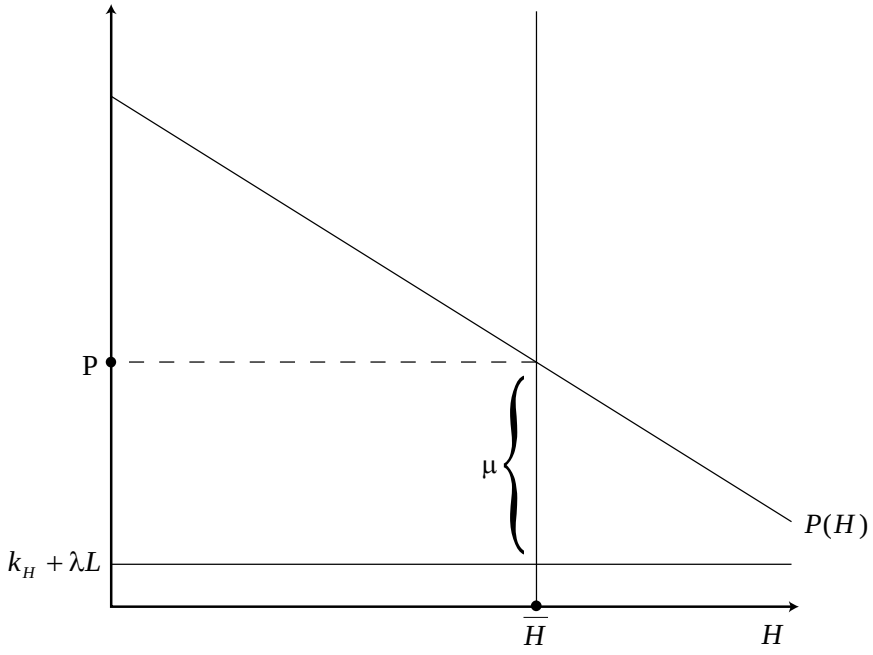

Figure 14: Rationed-Housing Model

Critical habitat designation has three main effects on consumer and producer welfare. First, critical habitat tightens the housing constraint, resulting in higher housing prices and lost rents to developers and landowners. Second, mitigation requirements drive up the marginal cost of housing development, subtracting from the rents earned through the production of scarce housing. Third, the need for Section 7 consultations can delay the completion of housing projects, resulting in surplus losses to consumers and producers.

When the number of housing units are unaffected by critical habitat and all adjustments occur through reducing consumption of land, the relevant market equilibrium is described by the following figure:

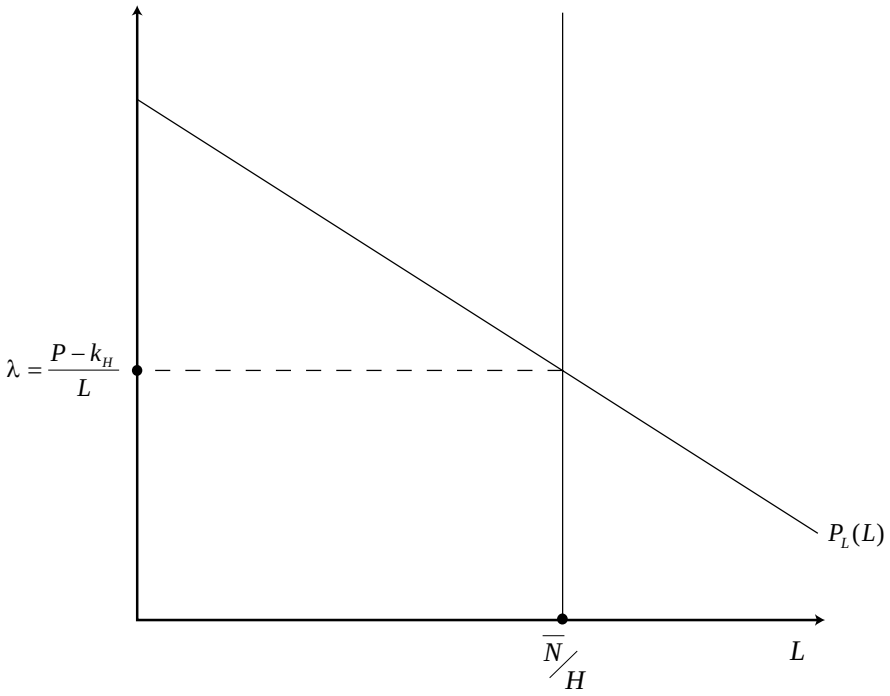

Figure 15: Densification Model

In the densification scenario, critical habitat has similar effects as in the rationed housing scenario: further constraints, increased costs and delay. The next section discussed specification of empirical demand and supply curves to estimate the surplus changes described in this section.

IX.1 Empirical Estimation

Empirical estimates of welfare impacts on the land market are based on the conceptual model outlined and on the spatial and socioeconomic data described earlier. This analysis adopts a supply and demand model for housing and land to compute the welfare impacts of designation. The model's primitives are functions describing the producer's marginal cost (the housing supply function), and the marginal benefit to consumers (the demand functions for land and housing). Estimating these functions permits measurement of the regulatory impact.

The analysis can be broken down into several steps:

1. Identify the supply and demand functions and determine the market equilibrium "but for" the regulatory action.
2. Determine the effects of regulation on consumers' marginal benefits and / or producers' marginal costs.
3. Estimate the resulting new market equilibrium and resultant changes in producer and consumer surplus.

The median home price per census tract was 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 for a total of approximately 245,000 observations.

In some tracts, DataQuick had no observations on new home sales. For these tracts, the median home price and median number of rooms from the 2000 Census were used to approximate new home price and size.[123] 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.

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 median square footage estimates per census tract. By using a single-story, stud-framed, stucco house estimates as the basic house profile and assigning construction quality based on median home price, building costs estimates were then generated in each census tract.

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). 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. These costs are summarized in table. For purposes of this study, total horizontal costs are assumed equal to 23% of the vertical cost of homebuilding. The sum of the building cost, soft cost and hard cost is the builder cost of new housing.

To determine the supply function for land, this analysis assumes the supply of developable land is fixed within each census tract (the supply curve is vertical.) The pre-regulation supply of land in census tract i is set equal to the total acreage of projected greenfield development:

$$q_0^i \equiv G_i$$

To determine greenfield development in each census tract, we adopt a method used by Landis and Reilly (2003), in which the overall urban footprint (including residential, commercial and public development) equals total new population divided by the gross density of people per acre, scaled to account for infill development.[124] Mathematically, projected greenfield development G is expressed as

$$G_i = (1 - F_i)\frac{\Delta P_i}{D_i},$$

[123] The median number of rooms is defined in the census to include bedrooms, kitchens, living rooms and dining rooms but not bathrooms, closets or hallways. This measure was inflated to square footage by assuming each "gross" room was 380 square feet. This estimate was obtained by an auxiliary regression of the DataQuick data.

[124] John D. Landis and Michael Reilly, "How We Will Grow: Baseline Projections of the Growth of California's Urban Footprint through the Year 2100" (August 1, 2003). Institute of Urban & Regional Development. IURD Working Paper Series. Paper WP-2003-04. http://repositories.cdlib.org/iurd/wps/WP-2003-04

where F is the infill share, P is population, and D is the gross density of persons per acre.[125]

Determining the change in population requires forecasts of population at the end of the analytic timeframe and estimates of present-day population. Population forecasts are derived from several sources, in order of preference. Wherever available, they were derived from the region's federally-designated metropolitan planning organization (MPO). Typically created by county governments, these forecasts are the preferred source for growth estimates because they are created using detailed knowledge about local growth trends and characteristics, potentially resulting in higher quality data than those obtained with mathematical forecasting techniques.

For counties where such forecasts were not available, the analysis uses projections created by researchers at UCLA and CalTrans for transportation planning.[126]

Present-day population figures were obtained from Applied Geographic Systems, a private supplier of demographic data. These data draw from a wide range of sources, including the Census, Internal Revenue Service, the Bureau of Labor Statistics, the United States Postal Service and the credit reporting agency, Experian.

The demand[127] function is identified using the pre-regulation equilibrium quantity and supply of land, along with an estimate of the elasticity of demand for land derived from the land economics literature. This elasticity is taken to be -1.0. The quantity of land to be developed must equal the fixed supply discussed in the preceding section. The price of land is determined by estimating bid-rent functions for the area designated as critical habitat and using intensive margin land values.

Combining the pre-regulation equilibrium price and quantity of land demand with the elasticity of demand for land identifies the land demand curve. Let η be the elasticity of demand for land. Then,

$$\eta = \frac{dQ}{dP}\frac{P}{Q} \Rightarrow \frac{dP}{dQ} = \frac{p_0}{q_0\eta} \Rightarrow P = \frac{p_0}{q_0\eta}Q + \beta \Rightarrow P = \frac{p_0}{q_0\eta}Q + p_0\left(1 - \frac{1}{\eta}\right).$$[128]

The rationed housing scenario uses a similar method, with prices and quantities expressed in terms of new housing units in each census tract. New housing units are calculated using the same procedure as for the densification scenario, but also accounting for

---

[125] For brevity, the i subscript is omitted in future formulas. All calculations are indexed at the census tract level.

[126] See "California Travel Trends and Demographics Study," California Department of Transportation, Division of Transportation Planning, Office of State Planning. December 2002.

[127] For purposes of calculating changes in the price of land, the demand curves for land and housing are assumed to be linear. This is a valid assumption since only small deviations around the initial equilibrium typically result from critical habitat designation.

[128] This calculation is valid as long as there is developable land within the census tract, i.e. $q_0 > 0$. If there is no developable land than the impact of designation is zero.

average numbers of persons per household in each census tract, obtained from the 2000 Census.

IX.2 Spatial Allocation of Economic Activity

A key assumption implicit in the above model is the ability to accurately predict the spatial distribution of housing and land development.

The quantity of development within critical habitat is calculated probabilistically using a mathematical identity. First, divide the census tract enclosing one or more habitat units into one-hectare grid cells, supposing there are *n* cells. The analysis proceeds according to whether the tract is covered by the CURBA model.

If so, then the CURBA model gives a probability that each cell will be developed by 2025. Define the CURBA prediction function $C : \{1,\mathsf{K}\ ,n\} \to [0,1]$ mapping each cell to its respective probability of development. The analysis assumes the identity

$$G = \lambda \sum_{i=1}^{n} C(i)$$

holds—in other words, the sum of probability scores within each census tract, scaled by a fixed multiplier, is identically equal to the total projected greenfield development for that tract. Now solve for λ and let the sets H_A and H_B be those cells that fall in Group A and B critical habitat. Then the expected development in Group A habitat is given by

$$G_A = \lambda \sum_{j \in H_A} C(j),$$

with G_B defined similarly.

X ECONOMETRICS

A hedonic regression was used to estimate the regional intensive margin value of land within the main regions of the study area. Using DataQuick data on new home sales, we fit the model

$$price = \beta_0 + \beta_1 lotsize + \beta_2 sqft + \beta_3 beds + \beta_4 baths + \beta_5 stories + \boldsymbol{\beta}\mathbf{tract}$$

for each region affected by critical habitat designation, where:

- *lotsize* is the size of the home's lot in square feet;
- *sqft* is square footage of the dwelling unit;
- *beds* is the number of bedrooms;
- *baths* is the number of bathrooms, including half bathrooms;
- *stories* is the number of stories; and
- **tract** is a vector of indicator variables capturing fixed effects for each census tract.

Coefficient β_1 denotes the marginal effect on price of an acre increase in lot size, holding the other major determinants of home price constant. Table X-1: Results for Sacramento Valley Region through Table X-4: Regression Results for North Sacramento Area display OLS results for each major region where data are available.[129] Observations were subsampled to eliminate outliers and present a representative estimate of the type of greenfield development expected to be affected by critical habitat designation.

The values contained in these tables denote the intensive margin value of an acre of land. In a perfectly competitive market, these estimates will equal the extensive margin value of land, defined as the producer's margin on new home production, scaled by lot size.[130] If the values differ, they suggest that housing is rationed, lending support to that portion of this analysis as the relevant method of assessing the economic impacts of designation. A secondary analysis reveals that, among the five census tracts with highest projected developed in critical habitat, the extensive margin value exceeded the intensive more than 97% of the time; a *t* test strongly rejects the null hypotheses that the two are equal (*p*-value: 0.000).

[129] Because data availability and completeness vary by county, it was not possible to estimate the full model for every region or county affected by critical habitat designation.

[130] Extensive margin = (price – buildcost) / lot size

Table X-1: Results for Sacramento Valley Region

Independent variable	Coefficient	Standard error	t	p-value
lotsize	11.0586	0.306163	36.12	0.000
sqft	120.3521	1.307192	92.07	0.000
bed	-2,934.786	823.0983	-3.57	0.000
bath	10,951.78	1,387.389	7.89	0.000
stories	-22,276.99	1,389.719	-16.03	0.000
Constant	89,128.28	3,231.159	27.58	0.000
N	11,171			
R^2	0.7990			

Table X-2: Regression Results for San Joaquin Valley

Independent variable	Coefficient	Standard error	t	p-value
lotsize	10.2024	0.345923	29.78	0.000
sqft	92.97908	1.435669	64.76	0.000
bed	-1,050.708	873.5263	-1.20	0.229
bath	6,064.542	1,516.707	4.00	0.000
stories	-4,294.984	1,041.246	-4.12	0.000
Constant	132,854	3,680.19	36.10	0.000
N	7,940			
R^2	0.8103			

Table X-3: Regression Results for Bay Area

Independent variable	Coefficient	Standard error	t	p-value
lotsize	13.2025	0.8651704	15.26	0.000
sqft	158.9862	4.275771	37.18	0.000
bed	9,852.859	2,572.515	3.83	0.000
bath	-925.729	2,121.898	-0.44	0.663
stories		N/A[131]		
Constant	158.9862	4.275771	37.18	0.000
N	3.471			
R^2	.7549			

[131] Variable not available for Bay Area counties.

Table X-4: Regression Results for North Sacramento Area

Independent variable	Coefficient	Standard error	t	p-value
lotsize	2.8538	0.832012	3.43	0.001
sqft	167.0559	6.03862	27.66	0.000
bed	6,491.808	3,469.398	1.87	0.062
bath	-11,324.87	6,467.951	-1.75	0.081
stories	50,552.91	12,081.52	4.18	0.000
Constant	122,714.4	35,774.9	3.43	0.001
N	380			
R^2	0.8856			

XI FIVE COUNTIES ANALYSIS

In addition to the statewide results presented earlier, the Service requested additional analysis of the incremental impacts of the biological and non-economic exclusions in five counties: Sacramento, Solano, Butte, Madera and Merced (the "five counties scenario".) This section presents those results by considering a scenario in which land that was excluded in the statewide analysis is reincorporated and treated as if it were a part of the proposed rule.

XI.1 LAND MARKET

The methodology used to calculate land impacts is described in Section IV.2. The results for the five county scenario are presented in Table XI-1: Socioeconomic Characteristics through Table XI-3: Welfare Impacts.

XI.2 OVERVIEW OF AFFECTED LANDS

Critical habitat designation affects a total of 719,873 acres in the 5-county region. Table XI-4: Non-Economic Exclusions by County and Table XI-5: Biological Exclusions by County and summarize these lands by county, according to the non-economic and biological exclusions they contain. There are a total of 32,304 acres excluded due for non-economic reasons, and 201,802 acres excluded because of biological considerations. Merced County contains the largest portion of both types of exclusions.

XI.3 PUBLIC PROJECTS AND ACTIVITIES

XI.3.1 Transportation Planning

Transportation planning impacts were calculated using the same methodology and data sources as in Section V.1. The results are summarized in Table XI-6: Transportation Impacts by County. Incorporating excluded lands results in an additional 4,510 meters (2.8 miles) of planned highway projects being affected by designation. The added cost due to mitigation for these projects is $6,370,922.

XI.3.2 Energy Industry

The SMUD Consumnes plant is the only planned power plant in California that is within one mile of critical habitat. The power plant is 897 yards from critical habitat excluded due to biological considerations. This plant was already analyzed in the statewide analysis, where it was determined that the impacts proceeding from designation were minimal. Adding excluded habitat to the analysis presents poses no new mitigation issues since the plant expansion has already undergone a Service consultation. Thus, the exclusions are not expected to add new costs for mitigation.

XI.3.3 Public Lands

Table XI-7: Impacts on Federal Lands lists intersections between the five counties scenario habitat and land managed by the Federal government. Wilderness areas and closed military bases are assumed to be unaffected by designation. The only remaining salient habitat is a 3,449-acre in Solano County, overlapping Travis Air Force Base. This represents a 735-acre increase in designated land over the statewide analysis. To the

extent that that land was excluded at the request of the Department of Defense, its inclusion in the final rule could have welfare impacts stemming from a reduction in military readiness. In order to estimate the effects, it is necessary to calculate the social benefits proceeding from military preparedness, a non-trivial exercise. At present, this analysis does not attempt to estimate those impacts, however they are likely to be considerable.

Table XI-1: Socioeconomic Characteristics

FIPS	County	Median Home Price	Average Square Footage	Projected Population Increase	New Households
06007000101	Butte	$260,971	1,520	10,199	3,676
06007000102	Butte	$265,572	2,047	2,223	850
06007000201	Butte	$255,669	1,547	1,084	433
06007000202	Butte	$255,062	1,630	902	394
06007000800	Butte	$274,061	2,006	1,134	433
06007000900	Butte	$311,627	1,511	17,714	6,582
06007001400	Butte	$456,840	2,579	4,473	1,434
06007001500	Butte	$392,497	2,256	2,221	761
06007001600	Butte	$454,191	2,645	3,545	1,307
06007002200	Butte	$272,039	2,318	3,160	1,286
06007002300	Butte	$452,976	2,483	2,837	1,148
06007002500	Butte	$168,559	1,743	2,190	638
06007002900	Butte	$168,964	1,248	3,417	1,135
06007003600	Butte	$170,783	1,401	1,999	635
06039000102	Madera	$282,198	2,072	1,733	623
06039000105	Madera	$225,329	1,986	11,943	4,038
06039000200	Madera	$251,806	2,307	24,222	2,763
06039000507	Madera	$203,327	1,686	6,952	1,689
06039000508	Madera	$284,385	2,196	4,802	1,104
06039000509	Madera	$246,820	1,836	3,704	1,021
06039001000	Madera	$264,274	2,043	678	174
06047000100	Merced	$200,691	1,741	310	88
06047000303	Merced	$79,273	1,343	919	240
06047000400	Merced	$295,165	1,736	4,477	1,242
06047000503	Merced	$220,841	1,638	2,090	539
06047000901	Merced	$188,600	1,431	377	96
06047000903	Merced	$535,107	3,161	640	185

FIPS	County	Median Home Price	Average Square Footage	Projected Population Increase	New Households
06047001002	Merced	$253,199	1,463	2,252	733
06047001101	Merced	$413,330	2,196	3,053	904
06047001801	Merced	$346,551	1,902	2,684	770
06047001802	Merced	$263,876	1,474	296	77
06047001901	Merced	$214,923	1,271	1,818	368
06047001902	Merced	$163,304	1,239	1,983	475
06047002000	Merced	$341,305	2,131	2,640	774
06047002100	Merced	$377,961	2,206	1,965	526
06047002302	Merced	$348,477	1,786	13,101	3,232
06067007206	Sacramento	$240,308	2,074	1,269	230
06067008005	Sacramento	$534,572	2,506	1,789	395
06067008600	Sacramento	$464,084	2,514	9,248	2,223
06067008701	Sacramento	$450,638	2,209	90,327	22,574
06067008800	Sacramento	$346,657	1,993	3,975	958
06067009005	Sacramento	$223,129	1,092	0	0
06067009009	Sacramento	$324,790	1,440	5,063	1,467
06067009200	Sacramento	$291,883	1,858	17,093	3,297
06067009315	Sacramento	$637,657	3,201	36,447	6,987
06067009403	Sacramento	$324,376	2,177	364	69
06067009404	Sacramento	$380,438	2,263	1,030	205
06067009406	Sacramento	$352,231	1,932	273	54
06095252305	Solano	$439,510	2,805	1,191	319
06095252308	Solano	$587,203	2,684	3,325	894
06095252309	Solano	$473,026	2,275	6,572	1,586
06095252402	Solano	$283,045	1,799	1,835	458
06095252502	Solano	$225,615	1,490	1,600	339
06095252607	Solano	$253,549	1,743	1,093	258
06095252609	Solano	$283,631	2,009	1,766	443

FIPS	County	Median Home Price	Average Square Footage	Projected Population Increase	New Households
06095252702	Solano	$457,774	2,461	3,744	966
06095252703	Solano	$383,199	1,730	664	153
06095252706	Solano	$313,713	2,198	341	77
06095252707	Solano	$307,071	3,005	1,018	276
06095252902	Solano	$504,685	2,444	4,334	1,378
06095252904	Solano	$417,088	1,945	2,810	756
06095252907	Solano	$485,051	2,385	4,814	1,184
06095252909	Solano	$352,194	2,678	823	202
06095252910	Solano	$409,905	1,853	984	238
06095253000[132]	Solano			37	
06095253105	Solano	$464,949	2,441	1,623	475
06095253108	Solano	$327,582	1,856	1,128	125
06095253202	Solano	$450,378	1,968	5,774	1,378
06095253300	Solano	$415,752	2,100	316	72
06095253500	Solano	$366,065	1,619	13,039	3,900
Total			**138,528**	**375,446**	**96,307**

[132] Data unavailable.

Table XI-2: Market Impacts

FIPS	County	Projected Housing Units, Group A	Projected Housing Units, Group B	Projected Housing, Total	Change in Housing Units	Pre-Regulation Housing Price	Change in Housing Price
06007000101	Butte	0	2,615	3,676	-157	$260,971	$11,140
06007000102	Butte	0	407	850	-24	$265,572	$7,620
06007000201	Butte	0	217	433	-13	$255,669	$7,669
06007000202	Butte	0	0	394	0	$255,062	$0
06007000800	Butte	0	0	433	0	$274,061	$0
06007000900	Butte	1,234	3,651	6,582	-219	$311,627	$10,371
06007001400	Butte	4	437	1,434	-26	$456,840	$8,362
06007001500	Butte	39	3	761	0	$392,497	$90
06007001600	Butte	7	227	1,307	-14	$454,191	$4,731
06007002200	Butte	725	82	1,286	-5	$272,039	$1,036
06007002300	Butte	320	0	1,148	0	$452,976	$0
06007002500	Butte	33	6	638	0	$168,559	$89
06007002900	Butte	85	478	1,135	-29	$168,964	$4,269
06007003600	Butte	5	0	635	0	$170,783	$0
06039000102	Madera	91	0	623	0	$282,198	$0
06039000105	Madera	1,342	0	4,038	0	$225,329	$0
06039000200	Madera	67	0	2,763	0	$251,806	$0
06039000507	Madera	972	0	1,689	0	$203,327	$0
06039000508	Madera	208	0	1,104	0	$284,385	$0
06039000509	Madera	809	0	1,021	0	$246,820	$0
06039001000	Madera	26	0	174	0	$264,274	$0
06047000100	Merced	7	48	88	-3	$200,691	$6,518
06047000303	Merced	0	3	240	0	$79,273	$51
06047000400	Merced	0	46	1,242	-3	$295,165	$651
06047000503	Merced	85	125	539	-8	$220,841	$3,073

FIPS	County	Projected Housing Units, Group A	Projected Housing Units, Group B	Projected Housing, Total	Change in Housing Units	Pre-Regulation Housing Price	Change in Housing Price
06047000901	Merced	9	16	96	-1	$188,600	$1,918
06047000903	Merced	0	86	185	-5	$535,107	$14,902
06047001002	Merced	0	174	733	-10	$253,199	$3,598
06047001101	Merced	0	0	904	0	$413,330	$0
06047001801	Merced	0	475	770	-28	$346,551	$12,828
06047001802	Merced	0	0	77	0	$263,876	$0
06047001901	Merced	0	248	368	-15	$214,923	$8,713
06047001902	Merced	148	104	475	-6	$163,304	$2,151
06047002000	Merced	0	277	774	-17	$341,305	$7,320
06047002100	Merced	0	12	526	-1	$377,961	$522
06047002302	Merced	0	465	3,232	-28	$348,477	$3,007
06067007206	Sacramento	7	0	230	0	$240,308	$0
06067008005	Sacramento	0	0	395	0	$534,572	$0
06067008600	Sacramento	422	271	2,223	-16	$464,084	$3,397
06067008701	Sacramento	807	8,164	22,574	-490	$450,638	$9,777
06067008800	Sacramento	596	233	958	-14	$346,657	$5,055
06067009005	Sacramento	0	0	0	0	$223,129	0
06067009009	Sacramento	90	0	1,467	0	$324,790	$0
06067009200	Sacramento	802	918	3,297	-55	$291,883	$4,874
06067009315	Sacramento	372	512	6,987	-31	$637,657	$2,806
06067009403	Sacramento	2	0	69	0	$324,376	$0
06067009404	Sacramento	67	68	205	-4	$380,438	$7,608
06067009406	Sacramento	13	14	54	-1	$352,231	$5,540
06095252305	Solano	0	3	319	0	$439,510	$250
06095252308	Solano	0	0	894	0	$587,203	$0
06095252309	Solano	96	1,323	1,586	-79	$473,026	$23,658
06095252402	Solano	0	140	458	-8	$283,045	$5,186

FIPS	County	Projected Housing Units, Group A	Projected Housing Units, Group B	Projected Housing, Total	Change in Housing Units	Pre-Regulation Housing Price	Change in Housing Price
06095252502	Solano	0	378	339	-23	$225,615	$15,098
06095252607	Solano	0	0	258	0	$253,549	0
06095252609	Solano	0	0	443	0	$283,631	0
06095252702	Solano	169	144	966	-9	$457,774	$4,101
06095252703	Solano	76	0	153	0	$383,199	$0
06095252706	Solano	0	76	77	-5	$313,713	$18,363
06095252707	Solano	0	8	276	-1	$307,071	$560
06095252902	Solano	0	0	1,378	0	$504,685	$0
06095252904	Solano	213	0	756	0	$417,088	$0
06095252907	Solano	321	509	1,184	-31	$485,051	$12,519
06095252909	Solano	1	0	202	0	$352,194	$0
06095252910	Solano	119	119	238	-7	$409,905	$12,295
06095253000	Solano[133]						
06095253105	Solano	0	0	475	0	$464,949	$0
06095253108	Solano	0	0	125	0	$327,582	$57
06095253202	Solano	325	0	1,378	0	$450,378	$0
06095253300	Solano	3	0	72	0	$415,752	$0
06095253500	Solano	1,065	712	3,900	-43	$366,065	$4,009
Total		**11,781**	**23,794**	**96,307**	**-1,427**		

[133] Data unavailable.

Table XI-3: Welfare Impacts

FIPS	County	Surplus Lost	Annualized Impacts
06007000101	Butte	$50,703,580	$4,472,953
06007000102	Butte	$8,102,745	$714,805
06007000201	Butte	$4,379,264	$386,329
06007000202	Butte	$0	$0
06007000800	Butte	$0	$0
06007000900	Butte	$106,281,792	$9,375,934
06007001400	Butte	$13,667,783	$1,205,740
06007001500	Butte	$627,252	$55,335
06007001600	Butte	$6,149,189	$542,467
06007002200	Butte	$9,462,950	$834,800
06007002300	Butte	$4,624,028	$407,921
06007002500	Butte	$408,947	$36,076
06007002900	Butte	$7,051,592	$622,075
06007003600	Butte	$46,774	$4,126
06039000102	Madera	$1,052,282	$92,830
06039000105	Madera	$12,146,918	$1,071,573
06039000200	Madera	$1,383,640	$122,062
06039000507	Madera	$11,211,069	$989,015
06039000508	Madera	$2,821,758	$248,929
06039000509	Madera	$9,475,329	$835,892
06039001000	Madera	$335,699	$29,615
06047000100	Merced	$880,288	$77,657
06047000303	Merced	$18,195	$1,605
06047000400	Merced	$1,164,228	$102,705
06047000503	Merced	$3,274,483	$288,867
06047000901	Merced	$393,753	$34,736
06047000903	Merced	$3,605,742	$318,090
06047001002	Merced	$3,870,008	$341,403
06047001101	Merced	$0	$0
06047001801	Merced	$13,608,354	$1,200,498
06047001802	Merced	$0	$0
06047001901	Merced	$6,266,942	$552,855
06047001902	Merced	$2,996,983	$264,387
06047002000	Merced	$7,285,105	$642,675
06047002100	Merced	$351,184	$30,981
06047002302	Merced	$14,330,357	$1,264,191
06067007206	Sacramento	$102,241	$9,019

FIPS	County	Surplus Lost	Annualized Impacts
06067008005	Sacramento	$0	$0
06067008600	Sacramento	$19,430,850	$1,714,145
06067008701	Sacramento	$349,696,480	$30,849,414
06067008800	Sacramento	$16,269,718	$1,435,277
06067009005	Sacramento	$0	$0
06067009009	Sacramento	$1,540,740	$135,921
06067009200	Sacramento	$42,439,128	$3,743,882
06067009315	Sacramento	$37,807,072	$3,335,253
06067009403	Sacramento	$35,463	$3,128
06067009404	Sacramento	$3,275,010	$288,914
06067009406	Sacramento	$587,457	$51,824
06095252305	Solano	$101,044	$8,914
06095252308	Solano	$0	$0
06095252309	Solano	$45,771,196	$4,037,829
06095252402	Solano	$2,042,486	$180,183
06095252502	Solano	$7,993,725	$705,188
06095252607	Solano	$0	$0
06095252609	Solano	$0	$0
06095252702	Solano	$7,087,971	$625,284
06095252703	Solano	$1,171,745	$103,369
06095252706	Solano	$1,952,025	$172,203
06095252707	Solano	$207,615	$18,315
06095252902	Solano	$0	$0
06095252904	Solano	$3,285,591	$289,847
06095252907	Solano	$22,804,604	$2,011,769
06095252909	Solano	$6,385	$563
06095252910	Solano	$5,056,584	$446,080
06095253000	Solano		
06095253105	Solano	$0	$0
06095253108	Solano	$13,203	$1,165
06095253202	Solano	$5,499,170	$485,124
06095253300	Solano	$34,121	$3,010
06095253500	Solano	$30,275,324	$2,670,819
Total		**$912,465,156**	**$80,495,565**

Table XI-4: Non-Economic Exclusions by County

County	Non-Economic Exclusion	Total
Butte	Butte Creek Canyon ER	137
	Mechoopda Tribe	644
	Oroville WA	40
	(None)	68,913
	TOTAL	69,734
Madera	San Joaquin River ER	277
	(None)	112,558
	TOTAL	112,835
Merced	North Grasslands WA	4,285
	San Luis NWR	19,542
	(None)	311,751
	TOTAL	335,579
Sacramento	Phoenix Field ER	7
	(None)	105,713
	TOTAL	105,721
Solano	Calhoun Cut ER	1,166
	Grizzly Island WA	220
	Hill Slough WA	896
	Travis AFB	5,090
	(None)	88,632
	TOTAL	96,004
Non-Economic Exclusions Total		32,304
Total		719,873

Table XI-5: Biological Exclusions by County

County	Biological Exclusions	Non-Excluded	Total
Butte	10,064	59,670	69,734
Madera	16,757	96,079	112,835
Merced	117,416	218,162	335,579
Sacramento	36,894	68,827	105,721
Solano	20,672	75,332	96,004
Total	201,802	518,070	719,873

Table XI-6: Transportation Impacts by County

County	Exclusion Type	Habitat Group	Project	Length (Yards)	Mitigation Costs
Butte	Biological	A	SR-99 East Biggs Hwy to SR-162, widen roadway 40 feet	167	$381,177
	Biological	B	SR-99 Wilson Landing Road to Hamilton-Nord Canal Hwy, widen for shoulder and left turn lane	425	$645,466
			Total	592	$1,026,643
Madera	Biological	A	2C/4C:AVE 12 TO AVE 15	1,998	$3,033,674
Merced	Biological	A	6F to 8F	890	$1,352,512
Solano	Biological	A	I-80 HOV lane between I-680 and I-505 through Fairfield and Vacaville.	630	$958,092
Total				4,112	$6,370,922

Table XI-7: Impacts on Federal Lands

Department	Area	Acreage
Air Force (DOD)	Castle Air Force Base (Closed)	343
	Mather Air Force Base (Closed)	2,762
	Travis Air Force Base	3,449
	Total	6,554
National Wildlife Refuge (FWS)	Kesterson National Wildlife Refuge	6,265
	Merced National Wildlife Refuge	2,577
	San Luis National Wildlife Refuge	7,085
	Total	15,927
Wildlife Management Area (FWS)	Grasslands Wildlife Management Area	69,469
Total		91,950