IEc

ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THE CALIFORNIA RED-LEGGED FROG

Final Report | January 25, 2010

prepared for:

U.S. Fish and Wildlife Service

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LIST OF ACRONYMS

Act	Endangered Species Act
AUMs	animal unit months
BEC	Berkeley Economic Consulting
BLM	U.S. Bureau of Land Management
BMPs	Best Management Practices
CA DFG	California Department of Fish and Game
Caltrans	California Department of Transportation
CARS	critical aquatic refuges
CCA	California Coastal Act
CDPR	California Department of Parks and Recreation
CFPR	California Forest Practice Rules
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CHD	critical habitat designation
CNDDB	California Natural Diversity Data Base
CTIS	California Transportation Investment System
CWA	Clean Water Act
DOI	U.S. Department of the Interior
ECCHCP	East Contra Costa County HCP
EIR	Environmental Impact Report
E.O.	Executive Orders
EPA	U.S. Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
ESHAs	environmentally sensitive habitat areas
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FMMP	Farmland Mapping & Monitoring Program
frog	California red-legged frog

FWS	Fish and Wildlife Service
HCP	Habitat Conservation Plan
IEC	Industrial Economics, Inc.
IRFA	Initial Regulatory Flexibility Analysis
IUDA	initial urban development area
MSHCP	Multiple Species Habitat Conservation Plan
MUDA	maximum urban development area
NAICS	North American Industry Classification System
NASS	National Agriculture Statistics Service
NRCS	Natural Resources Conservation Service
NGOs	non-governmental agencies
OMB	U.S. Office of Management and Budget
PCEs	primary constituent elements
RCA	riparian conservation area
RFA	Regulatory Flexibility Act
RPF	Registered Professional Forester
SBA	U.S. Small Business Administration
SBREFA	Small Business Regulatory Enforcement Fairness Act
Service	U.S. Fish and Wildlife Service
SNFPA	Sierra Nevada Forest Plan Amendment
THP	Timber Harvest Plan
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
WHIP	Wildlife Habitat Incentives Program
WLPZ	watercourse and lake protection zone
WUI	Wildlife-Urban Interface

EXECUTIVE SUMMARY

1. The purpose of this report is to identify and analyze the potential economic impacts resulting from the proposed critical habitat designation for the California red-legged frog (*Rana aurora draytonii*, hereafter, "frog"). This report was prepared by Industrial Economics, Incorporated (IEc) and Berkeley Economic Consulting (BEC) under contract to the U.S. Fish and Wildlife Service (Service).

OVERVIEW OF THE PROPOSED RULE

2. The frog was listed as threatened under the Endangered Species Act (Act) on May 23, 1996. Subsequently, the Service designated critical habitat on March 13, 2001 and revised the designation on April 13, 2006.[1] Then on December 12, 2007, the Center for Biological Diversity filed a complaint against the Service challenging the 2006 revision. In April 2008, the court entered a consent decree requiring a revised critical habitat rule by August 2009. On September 16, 2008, the Service published a Proposed Rule revising the designation of critical habitat for the frog.[2] In support of the revised proposed rule, on April 28, 2009, the Service published a Notice of Availability of the economic analysis estimating the rule's impacts.[3] On October 28, 2009, the Service reopened the public comment period, publishing a second Notice of Availability for a revised economic analysis. This most recent public comment period closed on November 9, 2009.[4] This economic analysis updates that report based on new information received during the public comment periods and since that time. A map of the proposed critical habitat is presented in ES-1.

3. The 50 proposed critical habitat units cover approximately 1.8 million acres across 28 counties in California. These proposed critical habitat units (the study area) include: approximately 70 percent private lands; 21 percent Federal lands; seven percent State lands; two percent owned by city, county, or other local entities; and less than one percent owned by conservation groups (e.g., The Nature Conservancy) and non-governmental

[1] 66 FR 14626; 71 FR 19244.

[2] 73 FR 53492.

[3] 74 FR 19184; and Industrial Economics, Incorporated, Economic Analysis of Critical Habitat Designation for the California Red-legged Frog, prepared for the U.S. Fish and Wildlife Service, March 3, 2009.

[4] 74 FR 51825; and Industrial Economics, Incorporated, Economic Analysis of Critical Habitat Designation for the California Red-legged Frog, prepared for the U.S. Fish and Wildlife Service, March 3, 2009.

organizations (NGOs). All of the proposed units are considered to be currently occupied by the frog.[5]

4. The Service is considering for exclusion six acres covered by the Bonny Doon Quarries Settlement Ponds Habitat Conservation Plan (HCP), 4,097 acres of non-Federal land within the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP), 92,592 acres of local land covered by the East Contra Costa County HCP, 8,292 acres of local land managed by the East Bay Regional Park District and 54 acres of Federal land managed by the U.S. Bureau of Land Management (BLM) under the Spivey Pond Management Plan.[6]

5. This analysis describes economic impacts of frog conservation efforts associated with the following categories of activity: (1) Residential and Commercial Development, (2) Water Management, (3) Agricultural Crop Farming, (4) Ranching/Grazing, (5) Timber Harvest, (6) Transportation, (7) Fire Management, (8) Utility and Oil and Gas Pipeline Construction and Maintenance and Mining Activities, and (9) Habitat Management. Forecast impacts are organized into two categories according to "without critical habitat" and "with critical habitat" scenarios. The "without critical habitat" scenario represents the baseline for the analysis, considering protections already accorded the frog; for example, protections provided under the Federal and State listing and other Federal, State, and local regulations. The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated economic impacts would not occur but for the designation. This analysis also looks at indirect costs that are the result of the influence of critical habitat designation upon other, non-Federal decision-makers. Because the Service believes that the direct benefits of the proposed rule are best expressed in biological terms, this analysis does not quantify or monetize benefits. However, a qualitative discussion of potential categories of benefits is provided at the end of the report.

6. Key findings of this analysis are presented below.[7] Throughout the report, impacts occurring prior to the finalization of this proposed rule (1996 – 2008) are referred to as "pre-designation" impacts. Likewise, impacts anticipated to occur after publication of the final rule (2009 – 2030) are referred to as "post-designation" impacts. Post-designation

[5] U.S. Fish and Wildlife Service, Endangered and Threatened Wildlife and Plants; Revised Critical Habitat for the California Red-Legged Frog (*Rana aurora draytonii*); Proposed Rule, published in the *Federal Register* on September 16, 2008, Vol. 73, No. 180.

[6] Chapter 1 provides detailed maps of all units, including areas considered for exclusion.

[7] As previously discussed, three existing HCPs, the Western Riverside MSHCP, the East Contra Costa County HCP and the Bonny Doon Quarries Settlement Pond Habitat Conservation Plan include conservation measures for the frog within acres considered for exclusion. For areas covered by these HCPs, frog conservation efforts are unlikely to be altered by the designation of critical habitat, therefore costs associated with implementing these conservation efforts would be attributed to the baseline. Ideally, this analysis would quantify the future baseline protections measures undertaken for the frog in the area of critical habitat within the boundaries of existing HCPs. It is anticipated that any information received during the public comment period regarding the characterization and cost of project modifications required by these plans will be included in the final version of this report.

impacts may occur in the baseline or be attributed as an incremental result of the designation.

7. A summary of post-designation impacts is presented in Exhibit ES-2, and total impacts by activity are presented in Exhibit ES-3. Detailed post-designation baseline and incremental impacts are presented by unit and activity in Exhibits ES-4 and ES-5, respectively. Exhibits ES-6 and ES-7 present the distribution of baseline and incremental impacts on development activities by proposed critical habitat unit. Exhibit ES-8 presents the distribution of overall incremental impacts by unit. Exhibits ES-9 and ES-10 present the geographic range of post-designation baseline and incremental impacts by subunit, respectively. Finally, Exhibit ES-11 provides incremental impact rankings for the top 20 subunits.[8]

8. Present value costs by time period and activity are presented throughout the report applying a discount rate of seven percent; the report tables are repeated in Appendix C applying a discount rate of three percent. Appendix D presents the undiscounted stream of impacts. Appendix B presents impacts by subunit. Administrative costs of consultations under section 7 of the Endangered Species Act (the Act) are incorporated into each Chapter corresponding to the activity for which the consultations are undertaken.

[8] A subunit is defined by a unique combination of a proposed critical habitat unit and a census tract.

KEY FINDINGS

Post-designation Baseline Impacts: Baseline impacts associated with consideration of the frog and its habitat are estimated to be $575 million to $1.34 billion ($36.1 million to $84.0 million on an annualized basis), assuming a three percent discount rate, or $488 to $1.25 billion ($44.1 million to $113 million on an annualized basis), assuming a seven percent discount rate, through the year 2030.*

Detailed Baseline Impacts: In the high scenario, impacts to development represent between 75 and 80 percent of total impacts, depending on the discount rate applied, followed by agricultural impacts, which account for most of the remaining costs. Impacts to all other activities, combined, represent approximately one percent of the total. In the low scenario, agricultural impacts become relatively more important, representing approximately 45 to 53 percent of total impacts, depending on the discount rate applied.

- Development: Development impacts are estimated to range from $257 million to $999 million assuming a seven percent discount rate. The largest cost expected in the post-designation period results from project delays as developers complete the section 7 consultation process and assemble required habitat offsets. Development projects not subject to section 7 consultation may experience similar delay costs indirectly as a result of the CEQA review process. The difference in estimates depends on the length of the delay, which may range from nine months to two years depending on whether habitat offsets are requested.

- Agricultural Activities: Agricultural conservation efforts are estimated to be $222 million to $229 million assuming a seven percent discount rate. Costs stem from lost agricultural production resulting from the implementation of no-pesticide use areas for 66 pesticide active ingredients in the study area, as required by a Stipulated Injunction issued on October 20, 2006. Estimates vary based on assumptions about the size of the buffer zone used to estimate affected acres.

- Other Activities: Baseline impacts to water management, transportation, utility and oil and gas pipelines, timber harvest, fire management, and habitat management constitute about one percent of total baseline impacts under both the low and high scenarios, assuming a seven percent discount rate. Activities associated with these impacts include frog survey and monitoring, and administrative costs of consultation and are often due to the presence of the frog or other pre-existing conditions.

Post-designation Incremental Impacts: Incremental impacts associated with the designation of critical habitat for the frog are estimated to be $178 million to $519 million ($11.2 million to $32.5 million on an annualized basis), assuming a three percent discount rate, or $159 million to $500 million ($14.4 million to $45.2 million annualized), assuming a seven percent discount rate, through the year 2030.

Detailed Incremental Impacts: As under the baseline scenario, impacts to development dominate, comprising 87 to 90 percent of total impacts, with agricultural impacts accounting for almost all of the remaining costs.

- Development: Incremental impacts range from $110 million to $451 million, assuming a seven percent discount rate, depending on the delay period. The types of costs and delay periods are the same as those described above.

- Agriculture Activities: Agricultural conservation efforts are estimated to be up to $48.4 million, assuming a seven percent discount rate. These costs result from the imposition of no-pesticide use areas in geographic regions not historically subject to the Stipulated Injunction described above.

- Other Activities: Incremental impacts to water management, transportation, utility and oil and gas pipelines, timber harvest, fire management, and habitat management constitute less than one percent of total incremental impacts, assuming a seven percent discount rate. Activities associated with these impacts are primarily administrative in nature.

* Additional unquantified baseline impacts include conservation measures to protect the frog from a proposed mining expansion project in SOL-1. Information to estimate the costs of these potential conservation measures is not available. For more discussion, see Section 10.2.

EXHIBIT ES-1 REVISED PROPOSED CRITICAL HABITAT

EXHIBIT ES-2 SUMMARY OF POST-DESIGNATION IMPACTS (PRESENT VALUE, 2009 DOLLARS)

	THREE PERCENT DISCOUNT RATE		SEVEN PERCENT DISCOUNT RATE	
	LOW SCENARIO	HIGH SCENARIO	LOW SCENARIO	HIGH SCENARIO
IMPACTS ATTRIBUTED TO EXISTING, BASELINE REGULATIONS*				
Present Value Impacts	$575,000,000	$1,340,000,000	$488,000,000	$1,250,000,000
Annualized Impacts	$36,100,000	$84,000,000	$44,100,000	$113,000,000
IMPACTS ATTRIBUTED INCREMENTALLY OF CRITICAL HABITAT DESIGNATION (THE PROPOSED RULE)				
Present Value Impacts	$178,000,000	$519,000,000	$159,000,000	$500,000,000
Annualized Impacts	$11,200,000	$32,500,000	$14,400,000	$45,200,000

Note: Totals may not sum due to rounding.

* Additional unquantified baseline impacts include conservation measures to protect the frog from a proposed mining expansion project in SOL-1. Information to estimate the costs of these potential conservation measures is not available. For more discussion, see Section 10.2.

EXHIBIT ES-3 SUMMARY OF POST-DESIGNATION, HIGH IMPACTS BY ACTIVITY (2009 DOLLARS, ASSUMES A SEVEN PERCENT DISCOUNT RATE)

ACTIVITY	BASELINE IMPACTS		INCREMENTAL IMPACTS	
	PRESENT VALUE IMPACTS	PERCENT OF TOTAL IMPACTS	PRESENT VALUE IMPACTS	PERCENT OF TOTAL IMPACTS
Development	$999,000,000	80%	$451,000,000	90%
Water Management	$2,930,000	0%	$188,000	0%
Agriculture	$229,000,000	18%	$48,400,000	10%
Grazing	$0	0%	$291,000	0%
Timber Harvest	$8,950,000	1%	$11,200	0%
Transportation	$2,220,000	0%	$27,200	0%
Fire Management	$24,800	0%	$42,600	0%
Utility & Pipeline	$2,440,000	0%	$61,300	0%
Species Management	$489,000	0%	$74,300	0%
Total	**$1,250,000,000**	**100%**	**$500,000,000**	**100%**

EXHIBIT ES-4 SUMMARY OF POST-DESIGNATION BASELINE IMPACTS BY UNIT AND ACTIVITY: HIGH SCENARIO (PRESENT VALUE, 2009 DOLLARS, SEVEN PERCENT)

UNIT	DEVELOPMENT	WATER MANAGEMENT	AGRICULTURE	TIMBER HARVEST	TRANSPORTATION	FIRE MANAGEMENT	UTILITY & PIPELINE	SPECIES MANAGEMENT	TOTAL
ALA-1A	$59,100,000	$16,100	$0	$0	$0	$0	$0	$22	$59,100,000
ALA-1B	$37,600,000	$62,500	$0	$0	$0	$0	$0	$60	$37,600,000
ALA-2	$114,000,000	$138,000	$33,100	$0	$0	$0	$163,000	$1,670	$114,000,000
BUT-1	$0	$43,600	$0	$83,100	$0	$12,800	$0	$50,100	$190,000
CAL-1	$7,650,000	$29,000	$0	$0	$0	$0	$0	$0	$7,680,000
CCS-1	$269,000	$80,100	$212,000	$0	$0	$0	$81,300	$106	$643,000
CCS-2	$259,000,000	$246,000	$1,040,000	$0	$600,000	$0	$244,000	$1,010	$261,000,000
ELD-1	$7,700,000	$43,600	$1,790	$229,000	$0	$0	$0	$88,800	$8,060,000
LOS-1	$0	$29,000	$0	$0	$0	$9,800	$0	$6,500	$45,300
MEN-1	$56,200	$58,100	$0	$0	$0	$0	$0	$0	$114,000
MNT-1	$18,100	$29,300	$0	$0	$0	$0	$0	$54	$47,500
MNT-2	$27,900,000	$146,000	$16,600,000	$0	$890,000	$0	$81,300	$12,800	$45,700,000
MNT-3	$46,800	$71,800	$6,240,000	$0	$0	$0	$0	$3,010	$6,360,000
MRN-1	$1,510,000	$14,500	$2,530	$0	$0	$0	$0	$1,340	$1,530,000
MRN-2	$149,000	$29,000	$7,290	$0	$0	$0	$0	$3,880	$189,000
MRN-3	$1,300,000	$58,100	$137,000	$0	$0	$0	$0	$5,840	$1,500,000
NAP-1	$393,000	$14,500	$7,800	$0	$0	$0	$0	$0	$415,000
NEV-1	$3,620,000	$58,100	$2,670	$394,000	$0	$766	$0	$61,300	$4,140,000
PLA-1	$564,000	$51,500	$0	$4,400	$0	$0	$0	$27,500	$647,000
RIV-1	$0	$43,600	$26,700	$0	$0	$0	$0	$0	$70,200
SCZ-1	$105,000,000	$120,000	$61,400,000	$3,280,000	$74,900	$0	$81,300	$70,500	$170,000,000
SCZ-2	$75,600,000	$46,300	$54,400,000	$0	$74,900	$0	$0	$4,120	$130,000,000
SLO-1	$9,190,000	$33,500	$103,000	$0	$0	$0	$163,000	$12,500	$9,500,000
SLO-2	$58,000,000	$78,900	$11,100,000	$0	$0	$0	$81,300	$10,100	$69,300,000
SLO-3	$92,500,000	$124,000	$13,300,000	$0	$310,000	$0	$163,000	$10,900	$106,000,000

UNIT	DEVELOPMENT	WATER MANAGEMENT	AGRICULTURE	TIMBER HARVEST	TRANSPORTATION	FIRE MANAGEMENT	UTILITY & PIPELINE	SPECIES MANAGEMENT	TOTAL
SLO-4	$598,000	$53,900	$10,700	$0	$0	$0	$0	$3,280	$666,000
SNB-1	$804,000	$48,900	$25,500,000	$0	$0	$0	$0	$1,060	$26,300,000
SNB-2	$3,070	$17,100	$48,200	$0	$0	$0	$81,300	$506	$150,000
SNB-3	$68,300	$53,000	$41,500	$0	$0	$0	$81,300	$1,870	$246,000
SNM-1	$20,900,000	$111,000	$1,590,000	$0	$0	$0	$81,300	$245	$22,700,000
SNM-2	$47,100,000	$142,000	$4,560,000	$4,270,000	$0	$0	$0	$1,530	$56,100,000
SOL-1	$5,640,000	$14,500	$56,500	$0	$0	$0	$81,300	$0	$5,800,000
SOL-2	$1,010,000	$14,500	$21,500	$0	$0	$0	$81,300	$0	$1,130,000
SOL-3	$6,140,000	$29,000	$21,300	$0	$0	$0	$81,300	$0	$6,270,000
SON-1	$119,000	$29,000	$506	$0	$0	$0	$0	$0	$149,000
SON-2	$183,000	$14,500	$15,500	$0	$0	$0	$0	$0	$213,000
SON-3	$2,150,000	$29,000	$107,000	$0	$0	$0	$0	$133	$2,290,000
STB-1	$961	$37,000	$0	$0	$0	$0	$0	$4,510	$42,500
STB-2	$7,660,000	$40,500	$2,300,000	$0	$0	$0	$81,300	$6,050	$10,100,000
STB-3	$2,100	$58,600	$14,800	$0	$0	$0	$0	$8,540	$84,000
STB-4	$0	$31,800	$0	$0	$0	$0	$0	$1,460	$33,300
STB-5	$98,900	$47,700	$178,000	$0	$271,000	$0	$163,000	$2,190	$760,000
STB-6	$6,940,000	$47,400	$17,600,000	$0	$0	$0	$163,000	$2,040	$24,800,000
STB-7	$165,000	$119,000	$391,000	$0	$0	$0	$81,300	$30,200	$787,000
STC-1	$7,240,000	$65,600	$795,000	$0	$0	$0	$81,300	$223	$8,190,000
STC-2	$30,400,000	$109,000	$1,440,000	$0	$0	$0	$81,300	$2,610	$32,000,000
VEN-1	$505,000	$19,000	$10,000,000	$0	$0	$0	$81,300	$1,450	$10,600,000
VEN-2	$0	$37,100	$0	$0	$0	$1,400	$0	$8,180	$46,700
VEN-3	$0	$65,800	$1,210	$0	$0	$0	$163,000	$2,490	$232,000
YUB-1	$903,000	$29,000	$0	$690,000	$0	$0	$0	$38,700	$1,660,000
Total	**$999,000,000**	**$2,930,000**	**$229,000,000**	**$8,950,000**	**$2,220,000**	**$24,800**	**$2,440,000**	**$489,000**	**$1,250,000,000**

Note: Totals may not sum due to rounding.

EXHIBIT ES-5 SUMMARY OF POST-DESIGNATION INCREMENTAL IMPACTS BY UNIT AND ACTIVITY: HIGH SCENARIO (PRESENT VALUE, 2009 DOLLARS, SEVEN PERCENT)

UNIT	DEVELOPMENT	WATER MANAGEMENT	AGRICULTURE	GRAZING	TIMBER HARVEST	TRANSPORTATION	FIRE MANAGEMENT	UTILITY & PIPELINE	SPECIES MANAGEMENT	TOTAL
ALA-1A	$4,590,000	$532	$0	$6,350	$0	$0	$0	$0	$7	$4,590,000
ALA-1B	$44,900,000	$1,460	$0	$17,700	$0	$0	$0	$0	$20	$44,900,000
ALA-2	$78,200,000	$17,100	$94,100	$267,000	$0	$0	$0	$4,090	$555	$78,600,000
BUT-1	$0	$0	$0	$0	$2,800	$0	$0	$0	$0	$2,800
CAL-1	$7,030,000	$0	$0	$0	$0	$0	$0	$0	$0	$7,030,000
CCS-1	$3,040,000	$2,490	$56,500	$0	$0	$0	$0	$2,040	$35	$3,100,000
CCS-2	$35,200,000	$23,900	$248,000	$0	$0	$7,350	$0	$6,130	$335	$35,500,000
ELD-1	$9,510,000	$0	$14,000	$0	$1,500	$0	$0	$0	$0	$9,520,000
LOS-1	$0	$0	$0	$0	$0	$0	$3,270	$0	$2,170	$5,430
MEN-1	$8,480,000	$0	$0	$0	$0	$0	$0	$0	$0	$8,480,000
MNT-1	$3	$86	$0	$0	$0	$0	$0	$0	$18	$107
MNT-2	$14,700,000	$19,800	$2,690,000	$0	$0	$10,900	$0	$2,040	$4,270	$17,500,000
MNT-3	$42,900	$4,550	$2,940	$0	$0	$0	$0	$0	$1,000	$51,400
MRN-1	$559,000	$0	$1,810	$0	$0	$0	$0	$0	$448	$562,000
MRN-2	$2,020,000	$0	$113,000	$0	$0	$0	$0	$0	$1,290	$2,140,000
MRN-3	$795,000	$0	$336,000	$0	$0	$0	$0	$0	$1,950	$1,130,000
NAP-1	$51,700	$0	$272	$0	$0	$0	$0	$0	$0	$51,900
NEV-1	$5,380,000	$0	$891	$0	$3,280	$0	$26,800	$0	$0	$5,410,000
PLA-1	$133	$2,640	$0	$0	$1,470	$0	$12,000	$0	$0	$16,200
RIV-1	$0	$0	$441	$0	$0	$0	$0	$0	$0	$441
SCZ-1	$15,000,000	$15,700	$10,100,000	$0	$0	$918	$0	$2,040	$23,500	$25,100,000
SCZ-2	$824,000	$901	$327,000	$0	$0	$918	$0	$0	$1,370	$1,150,000
SLO-1	$4,840,000	$1,500	$168,000	$0	$0	$0	$0	$4,090	$4,160	$5,010,000
SLO-2	$16,400,000	$11,800	$2,650,000	$0	$0	$0	$0	$2,040	$3,350	$19,000,000
SLO-3	$69,900,000	$12,300	$13,500,000	$0	$0	$3,800	$0	$4,090	$3,630	$83,400,000
SLO-4	$2,120,000	$3,460	$3,570	$0	$0	$0	$0	$0	$1,090	$2,120,000

UNIT	DEVELOPMENT	WATER MANAGEMENT	AGRICULTURE	GRAZING	TIMBER HARVEST	TRANSPORTATION	FIRE MANAGEMENT	UTILITY & PIPELINE	SPECIES MANAGEMENT	TOTAL
SNB-1	$476,000	$1,790	$10,800,000	$0	$0	$0	$0	$0	$352	$11,300,000
SNB-2	$4,640	$855	$1,870	$0	$0	$0	$0	$2,040	$169	$9,580
SNB-3	$1,510,000	$3,160	$1,590,000	$0	$0	$0	$0	$2,040	$623	$3,100,000
SNM-1	$11,300,000	$3,080	$454,000	$0	$0	$0	$0	$2,040	$82	$11,800,000
SNM-2	$52,800,000	$8,580	$1,210,000	$0	$0	$0	$0	$0	$510	$54,000,000
SOL-1	$1,090,000	$0	$981	$0	$0	$0	$0	$2,040	$0	$1,090,000
SOL-2	$1,520,000	$0	$58,000	$0	$0	$0	$0	$2,040	$0	$1,580,000
SOL-3	$1,790,000	$0	$288,000	$0	$0	$0	$0	$2,040	$0	$2,080,000
SON-1	$21	$0	$169	$0	$0	$0	$0	$0	$0	$189
SON-2	$166,000	$0	$176	$0	$0	$0	$0	$0	$0	$166,000
SON-3	$122,000	$0	$240	$0	$0	$0	$0	$0	$44	$123,000
STB-1	$3,590	$2,660	$0	$0	$0	$0	$0	$0	$1,500	$7,750
STB-2	$5,620,000	$3,800	$533,000	$0	$0	$0	$0	$2,040	$2,020	$6,160,000
STB-3	$16,500	$5,030	$40,800	$0	$0	$0	$0	$0	$2,850	$65,200
STB-4	$0	$919	$0	$0	$0	$0	$0	$0	$487	$1,410
STB-5	$23,300	$1,360	$22,400	$0	$0	$3,320	$0	$4,090	$729	$55,100
STB-6	$1,150,000	$1,270	$817,000	$0	$0	$0	$0	$4,090	$680	$1,970,000
STB-7	$339,000	$20,400	$1,130,000	$0	$0	$0	$0	$2,040	$10,100	$1,510,000
STC-1	$8,130,000	$2,500	$159,000	$0	$0	$0	$0	$2,040	$74	$8,300,000
STC-2	$37,300,000	$7,440	$432,000	$0	$0	$0	$0	$2,040	$870	$37,700,000
VEN-1	$118,000	$1,500	$575,000	$0	$0	$0	$0	$2,040	$483	$697,000
VEN-2	$0	$2,700	$0	$0	$0	$0	$466	$0	$2,730	$5,890
VEN-3	$2,820,000	$2,570	$404	$0	$0	$0	$0	$4,090	$829	$2,820,000
YUB-1	$720,000	$0	$0	$0	$2,160	$0	$0	$0	$0	$722,000
Total	**$451,000,000**	**$188,000**	**$48,400,000**	**$291,000**	**$11,200**	**$27,200**	**$42,600**	**$61,300**	**$74,300**	**$500,000,000**

Note: Totals may not sum due to rounding.

EXHIBIT ES-6 DISTRIBUTION OF HIGH SCENARIO BASELINE DEVELOPMENT IMPACTS BY UNIT (PRESENT VALUE, 2009 DOLLARS, SEVEN PERCENT)

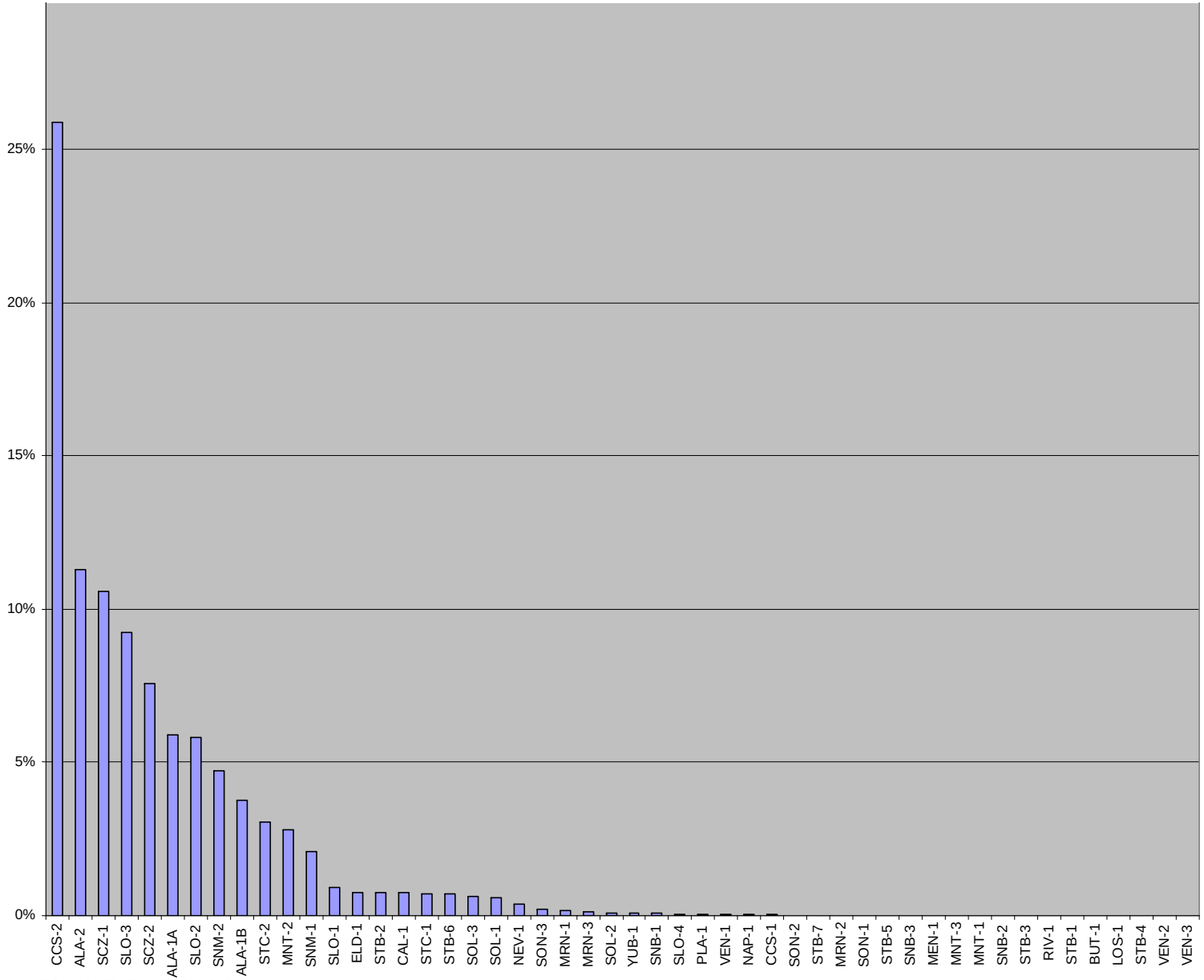

EXHIBIT ES-7 DISTRIBUTION OF HIGH SCENARIO INCREMENTAL DEVELOPMENT IMPACTS BY UNIT (PRESENT VALUE, 2009 DOLLARS, SEVEN PERCENT)

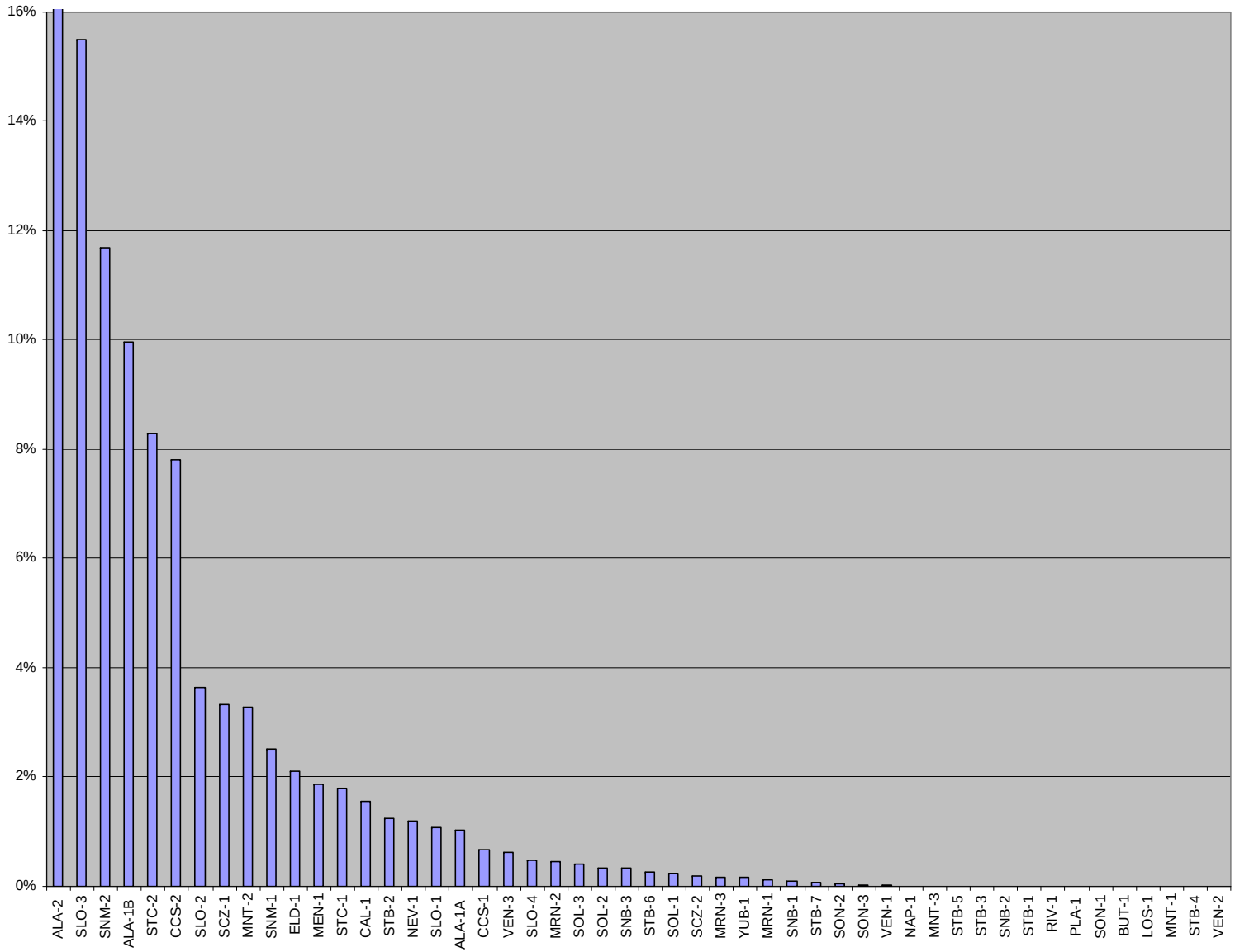

EXHIBIT ES-8 UNITS RANKED BY INCREMENTAL IMPACTS: HIGH SCENARIO (PRESENT VALUE, 2009 DOLLARS, SEVEN PERCENT DISCOUNT RATE)

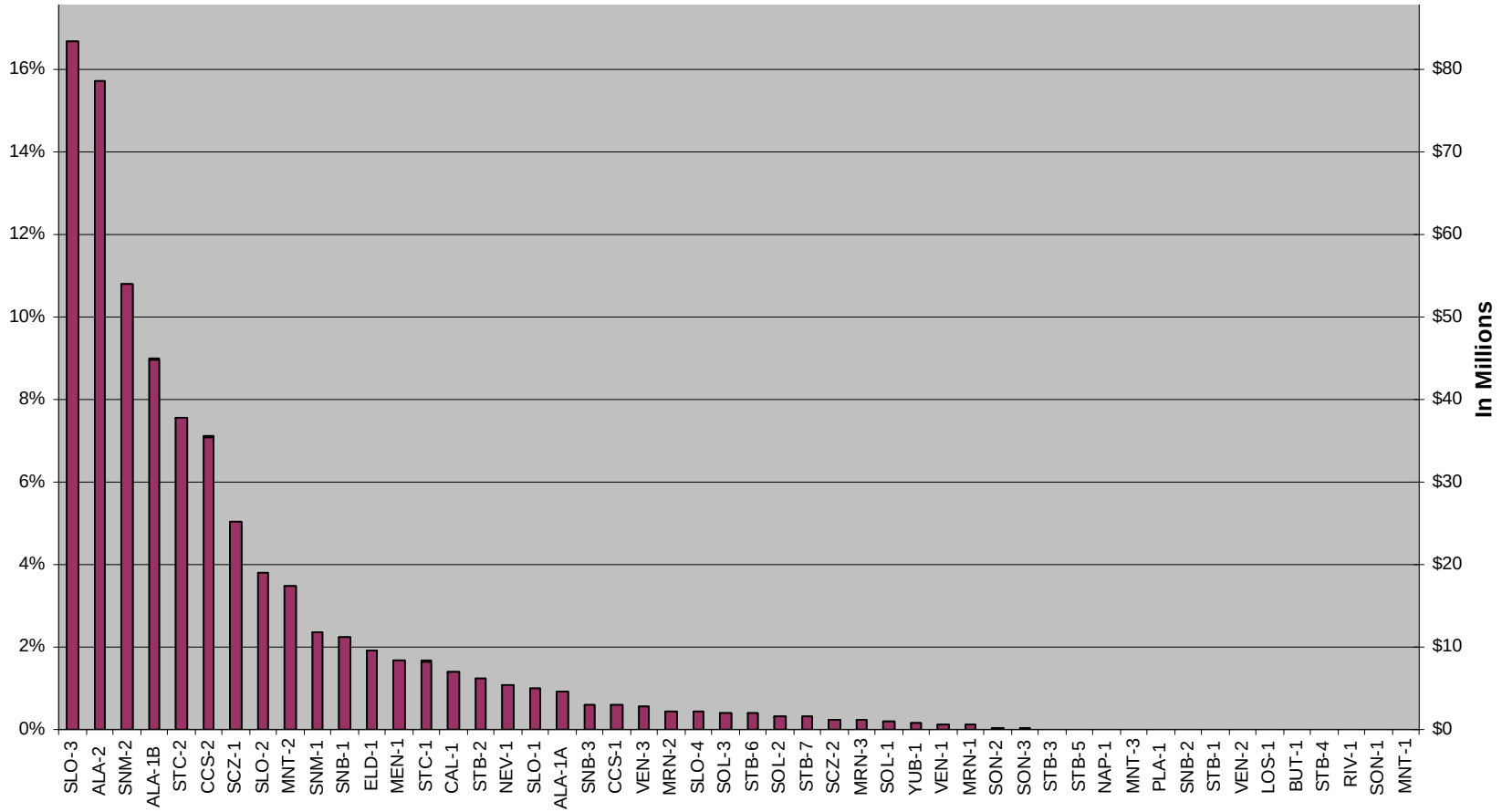

EXHIBIT ES-9 POST-DESIGNATION BASELINE IMPACTS RANGE BY SUBUNIT (PRESENT VALUE, 2009 DOLLARS, SEVEN PERCENT DISCOUNT RATE)

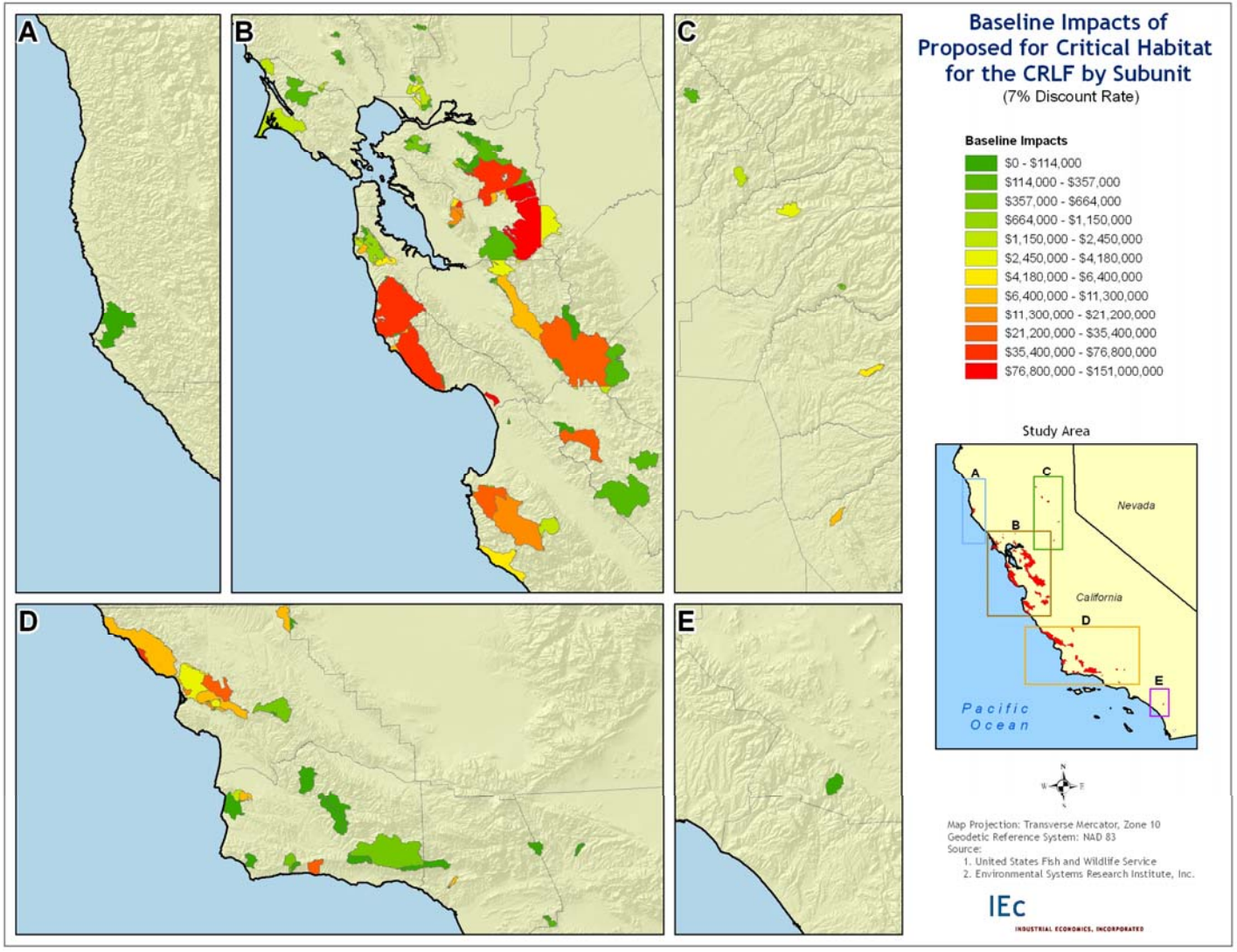

EXHIBIT ES-10 POST-DESIGNATION INCREMENTAL IMPACTS RANGE BY SUBUNIT (PRESENT VALUE, 2009 DOLLARS, SEVEN PERCENT DISCOUNT RATE)

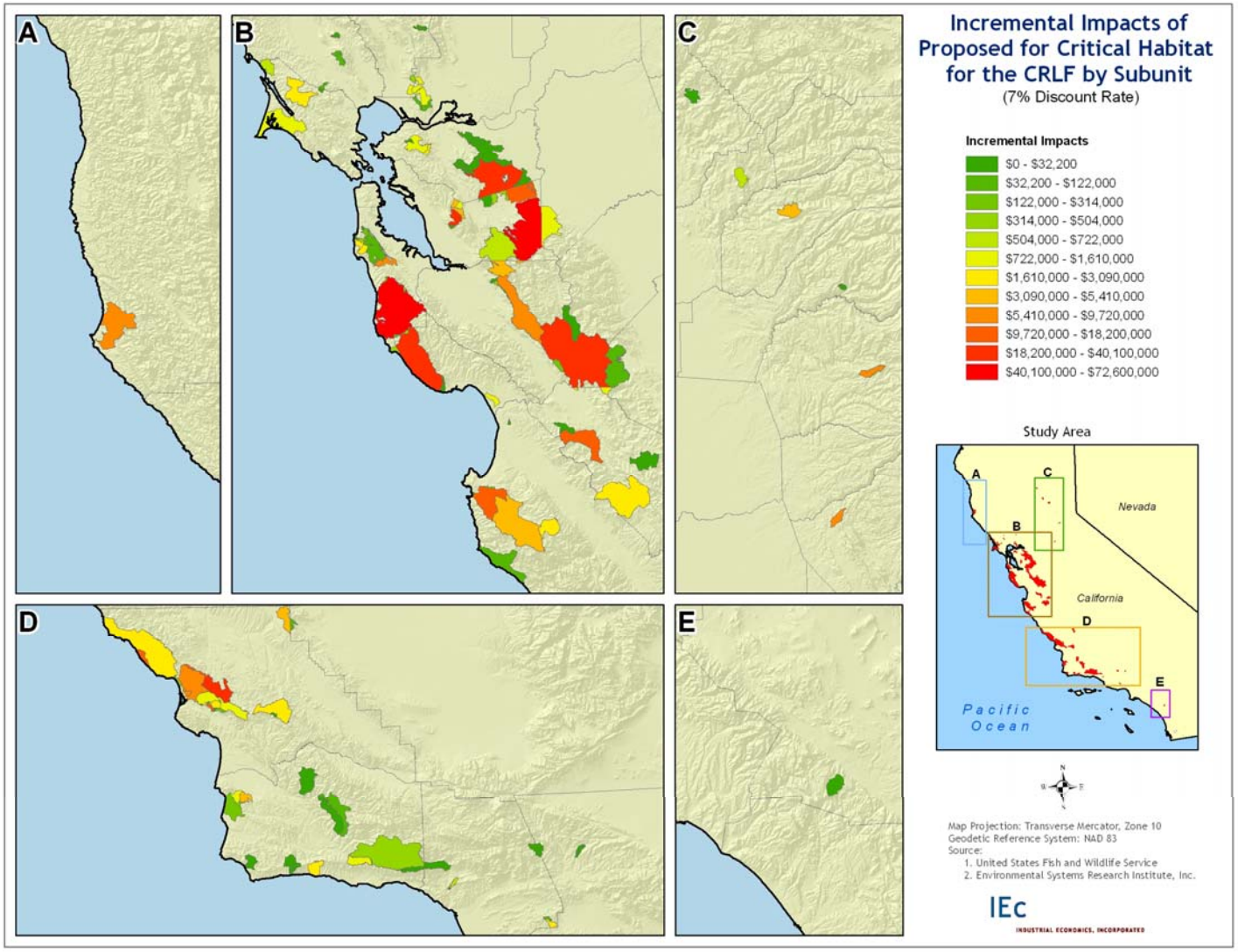

EXHIBIT ES-11 TOP TWENTY CENSUS TRACTS RANKED BY INCREMENTAL IMPACTS (PRESENT VALUE, 2009 DOLLARS, SEVEN PERCENT)

LOW SCENARIO				HIGH SCENARIO			
RANK	SUBUNIT	PRESENT VALUE IMPACTS	PERCENTAGE OF IMPACTS	RANK	SUBUNIT	PRESENT VALUE IMPACTS	PERCENTAGE OF IMPACTS
1	ALA-2-6001451101	$17,900,000	11.3%	1	ALA-2-6001451101	$72,600,000	14.5%
2	SCZ-1-6087120200	$13,900,000	8.7%	2	SNM-2-6081613800	$52,700,000	10.5%
3	SNM-2-6081613800	$13,900,000	8.7%	3	ALA-1B-6001435101	$40,100,000	8.0%
4	SLO-3-6079010800	$10,300,000	6.5%	4	STC-2-6085512700	$36,400,000	7.3%
5	ALA-1B-6001435101	$10,000,000	6.3%	5	SLO-3-6079012702	$29,900,000	6.0%
6	SNB-1-6069000800	$9,900,000	6.2%	6	SCZ-1-6087120200	$24,600,000	4.9%
7	STC-2-6085512700	$8,850,000	5.6%	7	CCS-2-6013355104	$23,900,000	4.8%
8	SLO-3-6079012702	$8,220,000	5.2%	8	SLO-3-6079011200	$18,200,000	3.6%
9	SLO-2-6079010400	$7,550,000	4.7%	9	SLO-2-6079010400	$16,200,000	3.2%
10	MNT-2-6053011600	$6,700,000	4.2%	10	SLO-3-6079012704	$11,800,000	2.4%
11	CCS-2-6013355104	$6,140,000	3.9%	11	SNB-1-6069000800	$11,300,000	2.3%
12	STB-6-6083002910	$6,100,000	3.8%	12	MNT-2-6053011600	$11,200,000	2.2%
13	SLO-3-6079010600	$6,030,000	3.8%	13	CCS-2-6001451101	$11,200,000	2.2%
14	SLO-3-6079011200	$4,920,000	3.1%	14	SLO-3-6079010800	$9,720,000	1.9%
15	MNT-2-6053011000	$3,350,000	2.1%	15	SLO-3-6079010600	$8,480,000	1.7%
16	SLO-2-6079010800	$3,080,000	1.9%	16	MEN-1-6045011100	$8,480,000	1.7%
17	SLO-3-6079012704	$2,760,000	1.7%	17	ELD-1-6017031405	$7,920,000	1.6%
18	CCS-2-6013303200	$2,750,000	1.7%	18	STC-1-6085512700	$7,870,000	1.6%
19	CCS-2-6001451101	$2,680,000	1.7%	19	CAL-1-6009000210	$7,020,000	1.4%
20	CAL-1-6009000210	$2,150,000	1.4%	20	SNM-1-6081613700	$6,800,000	1.4%

* In order to estimate impacts by critical habitat unit, the impacts to all census tracts overlapping a given critical habitat unit are summed. Thus, a critical habitat unit that contains the census tract with the highest impacts may not be the same critical habitat unit with the highest overall impacts (i.e., the impacts to other census tracts within the same critical habitat unit may be small).

SUMMARY OF BASELINE IMPACTS

9. Baseline impacts associated with consideration of the frog and its habitat are estimated to be $575 million to $1.34 billion ($36.1 million to $84.0 million on an annualized basis), assuming a three percent discount rate, or $488 to $1.25 billion ($44.1 million to $113 million on an annualized basis), assuming a seven percent discount rate. These costs are evidence of the significant regulatory protection that has been afforded this species by its listing under the Act as well as by the California Environmental Quality Act (CEQA). Census tract 06001451101 (within proposed Unit CCS-2) has the largest baseline impacts of the areas considered for designation, $151 million under the high scenario, assuming a discount rate of seven percent.

SUMMARY OF INCREMENTAL IMPACTS

10. Incremental impacts associated with the designation of critical habitat for the frog are estimated to be $178 million to $519 million ($11.2 million to $32.5 million on an annualized basis), assuming a three percent discount rate, or $159 million to $500 million ($14.4 million to $45.2 million annualized), assuming a seven percent discount rate. Census tract 06001451101 (within proposed Unit ALA-2) has the largest incremental impacts of the areas considered for designation, $72.6 million under the high scenario, assuming a discount rate of seven percent.

DISCUSSION OF RESULTS

11. Under the high scenario (assuming a seven percent discount rate), impacts to urban development represent approximately 80 percent and 90 percent of the total post-designation baseline and incremental impacts, respectively. Agricultural activities account for an additional 18 percent and 10 percent of the total post-designation baseline and incremental impacts, respectively. Impacts to all other activities, combined, represent approximately one percent of the total post-designation baseline and incremental impacts.

RESIDENTIAL AND COMMERCIAL DEVELOPMENT

12. The main cost expected in the post-designation period results from delayed construction during the section 7 consultation process (on average nine months) and while developers assemble habitat offsets (on average two years). The loss is based on the opportunity cost to developers of carrying undeveloped land during those time periods. The delay cost is calculated by multiplying the value of the land to be developed with the market interest rate and the time period of the delay (i.e., nine months to two years). The differences in project modification costs in the low and high impact scenarios are overcome by these delay costs.

13. Uncertainty regarding the type of project modifications required to offset impacts to the frog from urban development results in the evaluation of two scenarios. Under the first scenario, the Service may require compensating for impacts to the frog and its habitat from development activities by purchasing land and protecting it for the benefit of the frog. The average price per acre at local land conservation banks depends on the type of

compensating habitat required -- $11,000 per acre of dispersal habitat to $140,000 per acre for breeding habitat. Under the second scenario, the Service may recommend habitat restoration to offset development impacts, estimated to cost on average $50,000 per acre.

14. Development impacts vary widely both across the study area as well as within proposed critical habitat units. The counties of Alameda, Contra Costa, Santa Cruz, San Luis Obispo and San Mateo experience the greatest impacts due primarily to the high number of acres projected for development in each county within the study area. Land values also play a significant factor. Land values in Alameda, Contra Costa, San Mateo, and San Luis Obispo counties are among the highest in the study area – estimated at greater than $2.5 million per developed acre in some areas.

AGRICULTURE

15. Costs for protection of the frog and its habitat for agriculture activities are based on the conservation measures established by a Stipulated Injunction issued by the U.S. District Court for the Northern District of California on October 20, 2006. Specifically, the stipulated injunction imposes no-use buffer zones around upland and aquatic habitat and disallows the use of 66 pesticide active ingredients within those habitats and buffer zones (60 feet to 200 feet for ground and aerial applications, respectively). This analysis assumes that implementation of no-pesticide use areas will effectively result in the loss of agricultural production in affected areas. As part of the stipulated injunction, the U.S. Environmental Protection Agency (EPA) is required to prepare effects determinations for each pesticide active ingredient and initiate consultation with the Service. To the extent that future consultation with the Service on each pesticide active ingredient find more flexible ways to avoid jeopardy or adverse modification (e.g., adjustments in cropping or pesticide use practices), agricultural impacts in the post-designation period may be overstated. Furthermore, the analysis of agricultural activities does not take into account the potential for the conversion of agricultural lands to non-agricultural uses such as residential or commercial development; future land use changes may affect the report's results.

KEY SOURCES OF UNCERTAINTY

16. In proposed critical habitat areas, the key factor determining whether incremental impacts are expected is the likelihood that project proponents will detect the frog during pre-activity assessments and surveys. This analysis relies on guidance issued by the Service in 1997 and revised in 2005 to assist project proponents in assessing the likelihood of frog presence on their property or in the vicinity of the proposed project area. One of the primary data sources used by project proponents is the California Natural Diversity Data Base (CNDDB) maintained by the California Department of Fish and Game Natural Heritage Division. The CNDDB is a repository of reported sightings of rare species and natural communities and is updated on a regular basis as new data becomes available. Discussions with stakeholders indicate that the CNDDB is a well-known resource used by project proponents to assess frog presence within a project area. This analysis relies on

the CNDDB to identify areas where a project proponent would likely detect the frog. Impacts in these areas are attributed to the baseline.

17. In areas without any reported frog sightings in the CNDDB, the Service typically requires focused field surveys as well as site-specific assessments of suitable habitat and habitat connectivity. Ideally, this analysis would rely on data about the frequency that these additional site assessment activities result in the detection of the frog. However, according to discussions with the Service, these data are not tracked. Accordingly, this analysis conservatively assumes that frogs will not likely be detected in these areas. To the extent that this approach under-estimates the likelihood that frogs will be detected in a proposed critical habitat unit, baseline impacts will be understated and incremental impacts will be overstated.

18. Impact estimates are driven by delay costs, which rely on point estimates of the typical length of delay likely to be experienced by developers. The delay associated with the section 7 consultation process is assumed to be nine months, and the delay associated with assembling habitat offsets requested by the Service during section 7 consultation or by local authorities through the CEQA process is assumed to be two years. Furthermore, these delays are assumed to be sequential. If these assumptions represent worst-case, rather than average, delay times, impacts are likely overstated.

CHAPTER 1 | INTRODUCTION

1.1 INTRODUCTION

19. The purpose of this report is to estimate the economic impact of the proposed revision to designated critical habitat for the federally listed California red-legged frog (*Rana aurora draytonii*, "frog"). The report was prepared collaboratively by Industrial Economics, Incorporated (IEc) and Berkeley Economic Consulting (BEC) for the U.S. Fish and Wildlife Service (Service).

20. This analysis identifies the incremental effects of the proposed rule by estimating the impacts of actions taken to protect the frog and its habitat under two scenarios, one "without critical habitat" and the other "with critical habitat." The difference between the two represents the costs of the proposed rule. This information is intended to assist the Secretary in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation, unless such exclusion would result in the extinction of the species.[8] In addition, this information allows the Service to address the requirements of Executive Orders (E.O.) 12866 and 13211, and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).[9] Detailed discussion of the framework for this analysis is provided in Chapter 2.

21. This section provides a brief introduction to the revised proposed critical habitat for the frog. It includes a summary of past publications and legal actions that relate to the current proposal, a summary of land ownership within the current proposal, a map of the proposed units, and a summary of threats to the proposed critical habitat. This information is intended to provide background information to the reader. All official definitions and boundaries should be taken from the Proposed Rule.[10]

[8] 16 U.S.C. §1533(b)(2).

[9] Executive Order 12866, Regulatory Planning and Review, September 30, 1993 (as amended by Executive Order 13258 (2002) and Executive Order 13422 (2007)); 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.

[10] 2008 Proposed Rule, 73 FR 53492.

1.2 PREVIOUS FEDERAL ACTIONS

22. A Final Rule listing the frog as endangered under the Act was published on May 23, 1996.[11] Subsequently, the Service designated critical habitat for the frog across 4,140,440 acres in 28 California counties on March 13, 2001.[12] Then, on June 8, 2001, various homebuilding and commerce organizations filed a lawsuit against the Service challenging the final rule designating critical habitat for the frog.[13] In November 2002 a settlement was reached to re-evaluate the 2001 critical habitat designation and on April 13, 2006, the Service re-designated critical habitat for the frog across 450,288 acres in 20 California counties.[14]

23. More recently, on July 20, 2007, the Service announced that it would review the April 13, 2006, final rule after questions were raised about the integrity of scientific information used and whether the decision made was consistent with the appropriate legal standards. Based on these criteria, the Service determined it was necessary to revise critical habitat for the frog. On December 12, 2007, the Center for Biological Diversity filed a complaint in the U.S. District Court for the Northern District of California challenging the Service's designation of critical habitat for the frog.[15] On September 16, 2008, the Service published a Proposed Rule revising the designation of critical habitat for the frog.[16] In support of the revised proposed rule, on April 28, 2009, the Service published a Notice of Availability of the economic analysis estimating the rule's impacts.[17] On October 28, 2009, the Service reopened the public comment period, publishing a second Notice of Availability for a revised economic analysis. This most recent public comment period closed on November 9, 2009.[18] This economic analysis updates that report based on new information received during the public comment periods and since that time.

1.3 PROPOSED CRITICAL HABITAT DESIGNATION

24. The 2006 critical habitat rule for the frog consisted of 34 units comprising a total of 450,288 acres. The proposed revision includes 50 units comprising a total of 1,804,865 acres. In this revised proposal, the Service began its analysis to identify essential habitat without using the previous final designation as a base due to the potential inappropriate influence on the extent and location of that rule by U.S. Department of the Interior (DOI) personnel. According to the proposed rule, this unrestricted analysis resulted in an

[11] 1996 Final Listing Rule, 61 FR 25813.

[12] 2001 Final Rule, 66 FR 14626.

[13] Home Builders Ass'n of Northern California, et al. v. Norton, et al., Civ. No. 01-1291 (RJL) (D. D.C.).

[14] 2006 Final Rule, 71 FR 19244.

[15] Center for Biological Diversity v. Kempthorne, et al., Case No. C-07-6404-WHA.

[16] 2008 Proposed Rule, 73 FR 53492.

[17] 74 FR 19184; and Industrial Economics, Incorporated, Economic Analysis of Critical Habitat Designation for the California Red-legged Frog, prepared for the U.S. Fish and Wildlife Service, March 3, 2009.

[18] 74 FR 51825; and Industrial Economics, Incorporated, Revised Economic Analysis of Critical Habitat Designation for the California Red-legged Frog, prepared for the U.S. Fish and Wildlife Service, September 11, 2009.

increase in the amount and distribution of proposed critical habitat.[19] Exhibit ES-1 depicts the proposed critical habitat units.

25. Exhibit 1-1 provides information concerning land ownership for the proposed revised habitat by unit. The majority of proposed critical habitat (approximately 65 percent) is privately owned. Approximately 21 percent of proposed critical habitat is Federal land with National Forests representing the majority (78 percent) of those lands (i.e., portions of: Plumas, Eldorado, Tahoe, Los Padres, and Angeles National Forests). State lands represent approximately 10 percent of proposed critical habitat, with California Department of Parks and Recreation (CA DPR) land making up the majority (87 percent). Finally, local ownership (e.g., counties, cities, and water districts) represents approximately four percent of proposed critical habitat. All other proposed critical habitat (less than one percent) is owned by conservation groups (e.g., The Nature Conservancy) and non- governmental agencies (NGOs). All of the proposed units are considered to be currently occupied by the frog.[20]

26. Of the total acres proposed, the Service is considering excluding a total of 105,013 acres, including:

- Six acres of private land in Santa Cruz County protected by the Bonny Doon Quarries Settlement Ponds Habitat Conservation Plan (HCP);
- 54 acres of Federal lands managed by the U.S. Bureau of Land Management (BLM) constituting the Spivey Pond Management Area and subject to the Spivey Pond Management;
- 92,592 acres of local land protected by the East Contra Costa County HCP;
- 8,292 acres of local land managed by the East Bay Regional Park District (EBRPD); and
- 4,097 acres of State, local and private land protected by the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP).

[19] 2008 Proposed Rule, 73 FR 53492.

[20] 2008 Proposed Rule, 73 FR 53492.

EXHIBIT 1-1 DISTRIBUTION OF PROPOSED REVISED CRITICAL HABITAT BY LAND OWNERSHIP CATEGORY

SUBUNIT	SUBUNIT NAME	ACRES BY OWNER TYPE (PERCENT OF PCH UNIT)					GRAND TOTAL
		FEDERAL	STATE	LOCAL	PRIVATE	NGO/OTHER	
ALA-1A	Dublin Canyon	0 (0%)	0 (0%)	267 (7.32%)	3,383 (92.68%)	0 (0%)	3,650
ALA-1B	Cook Canyon	0 (0%)	0 (0%)	736 (7.24%)	9,432 (92.76%)	0 (0%)	10,168
ALA-2	Arroyo Valle	6,892 (4.49%)	97 (0.06%)	2,329 (1.52%)	144,306 (93.93%)	0 (0%)	153,624
BUT-1	Hughes Place Pond	3,222 (60.87%)	250 (4.73%)	0 (0%)	1,821 (34.41%)	0 (0%)	5,294
CAL-1	Young's Creek	7 (0.17%)	0 (0%)	0 (0%)	4,442 (99.83%)	0 (0%)	4,450
CCS-1	Berkeley Hills	0 (0%)	0 (0%)	4,205 (30.34%)	9,645 (69.6%)	8 (0.06%)	13,858
CCS-2	Mount Diablo	0 (0%)	9,869 (7.11%)	7,623 (5.49%)	121,215 (87.29%)	151 (0.11%)	138,858
ELD-1	Spivey Pond	750 (13.57%)	0 (0%)	0 (0%)	4,775 (86.43%)	0 (0%)	5,525
LOS-1	San Francisquito Creek	3,906 (92.31%)	0 (0%)	0 (0%)	325 (7.69%)	0 (0%)	4,231
MEN-1	Greenwood Creek	86 (0.32%)	296 (1.1%)	0 (0%)	26,400 (98.24%)	92 (0.34%)	26,875
MNT-1	Elkhorn Slough	0 (0%)	0 (0%)	0 (0%)	519 (100%)	0 (0%)	519
MNT-2	Carmel River	26,104 (21.85%)	827 (0.69%)	1,373 (1.15%)	91,187 (76.31%)	0 (0%)	119,491
MNT-3	Big Sur Coast	9,936 (36.08%)	6,025 (21.88%)	0 (0%)	11,581 (42.05%)	0 (0%)	27,542
MRN-1	Estero	0 (0%)	0 (0%)	0 (0%)	7,840 (100%)	0 (0%)	7,840
MRN-2	Salmon Creek	0 (0%)	0 (0%)	0 (0%)	22,559 (100%)	0 (0%)	22,559
MRN-3	Point Reyes Peninsula	31,665 (93.33%)	164 (0.48%)	0 (0%)	2,098 (6.18%)	0 (0%)	33,927
NAP-1	Wragg Creek	0 (0%)	0 (0%)	0 (0%)	2,524 (100%)	0 (0%)	2,524
NEV-1	Sailor Flat	3,165 (38.2%)	15 (0.18%)	0 (0%)	5,106 (61.62%)	0 (0%)	8,285
PLA-1	Michigan Bluff	820 (65.93%)	0 (0%)	0 (0%)	424 (34.07%)	0 (0%)	1,243
RIV-1	Cole Creek	0 (0%)	0 (0%)	0 (0%)	1,953 (47.66%)	2,144 (52.34%)	4,097
SCZ-1	North Coastal Santa Cruz County	226 (0.31%)	20,532 (28.42%)	0 (0%)	51,497 (71.27%)	0 (0%)	72,255
SCZ-2	Watsonville Slough	115 (2.83%)	0 (0%)	0 (0%)	3,942 (97.17%)	0 (0%)	4,057
SLO-1	Cholame	169 (0.94%)	0 (0%)	0 (0%)	17,849 (99.06%)	0 (0%)	18,018
SLO-2	Piedras Blancas to Cayucos Creek	497 (0.42%)	691 (0.59%)	0 (0%)	116,260 (98.99%)	0 (0%)	117,449
SLO-3	Willow and Toro Creeks to San Luis Obispo	29,107 (23.78%)	12,689 (10.36%)	0 (0%)	80,624 (65.86%)	0 (0%)	122,420
SLO-4	Upper Salinas River	23,970 (69.55%)	0 (0%)	0 (0%)	10,493 (30.45%)	0 (0%)	34,463
SNB-1	Hollister Hills/San Benito River	13 (0.04%)	3,109 (8.57%)	0 (0%)	33,172 (91.4%)	0 (0%)	36,293

SUBUNIT	SUBUNIT NAME	ACRES BY OWNER TYPE (PERCENT OF PCH UNIT)					GRAND TOTAL
		FEDERAL	STATE	LOCAL	PRIVATE	NGO/OTHER	
SNB-2	Antelope Creek/Upper Tres Pinos Creek	0 (0%)	0 (0%)	0 (0%)	17,356 (100%)	0 (0%)	17,356
SNB-3	Pinnacles National Monument	20,221 (31.72%)	0 (0%)	0 (0%)	43,532 (68.28%)	0 (0%)	63,753
SNM-1	Cahill Ridge	887 (2.54%)	17,102 (48.93%)	206 (0.59%)	16,186 (46.31%)	570 (1.63%)	34,952
SNM-2	Pescadero	406 (0.42%)	3,977 (4.14%)	6,332 (6.59%)	85,420 (88.85%)	4 (0%)	96,138
SOL-1	Sky Valley	0 (0%)	0 (0%)	0 (0%)	11,971 (100%)	0 (0%)	11,971
SOL-2	Jameson Canyon	0 (0%)	0 (0%)	0 (0%)	3,360 (100%)	0 (0%)	3,360
SOL-3	American Canyon	0 (0%)	0 (0%)	0 (0%)	3,510 (76.36%)	1,087 (23.64%)	4,597
SON-1	Annandel	0 (0%)	1,157 (73.96%)	0 (0%)	407 (26.04%)	0 (0%)	1,564
SON-2	Sonoma Mountain	0 (0%)	0 (0%)	0 (0%)	4,932 (100%)	0 (0%)	4,932
SON-3	Petaluma	0 (0%)	0 (0%)	105 (4.7%)	2,125 (95.3%)	0 (0%)	2,230
STB-1	La Brea Creek	20,895 (83.04%)	0 (0%)	0 (0%)	4,269 (16.96%)	0 (0%)	25,164
STB-2	San Antonio Terrace	23,911 (66.41%)	0 (0%)	0 (0%)	12,092 (33.59%)	0 (0%)	36,003
STB-3	Sisquoc River	40,115 (84.35%)	0 (0%)	0 (0%)	7,444 (15.65%)	0 (0%)	47,559
STB-4	Jalama Creek	1,012 (11.64%)	0 (0%)	0 (0%)	7,681 (88.36%)	0 (0%)	8,693
STB-5	Gaviota Creek	1,547 (12%)	2,074 (16.09%)	0 (0%)	9,267 (71.9%)	0 (0%)	12,888
STB-6	Arroyo Quemado to Refugio Creek	1,881 (15.69%)	28 (0.23%)	0 (0%)	10,076 (84.08%)	0 (0%)	11,985
STB-7	Upper Santa Ynez River and Matilija Creek	124,904 (86.07%)	0 (0%)	0 (0%)	20,216 (13.93%)	0 (0%)	145,120
STC-1	Canada de Pala	37 (0.07%)	0 (0%)	8,450 (16.16%)	43,795 (83.77%)	0 (0%)	52,283
STC-2	Wilson Peak	352 (0.17%)	53,266 (26.02%)	74 (0.04%)	151,025 (73.77%)	0 (0%)	204,717
VEN-1	San Antonio Creek	0 (0%)	0 (0%)	0 (0%)	2,915 (100%)	0 (0%)	2,915
VEN-2	Piru Creek	8,363 (94.64%)	0 (0%)	0 (0%)	474 (5.36%)	0 (0%)	8,837
VEN-3	Upper Las Virgenes Canyon	56 (1.12%)	0 (0%)	0 (0%)	4,833 (96.66%)	111 (2.22%)	5,000
YUB-1	Little Oregon Creek	2,486 (39.33%)	0 (0%)	0 (0%)	3,836 (60.67%)	0 (0%)	6,322
Total		**387,724 (21.45%)**	**132,168 (7.31%)**	**31,701 (1.75%)**	**1,252,096 (69.26%)**	**4,167 (0.23%)**	**1,807,857**
AREAS CONSIDERED FOR EXCLUSION							
ALA-1A	Dublin Canyon	0 (0%)	0 (0%)	267 (100%)	0 (0%)	0 (0%)	267
ALA-1B	Cook Canyon	0 (0%)	0 (0%)	286 (100%)	0 (0%)	0 (0%)	286
CCS-1	Berkeley Hills	0 (0%)	0 (0%)	4,202 (100%)	0 (0%)	0 (0%)	4,202
CCS-2	Mount Diablo	0 (0%)	5,857 (6.47%)	7,599 (8.39%)	76,943 (84.97%)	151 (0.17%)	90,551

SUBUNIT	SUBUNIT NAME	ACRES BY OWNER TYPE (PERCENT OF PCH UNIT)					GRAND TOTAL
		FEDERAL	STATE	LOCAL	PRIVATE	NGO/OTHER	
ELD-1	Spivey Pond	54 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	54
RIV-1	Cole Creek	0 (0%)	0 (0%)	0 (0%)	1,953 (47.66%)	2,144 (52.34%)	4,097
SCZ-1	North Coastal Santa Cruz County	0 (0%)	0 (0%)	0 (0%)	6 (100%)	0 (0%)	6
Subtotal		**55 (0.05%)**	**5,857 (5.89%)**	**12,354 (12.42%)**	**78,902 (79.33%)**	**2,296 (2.31%)**	**99,464**

Note: Totals may not sum due to rounding.
Sources:
(1) U.S. Fish and Wildlife Service, Endangered and Threatened Wildlife and Plants; Revised Critical Habitat for the California Red-Legged Frog (Rana aurora draytonii); Proposed Rule, published in the Federal Register on September 16, 2008, Vol. 73, No. 180.
(2) California Resources Agency. 2007. Public, Conservation and Trust Lands, v05_2. Data developed by VESTAS Resources, Inc. under contract to the California Resources Agency Legacy Project. January 2007. Sacramento, California.

1.4 THREATS TO CRITICAL HABITAT AREAS

27. This report describes and quantifies the potential economic impacts associated with proposed critical habitat designation for the frog in relation to the threats identified by the Service. The proposed rule describes threats to proposed critical habitat, including:

- Residential and Commercial Development;
- Water Management;
- Agricultural Crop Farming;
- Ranching/Grazing;
- Timber Harvest;
- Transportation;
- Fire Management;
- Utility and Oil and Gas Pipeline Construction and Maintenance and Mining Activities; and
- Habitat Management.

28. Exhibit 1-2 provides a summary of the activities that could potentially harm proposed critical habitat. It identifies the potentially affected proposed units and specific threats that may be caused by each activity. The final column lists examples of several frog conservation measures to avoid, mitigate, or compensate for these threats. These measures were reported in the proposed rule, the section 7 consultation history, the recovery plan, and in communication with staff at the Service's Sacramento Fish and Wildlife Office. These conservation measures are the basis of the economic impacts discussed in this analysis.

EXHIBIT 1-2 ACTIVITIES, THREATS AND POTENTIAL FROG CONSERVATION MEASURES

ECONOMIC ACTIVITY	AFFECTED UNITS	THREATS	EXAMPLES OF SPECIAL MANAGEMENT TO AVOID, MITIGATE OR COMPENSATE FOR THREAT
Urban Development	**All**	▪ Loss and fragmentation of habitat and landscape connectivity ▪ Habitat destruction and degradation ▪ Mechanical soil disturbance, clearing or grading	▪ Habitat restoration/mitigation to compensate for lost habitat following project completion ▪ Purchase conservation habitat to offset development
Agricultural Crop Farming	**37 Units**: ALA-2, CCS-1, CCS-2, ELD-1, MNT-2, MNT-3, MRN-1, MRN-2, MRN-3, NAP-1, NEV-1, RIV-1, SCZ-1, SCZ-2, SLO-1, SLO-2, SLO-3, SLO-4, SNB-1, SNB-2, SNB-3, SNM-1, SNM-2, SOL-1, SOL-2, SON-1, SON-2, SON-3, STB-2, STB-3, STB-5, STB-6, STB-7, STC-1, STC-2, VEN-1, VEN-3	▪ Direct toxic effects to frog or its prey base ▪ Contamination of water with fertilizers and pesticides	▪ Avoid pesticide use in frog habitat and in buffer zones around frog habitat
Ranching/ Grazing	**12 Units**: CAL-1, MEN-1, MRN-1, MRN-3, SOL-1, SOL-3, CCS-1, CCS-2, STC-1, SLO-1, SLO-2, SLO-3	▪ Higher instream water temperatures resulting from reduction or removal of vegetation ▪ Channel downcutting ▪ Lowered water tables ▪ Loss of plunge pools, which results in direct loss of pool habitats for the frog ▪ Diminished water quality through increased sediment loads and nutrient levels	▪ Species survey and monitoring ▪ Implementation of best management practices in Riparian Conservation Areas as described in the Sierra Nevada Forest Plan Amendment Standards and Guidelines for Aquatic and Riparian Ecosystems
Timber Harvest	**5 Units**: BUT-1, ELD-1, NEV-1, PLA-1, YUB-1	▪ Degradation of instream and riparian habitat through increased sedimentation ▪ Removal of trees that provide instream and streamside habitat structure and shade ▪ Changed patterns of runoff	▪ Implementation of best management practices to preserve water quality and protect forested areas immediately adjacent to waterbodies during timber harvest activities.

ECONOMIC ACTIVITY	AFFECTED UNITS	THREATS	EXAMPLES OF SPECIAL MANAGEMENT TO AVOID, MITIGATE OR COMPENSATE FOR THREAT
Water Management, Transportation, Utility and Oil & Gas Pipeline,	**All**	▪ Loss and fragmentation of habitat and landscape connectivity ▪ Habitat destruction and degradation	▪ Pre-construction survey, capture and removal of any frogs by qualified biologists ▪ Construction confined to the dry season ▪ Implementation of best management practices to protect riparian areas during construction activities ▪ In areas temporarily disturbed, vegetation will be removed by hand, where feasible, instead of by heavy equipment
Fire Suppression	**5 Units**: BUT-1, ELD-1, NEV-1, PLA-1, YUB-1	▪ Dewater aquatic frog habitat, thereby resulting in the desiccation of egg masses or direct death of adults from water drafting	▪ Design and manage fuel treatments to minimize the risk that treated areas will be used by unauthorized motorized and mechanized vehicles ▪ Avoid establishing staging bases, heli-bases, base camps, firelines or other areas of human concentration and equipment use within frog suitable and occupied habitat and riparian areas to the maximum extent possible ▪ Maintain and enhance soil productivity in riparian and upland areas by retention of standing and down coarse woody debris ▪ Avoid or minimize soil erosion by retention of ground cover in riparian and upland areas
Habitat Management	**All**	▪ Loss and fragmentation of habitat and landscape connectivity ▪ Habitat destruction and degradation	▪ Pre-construction frog surveys and removal of identified frogs ▪ Biologist on-site during all activities ▪ Worker education and training session ▪ Revegetate and re-contour all disturbed areas with native vegetation ▪ Construction work limited to the dry season (May 1 – Oct 31) and/or low stream flow periods (June 1 – Nov 1) ▪ Implementation of best management practices to protect riparian areas during construction activities

1.5 STRUCTURE OF THE REPORT

29. This report describes and quantifies the potential economic impacts associated with proposed critical habitat designation for the frog in relation to the threats identified by the Service. The proposed rule describes threats to proposed critical habitat, including:

- Chapter 2: Framework for the Analysis;
- Chapter 3: Baseline Regulations;
- Chapter 4: Residential and Commercial Development;
- Chapter 5: Water Management;
- Chapter 6: Agricultural Crop Farming;
- Chapter 7: Grazing;
- Chapter 8: Timber Harvest;
- Chapter 9: Transportation;
- Chapter 10: Utility and Pipeline Construction;
- Chapter 11: Fire Management;
- Chapter 12: Habitat & Vegetation Management;
- Chapter 13: Economic Benefits;
- References;
- Appendix A: Small Business and Energy Impact Analysis;
- Appendix B: Census Tract Exhibits;
- Appendix C: Three Percent Discount Rate Exhibits;
- Appendix D: Undiscounted Stream of Impacts; and
- Appendix E: Technical Information for Impacts to Urban Development.

CHAPTER 2 | FRAMEWORK

30. The purpose of this report is to estimate the economic impact of actions taken to protect the federally-listed frog and its habitat. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the species and its habitat within the areas considered for critical habitat designation. This analysis employs "without critical habitat" and "with critical habitat" scenarios. The "without critical habitat" scenario represents the baseline for the analysis, considering protections already accorded the frog; for example, under the Federal listing and other Federal, State, and local regulations. The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat for the frog. The analysis looks retrospectively at baseline impacts incurred since the species was listed, and forecasts both baseline and incremental impacts likely to occur after the proposed critical habitat is finalized.

31. This information is intended to assist the Secretary of DOI in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.[22] In addition, this information allows the Service to address the requirements of E.O. 12866 and 13211, and the RFA, as amended by SBREFA.[23]

32. This section describes the framework for the analysis. First, it describes the case law that led to the selection of the framework applied in this report. It then describes in economic terms the general categories of economic effects that are the focus of regulatory impact analysis, including a discussion of both efficiency and distributional effects. Next, this section defines the analytic framework used to measure these impacts in the context of critical habitat regulation, including the link between existing and critical habitat-related protection efforts and potential impacts, and the consideration of benefits. It concludes with a presentation of the information sources relied upon in the analysis and the structure of the report.

[22] 16 U.S.C. §1533(b)(2).

[23] E.O. 12866, Regulatory Planning and Review, September 30, 1993 (as amended by E.O. 13258 (2002) and E.O. 13422 (2007)); E.O. 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.

2.1 BACKGROUND

33. The U.S. Office of Management and Budget's (OMB) guidelines for conducting economic analysis of regulations direct Federal agencies to measure the costs of a regulatory action against a baseline, which it defines as the "best assessment of the way the world would look absent the proposed action."[24] In other words, the baseline includes the existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat. Impacts that are incremental to that baseline (i.e., occurring over and above existing constraints) are attributable to the proposed regulation. Significant debate has occurred regarding whether assessing the impacts of the Service's proposed regulations using this baseline approach is appropriate in the context of critical habitat designations.

34. In 2001, the U.S. Tenth Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of proposed critical habitat, regardless of whether those impacts are attributable co-extensively to other causes.[25] Specifically, the court stated,

> "The statutory language is plain in requiring some kind of consideration of economic impact in the CHD [critical habitat designation] phase. Although 50 C.F.R. 402.02 is not at issue here, the regulation's definition of the jeopardy standard as fully encompassing the adverse modification standard renders any purported economic analysis done utilizing the baseline approach virtually meaningless. We are compelled by the canons of statutory interpretation to give some effect to the congressional directive that economic impacts be considered at the time of critical habitat designation…. Because economic analysis done using the FWS's [Fish and Wildlife Service's] baseline model is rendered essentially without meaning by 50 C.F.R. § 402.02, we conclude Congress intended that the FWS conduct a full analysis of all of the economic impacts of a critical habitat designation, regardless of whether those impacts are attributable co-extensively to other causes. Thus, we hold the baseline approach to economic analysis is not in accord with the language or intent of the ESA [Endangered Species Act]."[26]

35. Since that decision, however, courts in other cases have held that an incremental analysis of impacts stemming solely from the critical habitat rulemaking is proper.[27] For example, in the March 2006 ruling that the August 2004 critical habitat rule for the Peirson's milk-vetch was arbitrary and capricious, the United States District Court for the Northern District of California stated,

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[24] OMB, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf.

[25] *New Mexico Cattle Growers Assn v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

[26] *New Mexico Cattle Growers Assn v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

[27] *Cape Hatteras Access Preservation Alliance v. Department of Interior,* 344 F. Supp. 2d 108 (D.D.C.); *Center for Biological Diversity v. United States Bureau of Land Management*, 422 F. Supp/. 2d 1115 (N.D. Cal. 2006).

> "The Court is not persuaded by the reasoning of *New Mexico Cattle Growers*, and instead agrees with the reasoning and holding of *Cape Hatteras Access Preservation Alliance v. U.S. Dep't of the Interior,* 344 F. Supp 2d 108 (D.D.C. 2004). That case also involved a challenge to the Service's baseline approach and the court held that the baseline approach was both consistent with the language and purpose of the ESA and that it was a reasonable method for assessing the actual costs of a particular critical habitat designation *Id* at 130. 'To find the true cost of a designation, the world with the designation must be compared to the world without it.'"[28]

36. In order to address the divergent opinions of the courts and provide the most complete information to decision-makers, this economic analysis reports both:

    a. The baseline impacts of frog conservation from protections afforded the species absent critical habitat designation; and

    b. The estimated incremental impacts precipitated specifically by the designation of critical habitat for the species.

    Summed, these two types of impacts comprise the fully co-extensive impacts of frog conservation in areas considered for critical habitat designation.

37. Incremental effects of critical habitat designation are determined using the Service's December 9, 2004 interim guidance on "Application of the 'Destruction or Adverse Modification' Standard Under Section 7(a)(2) of the Endangered Species Act" and information from the Service regarding what potential consultations and project modifications may be imposed as a result of critical habitat designation over and above those associated with the listing.[29] Specifically, in *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, the Ninth Circuit invalidated the Service's regulation defining destruction or adverse modification of critical habitat, and the Service no longer relies on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat.[30] Under the statutory provisions of the Act, the Service determines destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the affected critical habitat would remain functional to serve its intended conservation role for the species. A detailed description of the methodology used to define baseline and incremental impacts is provided later in this section.

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[28] *Center for Biological Diversity et al, Plaintiffs, v. United States Bureau of Land Management et. al, Defendants and American Sand Association, et al, Defendant Intervenors*, Order re: Cross Motions for Summary Judgment, Case 3:03-cv-02509 Document 174 Filed 03/14/2006, pages 44-45.

[29] Director, U.S. Fish and Wildlife Service, Memorandum to Regional Directors and Manager of the California-Nevada Operations Office, Subject: Application of the "Destruction or Adverse Modification" Standard under Section 7(a)(2) of the Endangered Species Act, dated December 9, 2004.

[30] *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, No. 03-35279 (9th Circuit 2004).

2.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

38. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the frog and its habitat (hereinafter referred to collectively as "frog conservation efforts"). Economic efficiency effects generally reflect "opportunity costs" associated with the commitment of resources required to accomplish species and habitat conservation. For example, if the set of activities that may take place on a parcel of land is limited as a result of the designation or the presence of the species, and thus the market value of the land is reduced, this reduction in value represents one measure of opportunity cost or change in economic efficiency. Similarly, the costs incurred by a Federal action agency to consult with the Service under section 7 represent opportunity costs of frog conservation efforts.

39. 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 efforts on small entities and the energy industry. This information may be used by decision-makers to assess whether the effects of species conservation efforts unduly burden a particular group or economic sector. For example, while conservation efforts may have a small impact relative to the national economy, individuals employed in a particular sector of the regional economy may experience relatively greater impacts. The differences between economic efficiency effects and distributional effects, as well as their application in this analysis, are discussed in greater detail below.

2.2.1 EFFICIENCY EFFECTS

40. At the guidance of OMB and in compliance with E.O. 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. In the context of regulations that protect frog habitat, these 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 surpluses in affected markets.[31]

41. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a Federal land manager, such as the U.S. Army Corps of Engineers (USACE), may enter into a consultation with the Service to ensure that a particular activity will not adversely modify critical habitat. The effort required for the consultation is an economic opportunity cost because the landowner or manager's time and effort would have been spent in an alternative activity had the parcel not been included in the designation. When 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

[31] 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.

service demanded given a change in price -- the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.

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

43. This analysis begins by measuring impacts associated with efforts undertaken to protect frog and its habitat. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. In frog habitat, residential development projects experience the greatest impacts. However, the quantity and price of housing is not anticipated to be significantly affected. Instead, developers may experience compliance and delay costs. As a result, measurable changes in consumer and producer surplus are not anticipated.

2.2.2 DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

44. Measurements of changes in economic efficiency focus on the net impact of conservation efforts, 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.[32] 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.

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

45. This analysis considers how small entities, including small businesses, organizations, and governments, as defined by the RFA, might be affected by future species conservation efforts.[33] In addition, in response to E.O. 13211 "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," this analysis considers the future impacts of conservation efforts on the energy industry and its customers.[34]

[32] 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.

[33] 5 U.S.C. §§601 *et seq*.

[34] E.O. 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001.

Regional Economic Effects

46. Regional economic impact analysis can provide an assessment of the potential localized effects of conservation efforts. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that represent the relationship between a change in one sector of the economy (e.g., expenditures by recreators) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreators). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.

47. The use of regional input/output models in an analysis of the impacts of species and habitat conservation efforts can overstate the long-term impacts of a regulatory change. Most importantly, these models provide a static view of the economy of a region. That is, they measure the initial impact of a regulatory change on an economy but do not consider long-term adjustments that the economy will make in response to this change. For example, these models provide estimates of the number of jobs lost as a result of a regulatory change, but do not consider re-employment of these individuals over time or other adaptive responses by 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.

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

49. Impacts associated with frog conservation activities largely include compliance and delay costs; the quantity of housing supplied in the broader region is not anticipated to be affected. Other types of projects are anticipated to go forward while incurring costs associated with surveying, monitoring, and habitat management. Therefore, measurable impacts of the type typically assessed with input-output models are not anticipated.

2.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

50. This analysis identifies those economic activities most likely to threaten the listed species and its habitat and, where possible, quantifies the economic impact to avoid or minimize such threats within the boundaries of the study area (the geographic boundaries of the study area are described later in this chapter). This section provides a description of the methodology used to separately identify baseline impacts and incremental impacts stemming from the proposed designation of critical habitat for the frog. This evaluation of impacts in a "with critical habitat designation" versus a "without critical habitat

designation" framework effectively measures the net change in economic activity associated with the proposed rulemaking.

2.3.1 IDENTIFYING BASELINE IMPACTS

51. The baseline for this analysis is the existing state of regulation, prior to the designation of critical habitat, that provides protection to the species under the Act, as well as under other Federal, State and local laws and guidelines. This "without critical habitat designation" scenario also considers a wide range of additional factors beyond the compliance costs of regulations that provide protection to the listed species. As recommended by OMB, the baseline incorporates, as appropriate, trends in market conditions, implementation of other regulations and policies by the Service and other government entities, and trends in other factors that have the potential to affect economic costs and benefits, such as the rate of regional economic growth in potentially affected industries.

52. Baseline impacts include sections 7, 9, and 10 of the Endangered Species Act (Act), and economic impacts resulting from these protections to the extent that they are expected to occur absent the designation of critical habitat for the species.

- Section 7 of the Act, absent critical habitat designation, 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. The portion of the administrative costs of consultations under the jeopardy standard, along with the impacts of project modifications resulting from consideration of this standard, are considered baseline impacts. Baseline administrative costs of section 7 consultation are summarized later in Exhibit 2-2.
- 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, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."[35] 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 (e.g., a landowner or local government) may develop an HCP for a listed 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.[36] The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately avoided or minimized. The development and implementation of HCPs is considered a baseline protection for the species and habitat unless the HCP is determined to be precipitated by the designation of critical habitat, or the designation influences stipulated conservation efforts under HCPs.

[35] 16 U.S.C. 1532.

[36] U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at http://endangered.fws.gov/hcp/.

Enforcement actions taken in response to violations of the Act are not included in this analysis.

53. In the case of the frog, critical habitat was previously designated in 2001 and 2006.[37] The impacts of historical efforts to conserve critical habitat are assigned to the baseline, as these costs have already been incurred and therefore are unaffected by the proposed rule. In the future, the analysis assumes that the existing critical habitat is no longer in place as it has been revised by the new designation. To the extent that the study area for this analysis overlaps with the formerly designated habitat, future impacts attributable solely to critical habitat designation are attributed to the proposed rule currently under consideration.

54. 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. If compliance with the Clean Water Act or State environmental quality laws, for example, protects habitat for the species, such protective efforts are considered to be baseline protections and costs associated with these efforts are categorized accordingly. Of note, however, is that such efforts may not be considered baseline in the case that they would not have been triggered absent the designation of critical habitat. In these cases, they are considered incremental impacts and are discussed below.

2.3.2 IDENTIFYING INCREMENTAL IMPACTS

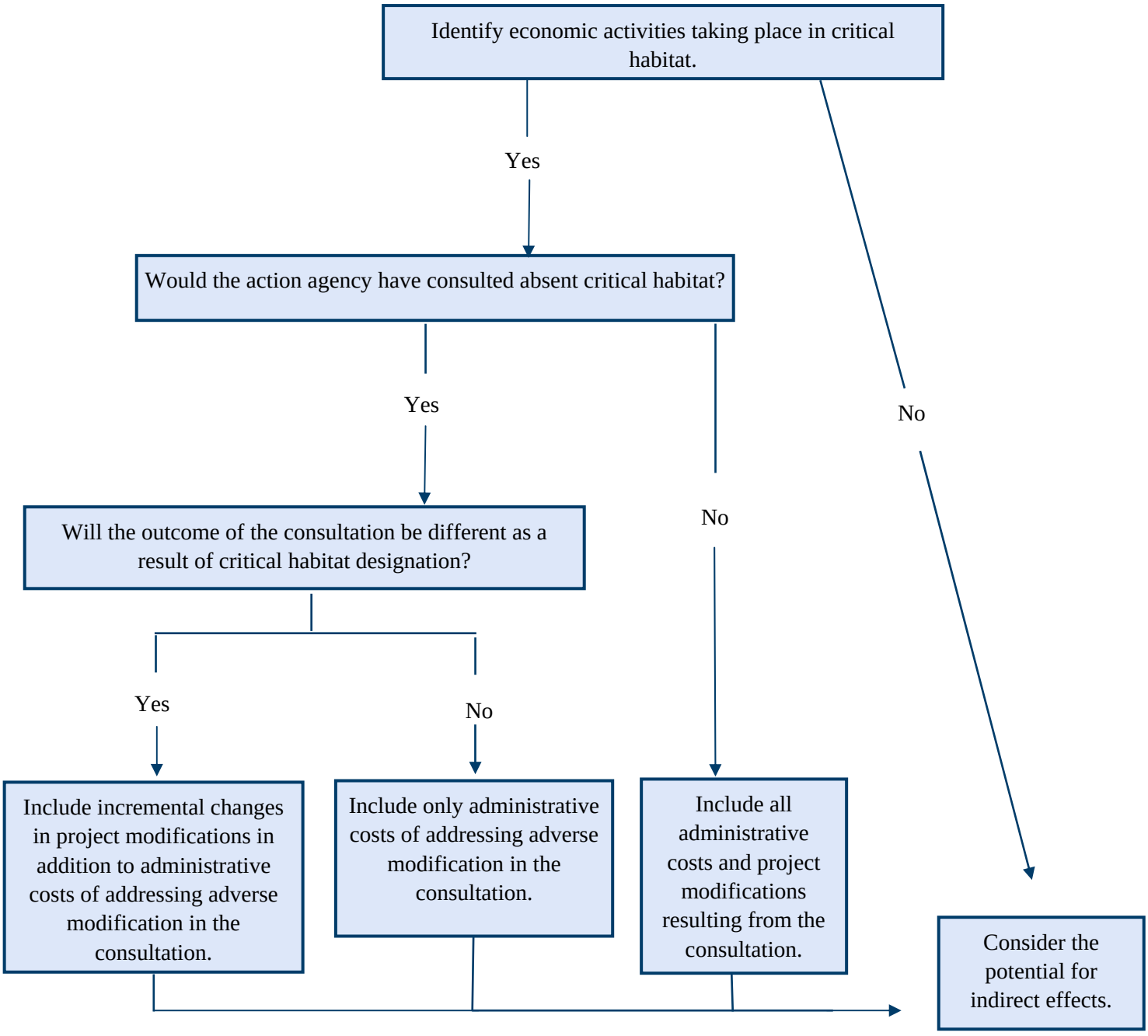
55. This analysis separately quantifies the incremental impacts of this rulemaking. The focus of the incremental analysis is to determine the impacts on land uses and activities from the designation of critical habitat that are above and beyond those impacts due to existing required or voluntary conservation efforts being undertaken due to other Federal, State, and local regulations or guidelines.

56. When critical habitat is designated, section 7 requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat (in addition to considering whether the actions are likely to jeopardize the continued existence of the species). The added administrative costs of including consideration of critical habitat in section 7 consultations, and the additional impacts of implementing project modifications resulting from the protection of critical habitat are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental impacts of the rulemaking.

57. Exhibit 2-1 depicts the decision analysis regarding whether an impact should be considered incremental. The following sections describe this decision tree in detail.

[37] 66 FR 14626; 71 FR 19244

EXHIBIT 2-1 IDENTIFYING INCREMENTAL IMPACTS OF CRITICAL HABITAT DESIGNATION



58. Incremental impacts may be the direct compliance costs associated with additional effort to forecast consultations, reinitiated consultations, new consultations occurring specifically because of the designation, and additional project modifications that would not have been required under the jeopardy standard. Additionally, incremental impacts may include indirect impacts resulting from reaction to the potential designation of critical habitat (e.g., developing HCPs in an effort to avoid designation of critical habitat), triggering of additional requirements under State or local laws intended to protect sensitive habitat, and uncertainty and perceptional effects on markets.

Direct Impacts

59. The direct, incremental impacts of critical habitat designation stem from the consideration of the potential for destruction or adverse modification of critical habitat during section 7 consultations. The two categories of direct, incremental impacts of critical habitat designation are: 1) the administrative costs of conducting section 7 consultation; and 2) implementation of any project modifications requested by the Service through section 7 consultation to avoid or minimize potential destruction or adverse modification of critical habitat.

Administrative Section 7 Consultation Costs

60. Parties involved in section 7 consultations include the Service, a Federal "action agency," and in some cases, a private entity involved in the project or land use activity. The action agency (i.e., the Federal nexus necessitating the consultation) serves as the liaison with the Service. While consultations are required for activities that involve a Federal nexus and may jeopardize the continued existence of the species regardless of whether critical habitat is designated, the designation may increase the effort for consultations in the case that the project or activity in question may adversely modify critical habitat. Administrative efforts for consultation may therefore result in both baseline and incremental impacts.

61. In general, three different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:

1. **Additional effort to address adverse modification in a new consultation -** New consultations taking place after critical habitat designation may require additional effort to address critical habitat issues above and beyond the listing issues. In this case, only the additional administrative effort required to consider critical habitat is considered an incremental impact of the designation.

2. **Re-initiation of consultation to address adverse modification -** Consultations that have already been completed on a project or activity may require re-initiation to address critical habitat. In this case, the costs of re-initiating the consultation, including all associated administrative and project modification costs are considered incremental impacts of the designation.

3. **Incremental consultation resulting entirely from critical habitat designation -** Critical habitat designation may trigger additional consultations that may not occur absent the designation (e.g., for an activity for which adverse modification may be an issue, while jeopardy is not, or consultations resulting from the new information about the potential presence of the species provided by the designation). Such consultations may, for example, be triggered in critical habitat areas that are not occupied by the species. All associated administrative and project modification costs of incremental consultations are considered incremental impacts of the designation.

62. The administrative costs of these consultations vary depending on the specifics of the project. One way to address this variability is to show a range of possible costs of consultation, as it may not be possible to predict the precise outcome of each future consultation in terms of level of effort. Review of consultation records and discussions with Service field offices resulted in a range of estimated administrative costs of consultation. For simplicity, the average of the range of costs in each category is applied in this analysis.

63. Exhibit 2-2 provides estimated administrative consultation costs representing effort required for all types of consultation, including those that considered both adverse modification and jeopardy. To estimate the fractions of the total administrative consultation costs that are baseline and incremental, the following assumptions were applied.

- The greatest effort will be associated with consultations that consider both jeopardy and adverse modification. Depending on whether the consultation is precipitated by the listing or the critical habitat designation, part or all of the costs, respectively, will be attributed to the proposed rule.
- Efficiencies exist when considering both jeopardy and adverse modification at the same time (e.g., in staff time saved for project review and report writing), and therefore incremental administrative costs of considering adverse modification in consultations precipitated by the listing result in the least incremental effort, roughly one-quarter of the cost of the entire consultation. The remaining three-quarters of the costs are attributed to consideration of the jeopardy standard in the baseline scenario. This latter amount also represents the cost of a consultation that only considers adverse modification (e.g., an incremental consultation for activities in unoccupied critical habitat) and is attributed wholly to critical habitat.
- Incremental costs of the re-initiation of a previously completed consultation because of the critical habitat designation are assumed to be approximately half the cost of a consultation considering both jeopardy and adverse modification. This assumes that re-initiations are less time-consuming as the groundwork for the project has already been considered in terms of its effect on the species. However, because the previously completed effort must be re-opened, they are more costly

EXHIBIT 2-2 RANGE OF ADMINISTRATIVE CONSULTATION COSTS (2009 DOLLARS)

BASELINE ADMINISTRATIVE COSTS OF CONSULTATION					
CONSULTATION TYPE	**SERVICE**	**FEDERAL AGENCY**	**THIRD PARTY**	**BIOLOGICAL ASSESSMENT**	**TOTAL COSTS**
NEW CONSULTATION CONSIDERING JEOPARDY (DOES NOT INCLUDE CONSIDERATION OF ADVERSE MODIFICATION)					
Technical Assistance	$420	n/a	$788	n/a	$1,130
Informal	$1,840	$2,330	$1,540	$1,500	$7,130
Formal	$4,090	$4,610	$2,630	$3,600	$15,000
Programmatic	$12,300	$10,200	n/a	$4,200	$26,700
INCREMENTAL ADMINISTRATIVE COSTS OF CONSULTATION					
CONSULTATION TYPE	**SERVICE**	**FEDERAL AGENCY**	**THIRD PARTY**	**BIOLOGICAL ASSESSMENT**	**TOTAL COSTS**
NEW CONSULTATION RESULTING ENTIRELY FROM CRITICAL HABITAT DESIGNATION (TOTAL COST OF A CONSULTATION CONSIDERING BOTH JEOPARDY AND ADVERSE MODIFICATION)					
Technical Assistance	$560	n/a	$1,050	n/a	$1,500
Informal	$2,450	$3,100	$2,050	$2,000	$9,500
Formal	$5,450	$6,150	$3,500	$4,800	$20,000
Programmatic	$16,400	$13,700	n/a	$5,600	$35,700
NEW CONSULTATION CONSIDERING ONLY ADVERSE MODIFICATION (UNOCCUPIED HABITAT)					
Technical Assistance	$420	n/a	$788	n/a	$1,130
Informal	$1,840	$2,330	$1,540	$1,500	$7,130
Formal	$4,090	$4,610	$2,630	$3,600	$15,000
Programmatic	$12,300	$10,200	n/a	$4,200	$26,700
RE-INITIATION OF CONSULTATION TO ADDRESS ADVERSE MODIFICATION					
Technical Assistance	$280	n/a	$525	n/a	$750
Informal	$1,230	$1,550	$1,030	$1,000	$4,750
Formal	$2,730	$3,080	$1,750	$2,400	$10,000
Programmatic	$8,200	$6,830	n/a	$2,800	$17,800
ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION (ADDITIVE WITH BASELINE COSTS ABOVE OF CONSIDERING JEOPARDY)					
Technical Assistance	$140	n/a	$263	n/a	$375
Informal	$613	$775	$513	$500	$2,380
Formal	$1,360	$1,540	$875	$1,200	$5,000
Programmatic	$4,100	$3,410	n/a	$1,400	$8,910

Source: IEc analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2009, and a review of consultation records from several Service field offices across the country conducted in 2002.

Notes:
1. Totals may not sum due to rounding.
2. Estimates reflect average hourly time required by staff.

than simply adding consideration of critical habitat to a consultation already underway.

Section 7 Project Modification Impacts

64. Section 7 consultation considering critical habitat may also result in additional project modification recommendations specifically addressing potential destruction or adverse modification of critical habitat. For forecast consultations considering jeopardy and adverse modification, and for re-initiations of past consultations to consider critical habitat, the economic impacts of project modifications undertaken to avoid or minimize adverse modification are considered incremental impacts of critical habitat designation. For consultations that are forecast to occur specifically because of the designation (incremental consultations), impacts of all associated project modifications are assumed to be incremental impacts of the designation. This is summarized below.

1. **Additional effort to address adverse modification in a new consultation** - Only project modifications above and beyond what would be requested to avoid or minimize jeopardy are considered incremental.
2. **Re-initiation of consultation to address adverse modification -** Only project modifications above and beyond what was requested to avoid or minimize jeopardy are considered incremental.
3. **Incremental consultation resulting entirely from critical habitat designation -** Impacts of all project modifications are considered incremental.

Indirect Impacts

65. The designation of critical habitat may, under certain circumstances, affect actions that do not have a Federal nexus and thus are not subject to the provisions of section 7 under the Act. Indirect impacts are those unintended changes in economic behavior that may occur outside of the Act, through other Federal, State, or local actions, and that are caused by the designation of critical habitat. This section identifies common types of indirect impacts that may be associated with the designation of critical habitat. Importantly, these types of impacts are not always considered incremental. In the case that these types of conservation efforts and economic effects are expected to occur regardless of critical habitat designation, they are appropriately considered baseline impacts in this analysis.

Habitat Conservation Plans

66. Under section 10 of the Act, landowners seeking an incidental take permit must develop an HCP to counterbalance the potential harmful effects that an otherwise lawful activity may have on a species. As such, the purpose of the habitat conservation planning process is to ensure that the effects of incidental take are adequately avoided or minimized. Thus, HCPs are developed to ensure compliance with section 9 of the Act and to meet the requirements of section 10 of the Act.

67. Application for an incidental take permit and completion of an HCP are not required or necessarily recommended by a critical habitat designation. However, in certain situations

the new information provided by the proposed critical habitat rule may prompt a landowner to apply for an incidental take permit. For example, a landowner may have been previously unaware of the potential presence of the species on his or her property, and expeditious completion of an HCP may offer the landowner regulatory relief in the form of exclusion from the final critical habitat designation. In this case, the effort involved in creating the HCP and undertaking associated conservation actions are considered an incremental effect of designation. No specific plans to prepare new HCPs in response to this proposed designation were identified.

Other State and Local Laws

68. Under certain circumstances, critical habitat designation may provide new information to a community about the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under other State or local laws. In cases where these impacts would not have been triggered absent critical habitat designation, they are considered indirect, incremental impacts of the designation.

69. The California Environmental Quality Act (CEQA), for example, requires that lead agencies, public agencies responsible for project approval, consider the environmental effects of proposed projects that are considered discretionary in nature and not categorically or statutorily exempt. In some instances, critical habitat designation may trigger CEQA-related requirements. This is most likely to occur in areas where the critical habitat designation provides clearer information on the importance of particular areas as habitat for a listed species. In addition, applicants who were "categorically exempt" from preparing an Environmental Impact Report (EIR) under CEQA may no longer be exempt once critical habitat is designated. In cases where the designation triggers the CEQA significance test or results in a reduction of categorically exempt activities, associated impacts are considered to be an indirect, incremental effect of the designation.

Additional Indirect Impacts

70. In addition to the indirect effects of compliance with other laws or triggered by the designation, project proponents, land managers and landowners may face additional indirect impacts, including the following:

- **Time Delays -** Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the need to reinitiate the section 7 consultation process and/or compliance with other laws triggered by the designation. To the extent that delays result from the designation, they are considered indirect, incremental impacts of the designation.
- **Regulatory Uncertainty -** The Service conducts each section 7 consultation on a case-by-case basis and issues a biological opinion on formal consultations based on species-specific and site-specific information. As a result, government agencies and affiliated private parties who consult with the Service under section 7 may face uncertainty concerning whether project modifications will be recommended by the Service and what the nature of these modifications will be. This uncertainty may diminish as consultations are completed and additional information becomes

available on the effects of critical habitat on specific activities. Where information suggests that this type of regulatory uncertainty stemming from the designation may affect a project or economic behavior, associated impacts are considered indirect, incremental impacts of the designation. In this specific analysis, information is not available to quantify this effect.

- **Stigma -** In some cases, the public may perceive that critical habitat designation may result in limitations on private property uses above and beyond those associated with anticipated project modifications and regulatory uncertainty described above. Public attitudes about the limits or restrictions that critical habitat may impose can cause real economic effects to property owners, regardless of whether such limits are actually imposed. All else equal, a property that is designated as critical habitat may have a lower market value than an identical property that is not within the boundaries of critical habitat due to perceived limitations or restrictions. As the public becomes aware of the true regulatory burden imposed by critical habitat, the impact of the designation on property markets may decrease. To the extent that potential stigma effects on markets are probable and identifiable, these impacts are considered indirect, incremental impacts of the designation. Data limitations prevent the quantification of stigma effects resulting from frog conservation efforts.

2.3.3 BENEFITS

71. Under E.O. 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.[38] OMB's Circular A-4 distinguishes two types of economic benefits: *direct benefits and ancillary benefits*. Ancillary benefits are defined as favorable impacts of a rulemaking that are typically unrelated, or secondary, to the statutory purpose of the rulemaking.[39]

72. In the context of critical habitat, the primary purpose of the rulemaking (i.e., the direct benefit) is the potential to enhance conservation of the species. The published economics literature has documented that social welfare benefits can result from the conservation and recovery of endangered and threatened species. In its guidance for implementing E.O. 12866, OMB acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency's part to conduct new research.[40] *Rather than rely on economic measures, the Service believes that the direct benefits of the proposed rule are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.*

73. Critical habitat designation may also generate ancillary benefits. Critical habitat aids in the conservation of species specifically by protecting the primary constituent elements

[38] E.O. 12866, Regulatory Planning and Review, September 30, 1993.

[39] 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.

[40] Ibid.

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

74. It is often difficult to evaluate the ancillary benefits of critical habitat designation. To the extent that the ancillary benefits of the rulemaking may be captured by the market through an identifiable shift in resource allocation, they are factored into the overall economic impact assessment in this report. For example, if habitat preserves are created to protect a species, the value of existing residential property adjacent to those preserves may increase, resulting in a measurable positive impact. Where data are available, this analysis attempts to capture the *net* economic impact (i.e., the increased regulatory burden less any discernable offsetting market gains), of species conservation efforts imposed on regulated entities and the regional economy.

2.3.4 GEOGRAPHIC SCOPE OF THE ANALYSIS

75. The geographic scope of the analysis includes all land proposed as critical habitat. Note the economic impacts may by sited outside of the boundaries of the study area (e.g., pesticide use buffers); these impacts are considered relevant to this analysis. The study area does not include lands previously designated as critical habitat that are not included in this proposed revision.

76. Results are presented by proposed critical habitat unit in most tables. Where significant impacts result from specific parcels within units, these parcels and the associated costs are identified in the text and summary tables included in the Executive Summary. Appendix B presents detailed results by census tract.

2.3.5 ANALYTIC TIME FRAME

77. The analysis 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. The analysis estimates economic impacts to activities from 1996 (year of the species' final listing) to 2030, 22 years from the expected year of final critical habitat designation(based on development project forecasts obtained from local planning authorities). Estimated impacts are divided into pre-designation (1996- 2008) and post-designation (2009-2030) impacts.[41]

[41] As described in the Proposed Rule, the Service first designated critical habitat for this species in 2001 (66 FR 14626). "Pre-designation" and "post-designation" in this report refer to the revised final critical habitat designation expected in 2009.

2.4 INFORMATION SOURCES

78. The primary sources of information for this report are communications with, and data provided by, personnel from the Service, Federal, State, and local governments and other stakeholders. In addition, this analysis relies upon the Service's section 7 consultation records and draft management plans prepared by various government agencies. A complete list of references is provided at the end of this document.

CHAPTER 3 | BASELINE REGULATIONS

79. The conservation and protection of endangered species takes place at multiple levels in the State of California, under a complex web of regulation and permitting processes designed to protect sensitive species and their habitat. Specifically, the frog receives protection at the Federal level, under the Act and at the State level under the California Endangered Species Act (CESA) and CEQA. Layered over this regulatory framework are geographically specific factors which also contribute to treatment of the frog and its critical habitat.

80. Below, we summarize the baseline protections provided by Federal, State and local statutes and regulations that may affect proposed critical habitat areas. For each baseline element, we discuss the general methodology that this analysis will use to differentiate baseline versus incremental impacts. Exhibit 3-1 depicts the general framework regarding whether an impact should be considered incremental. The following sections describe this framework in detail.

3.1 FEDERAL ESA LISTING

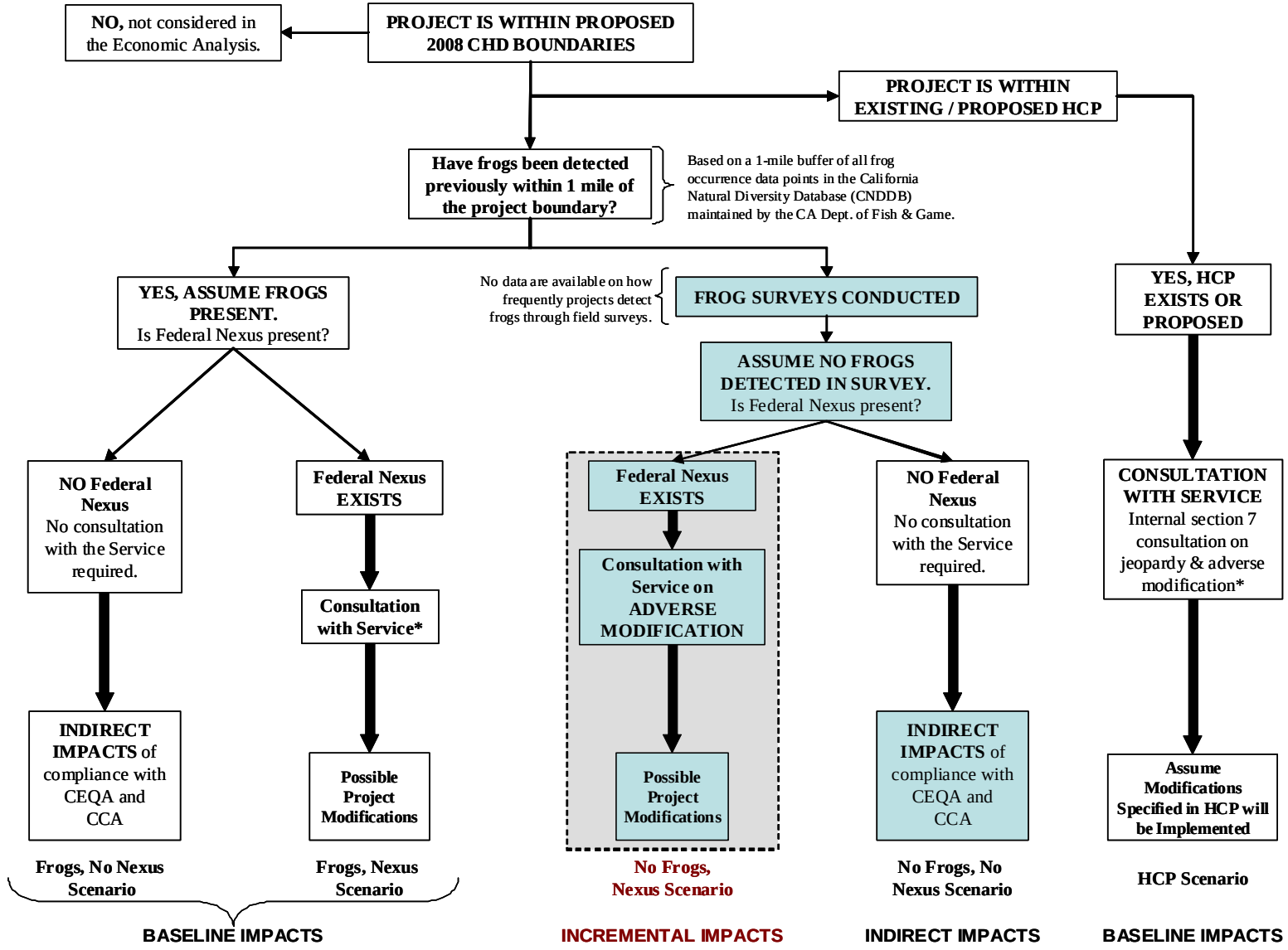
3.1.1 GUIDANCE ON FROG SITE ASSESSMENTS AND FIELD SURVEYS

81. On May 23, 1996, the Service listed the frog as an endangered species under the Act. Under the listing, Federal agencies must consult with the Service regarding any actions they fund, authorize, permit or carry out that may affect the listed species. The listing of the frog is the most significant aspect of baseline protection, as it makes it illegal for any person to "take" the species without a permit from the Service.[42] In order to prevent take of frogs, on February 18, 1997 the Service issued guidance on conducting site assessments and surveys for the frog before commencing new land-altering activities. This guidance was revised by the Service in August 2005 based on the review of numerous site assessments and survey results collected by the Service since the listing of the species in 1996.[43]

[42] "Take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." (16 U.S.C. 1532)

[43] U.S. FWS. 2005. *Revised Guidance on Site Assessment and Field Surveys for the California Red-legged Frog*, August 2005. Available online at: http://www.fws.gov/sacramento/es/documents/crf_survey_guidance_aug2005.PDF

EXHIBIT 3-1 GENERAL METHODOLOGY TO IDENTIFY AND SEPARATE BASELINE AND INCREMENTAL IMPACTS



* Minor administrative costs of adding adverse modification to consultation are counted as incremental impacts.

82. The survey protocol recommends two procedures to aid landowners and project developers in assessing the likelihood of frog presence on their property or in the vicinity of the proposed project area: (1) conduct an assessment of frog occurrence records within a one-mile radius of the project site; and (2) if habitat is present but no historical frog occurrences are identified within a one-mile radius of the project site, arrange for a qualified biologist to conduct focused field surveys of breeding pools and other associated habitat to determine whether frogs are likely to be present.[44]

Procedure 1: Site Assessment

83. To determine whether reported occurrences of the frog exist within a one-mile radius of a project site, this analysis identifies two sources of frog occurrence data available to project proponents. The first is the California Natural Diversity Data Base (CNDDB) maintained by the California Department of Fish and Game (CA DFG) Natural Heritage Division. Specifically, the survey protocol recommends the use of the CNDDB to determine if there are reported occurrences of the frog within a one-mile radius of the project site. The CNDDB is a program that inventories the location of rare and endangered plants, animals and natural communities in California. Including over 40,000 location records (as of 2001), CNDDB acts as a repository of reported sightings of rare species and natural communities and is updated on a regular basis as new data becomes available. In addition to the CNDDB, the Service identifies a number of other sources available to augment the CNDDB, including site-specific assessments of habitat connectivity, biological consultants, local residents, amateur herpetologists, resource managers and biologists from municipal, State, and Federal agencies, environmental groups and museums and universities. However, discussions with Service staff as well as preliminary calls with a number of county planning departments confirms that the CNDDB is the most well-known resource used by landowners and project proponents to determine frog presence.[45] Accordingly, this analysis relies on the CNDDB to identify areas where frogs are assumed to be present. The CNDDB contains 971 occurrence records for the frog. Applying a one-mile buffer to these data points within the proposed critical habitat boundaries results in a total of 604 occurrence records and an area of approximately 696,770acres.

84. A second source of frog occurrence data is maintained by the Service's Ventura Fish and Wildlife Office (VFWO). The VFWO has all or parts of 11 counties in its area of responsibility including: San Benito County; the coastal counties from Santa Cruz County south to western Los Angeles County; the desert portions of Los Angeles, Kern, and San Bernardino counties; Inyo County; and Mono County south of Conway Summit. Based

[44] The one-mile radius is a general guideline. The Service may advise an alternate distance based on site-specific conditions on a case-by-case basis.

[45] Personal communication with Arnold Roessler, U.S. Fish and Wildlife Service, November 5, 2008; Personal communication with Jody Lyons, Monterey County Planning, November 19, 2008; Personal communication with Claudia Slater, Santa Cruz Planning Department, November 14, 2008.

on these frog occurrence data points, an additional 127,984 acres are identified as areas where the frogs are assumed to be present.[46]

85. Impacts to projects that fall within these areas (hereinafter collectively referred to as the "CNDDB footprint") will be considered baseline for this analysis. To the extent that site-specific information available to the Service may result in a determination of frog presence, for example based on habitat connectivity, areas considered as baseline for this analysis may be under-estimated.

Procedure 2: Field Surveys

86. If no known occurrences of the frog are identified through the CNDDB, but frog habitat is present, the survey protocol recommends having a qualified biologist conduct up to eight focused field surveys to determine frog presence at or near the project site. Each survey must take place at least seven days apart, and the survey period must be conducted over a minimum period of six weeks. If focused field surveys find no frogs in or near the project area, no section 7 consultation (or resulting project modifications) would likely have been required because the activity would be presumed not to affect the frog. In contrast, all projects taking place on critical habitat lands will likely require some form of section 7 consultation, regardless of whether biological surveys actually find frogs, in order to address potential adverse modifications to critical habitat.[47] As a result, critical habitat designation could potentially impose incremental consultation costs as well as new project modifications.

87. Ideally this analysis would rely on data about the frequency that field surveys result in detection of the frog, however, according to discussions with the Service, data on the results of focused field surveys are not tracked and currently unavailable. Accordingly, this analysis conservatively assumes that frogs will not be detected by field surveys outside of known frog occurrences from the CNDDB, and therefore projects that fall within these areas will be considered incremental impacts for this analysis.[48] To the extent that field surveys detect frogs, this analysis may under-estimate baseline impacts and over-estimate incremental impacts.

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[46] Hereinafter, all data related to known frog occurrences will be collectively referred to as the CNDBB.

[47] According to the Service, site-specific assessment of a project may conclude that the proposed activity would not adversely affect PCEs and therefore formal consultation would not be required. To the extent that project activities taking place on critical habitat lands do not result in adverse impacts to PCEs, this analysis may over-estimate incremental impacts.

[48] According to the Service, "[t]he proposed critical habitat units for the California red-legged frog (frog) represent habitat-based population distributions associated with known occurrence records for this species…[t]he habitat-based population distributions, which are the basis for delineation of most critical habitat unit areas within a watershed, predict the geographic habitat areas needed for long-term conservation of the California red-legged frog populations associated with each core occurrence complex." (Memorandum provided by U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, "Comments on how DEA Should Estimate Incremental Costs for the California Red-legged Frog Critical Habitat Designation," November 20, 2008.) Therefore, although each unit is assumed by the Service to be currently occupied, the frog likely moves between the aquatic (breeding and non-breeding), upland, and dispersal habitat within these units. Therefore, depending on the time of year and the habitat type located within a particular project site, surveys may not identify the frog. At the writing of this report, the Service is unable to provide more precise information about the likelihood that a given field survey will confirm the presence of the frog.

88. Exhibits 3-2 and 3-3 present proposed critical habitat areas where the frog would likely be detected (i.e., within one-mile of a CNDDB frog occurrence) and those areas where the frog would not likely be detected (i.e., incremental).

3.1.2 RECOVERY PLAN

89. Another important component of the baseline scenario is the Recovery Plan, finalized in 2002. The plan includes a map delineating recovery units for the frog, as well as the methodology employed in determining its distribution. All of the proposed critical habitat units fall within the recovery units delineated by the Recovery Plan. While the Recovery Plan imposes no binding restrictions or regulatory burden on landowners and managers, it serves as an important information source for landowners regarding conservation needs for frog habitat areas. Because this document is made publicly available through the publication of a Notice of Availability in the Federal Register, it publicizes information about frog habitat requirements and sighting locations. In conjunction with the CNDDB, the Recovery Plan provides information to the public about areas likely to be subject to consultation with the Service.

3.1.3 SPECIAL RULE EXEMPTION FOR ROUTINE RANCHING ACTIVITIES[49]

90. Another important component of the baseline scenario is the Special Rule Exemption issued in 2006 for routine ranching activities. Section 4(d) of the Act provides the Service the authority to publish a special rule that modifies the standard protections for threatened species under the Service's regulations implementing section 9 of the Act with special measures tailored to the conservation of the species. In the 2006 final rule designating critical habitat, the Service identified the continuing loss of aquatic breeding and associated uplands as among the greatest threats to the frog. Without these natural habitats, the Service highlighted alternative breeding sites as "critical for the continued survival" of the frog.[50] Stock pond and small reservoir impoundments created as a part of livestock ranching activities have become an important source of alternative breeding sites for the frog. Accordingly, in recognition of the beneficial (or neutral) impact that managed livestock grazing at low to moderate levels has on frog habitat, the Service issued a Special Rule under section 4(d) exempting routine ranching activities on non-Federal lands from prohibitions against take in order to encourage continued responsible land uses that provide an overall benefit to the species. Consequently, under the Special Rule Exemption for routine ranching activities, this analysis assumes ranchers on non-Federal lands will not experience any economic impacts with respect to routine ranching activities due to critical habitat designation.

[49] 71 FR 19244.

[50] Ibid.

EXHIBIT 3-2 PROPOSED CRITICAL HABITAT AREAS WITHIN ONE-MILE BUFFER OF CNDDB

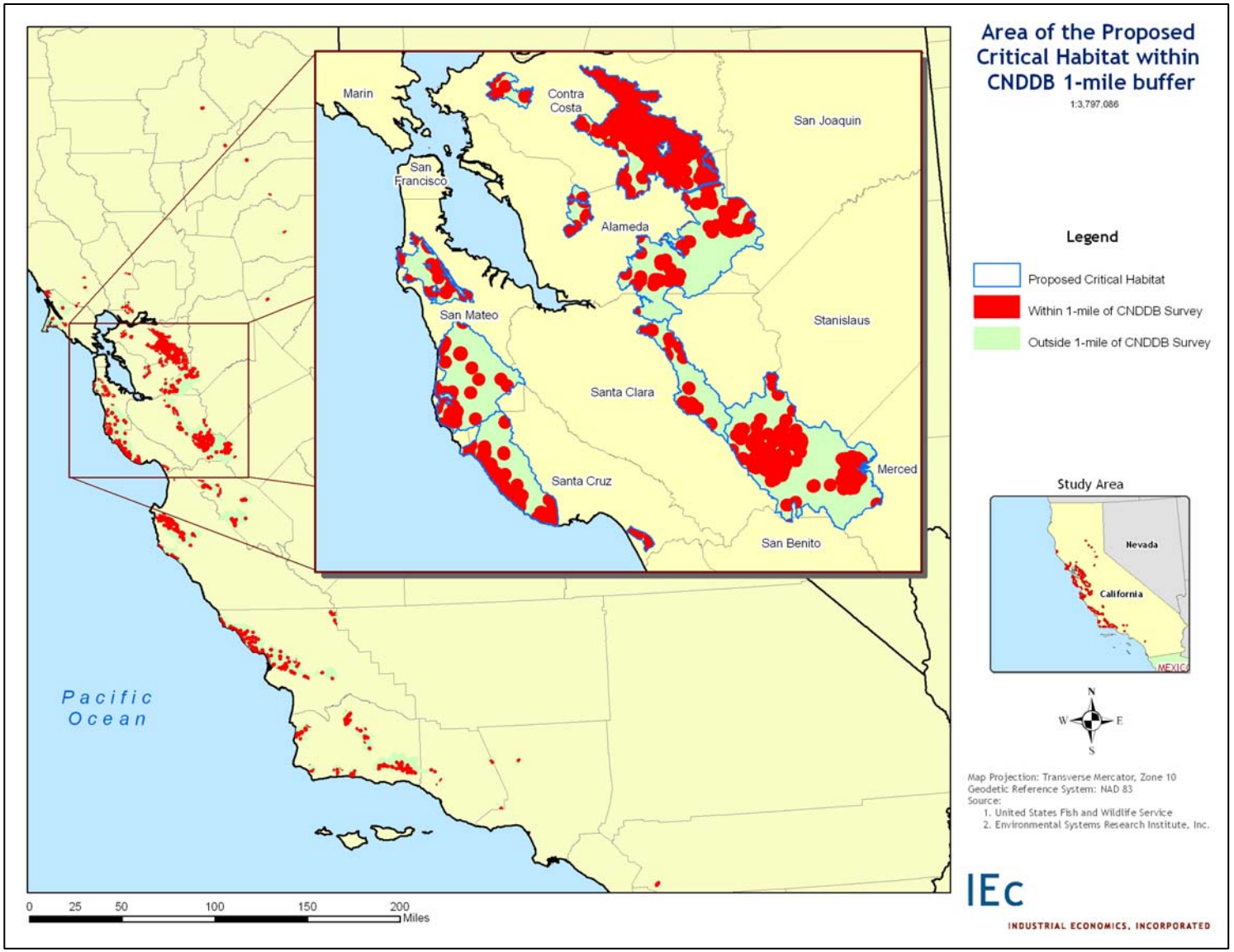


EXHIBIT 3-3 PROPOSED CRITICAL HABITAT AREAS WITHIN ONE-MILE BUFFER OF CNDDB BY UNIT

UNIT	BASELLINE ACRES	INCREMENTAL ACRES	PERCENT INCREMENTAL	TOTAL ACRES
ALA-1A	2,278	1,372	38%	3,650
ALA-1B	6,645	3,523	35%	10,168
ALA-2	60,369	93,255	61%	153,624
BUT-1	2,591	2,702	51%	5,293
CAL-1	2,004	2,445	55%	4,449
CCS-1	8,939	4,919	35%	13,858
CCS-2	127,064	11,795	8%	138,858
ELD-1	1,608	3,918	71%	5,525
LOS-1	2,015	2,216	52%	4,231
MEN-1	5,115	18,790	79%	23,905
MNT-1	519	0	0%	519
MNT-2	61,707	57,785	48%	119,492
MNT-3	8,205	19,337	70%	27,542
MRN-1	5,885	1,956	25%	7,840
MRN-2	2,211	20,348	90%	22,559
MRN-3	7,647	26,281	77%	33,928
NAP-1	1,955	569	23%	2,524
NEV-1	2,214	6,072	73%	8,285
PLA-1	1,243	0	0%	1,243
RIV-1	4,069	0	0%	4,069
SCZ-1	37,041	35,214	49%	72,255
SCZ-2	3,932	125	3%	4,057
SLO-1	9,087	8,931	50%	18,018
SLO-2	62,027	55,422	47%	117,449
SLO-3	49,921	72,499	59%	122,420
SLO-4	4,295	30,168	88%	34,463
SNB-1	17,620	18,674	51%	36,293
SNB-2	5,452	11,904	69%	17,356
SNB-3	12,662	51,093	80%	63,755
SNM-1	20,488	14,464	41%	34,952
SNM-2	35,921	60,218	63%	96,139
SOL-1	6,908	5,063	42%	11,971
SOL-2	642	2,718	81%	3,360
SOL-3	3,166	1,432	31%	4,597
SON-1	1,564	0	0%	1,564
SON-2	1,639	3,293	67%	4,932
SON-3	2,106	124	6%	2,230
STB-1	15,579	9,586	38%	25,165
STB-2	15,805	20,198	56%	36,003
STB-3	14,350	33,209	70%	47,559
STB-4	3,538	5,156	59%	8,693

UNIT	BASELLINE ACRES	INCREMENTAL ACRES	PERCENT INCREMENTAL	TOTAL ACRES
STB-5	6,527	6,361	49%	12,888
STB-6	6,872	5,113	43%	11,985
STB-7	49,471	95,650	66%	145,121
STC-1	20,849	31,435	60%	52,283
STC-2	94,299	110,419	54%	204,718
VEN-1	1,840	1,076	37%	2,915
VEN-2	2,994	5,844	66%	8,837
VEN-3	1,672	3,328	67%	5,000
YUB-1	2,206	4,116	65%	6,322
Total	**824,754**	**980,111**	**54%**	**1,804,865**

3.1.4 HABITAT CONSERVATION PLANS

91. Future impacts resulting from past decisions incorporating critical habitat concerns (e.g., the impacts associated with existing HCPs that incorporated the boundaries of the former designation) are also assigned to the baseline. Three existing HCPs include conservation measures for the frog within acres considered for exclusion from the proposed critical habitat designation:

- **The Western Riverside MSHCP**. The Western Riverside MSHCP is "a comprehensive, multi-jurisdictional HCP focusing on conservation of species and their associated habitats in Western Riverside County."[51] The MSHCP addresses 146 listed and unlisted "covered" species, including the frog. Conservation objectives included in the MSHCP specific to the frog include the conservation of occupied and historical breeding habitat, intervening lands that provide for movement between core areas and upland habitat adjacent to occupied or suitable breeding habitat. Completed in 2003, the measures undertaken as part of this MSHCP are likely to occur in the absence of designated critical habitat and are attributed to the baseline.
- **The East Contra Costa County HCP (ECCHCP)**. The ECCHCP provides regional conservation and development guidelines to protect natural resources while improving and streamlining the permit process for endangered species and wetland regulations. Participants in the HCP include the County of Contra Costa, and four (4) cities, including Brentwood, Clayton, Oakley, and Pittsburgh, California. Recently finalized on July 25, 2007, conservation measures for the frog included in this HCP are likely to occur in the absence of designated critical habitat and therefore are attributed to the baseline.
- **The Bonny Doon Quarries Settlement Ponds HCP**. The Bonny Doon HCP encompasses approximately 6 acres of privately-owned lands in the Santa Cruz Mountains near the town of Davenport. The Bonny Doon HCP contains measures to minimize and mitigate impacts to the frog and its habitat from the

[51] Riverside County MSHCP. Available at: http://www.rctlma.org/mshcp/index.html

operations, maintenance, and possible reclamation activities and to further conservation of the frog. The Bonny Doon HCP was finalized in 1998 and therefore is not likely to be affected by the decision to re-designate these areas as critical habitat.

3.2 STATE STATUTES AND REGULATIONS

3.2.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)[52]

92. CEQA requires the identification of the environmental effects of proposed projects that have the potential to harm sensitive species or habitat (state- or federally-listed). CEQA requires State and local agencies ("the lead agency") to determine whether a proposed project would have a "significant" impact on the environment, and for any such impacts identified, determine whether feasible mitigation measures or feasible alternatives will reduce the impact to a less-than-significant level. Under CEQA, the lead agency typically requires projects that may impact sensitive species or habitat to undertake a biological assessment by a qualified biologist to determine the potential for impacts to all rare, threatened and endangered species. Section 15065 of Article 5 of the CEQA regulations states that a finding of significance is mandatory if the project will:

> "substantially reduce the habitat of a fish and 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."

If the lead agency finds that a project causes significant impacts, the project proponent must prepare an EIR.

93. CEQA requirements already play a role in requiring environmental review for projects that may impact the frog. To identify projects that may impact the frog, preliminary discussions with county planning departments indicate that the most consistently used resource is the CNDDB. Similar to the Service's August 2005 survey protocol, planning department staff also use additional site-specific resources to augment this information, including focused field surveys. Where the frog is identified as present at a project site, the CEQA process is not expected to change after designation of critical habitat. Costs associated with these projects are assumed to be attributable to the baseline.

94. In cases where the species is not detected, this analysis proposes to use the same approach as previously discussed above – assuming that the frog is not detected in areas without a history of CNDDB occurrence records and attributing CEQA-related impacts to projects in these areas as incremental to the rule.

[52] Economic & Planning Systems, "Draft Economic Analysis of Critical Habitat Designation for San Diego Fairy Shrimp," prepared for the U.S. Fish and Wildlife Service, April 2004.

3.2.2 CALIFORNIA COASTAL ACT (CCA)

95. The California Coastal Act (CCA) protects California's coast through the implementation of policies at the State and local government level that safeguard the State's coastal resources. The CCA defines the "coastal zone" as the area of the State which extends three miles seaward and about 1,000 yards inland, up to a maximum of 5 miles inland from the mean high tide line. Under the CCA, each of the 53 cities and 15 counties within the coastal zone is required to prepare a Local Coastal Program (LCP), which is certified by the Coastal Commission. LCPs articulate the measures used by the city or county to implement the policies of the CCA and provide the overarching regulatory framework for issuance of permits for all development within the coastal zone.[53]

96. CCA defines environmentally sensitive habitat areas (ESHAs) as "any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments."[54] Development in ESHAs must be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.[55] Exhibit 3-4 summarizes proposed critical habitat within the coastal zone by County.

EXHIBIT 3-4 PROPOSED CRITICAL HABITAT AREAS IN THE COASTAL ZONE BY COUNTY

COUNTY	PCHD (ACRES)
Marin	25,891
Mendocino	2,422
Monterey	18,720
San Luis Obispo	82,217
San Mateo	58,088
Santa Barbara	21,176
Santa Cruz	48,684
Sonoma	520
Total	**257,718**

Source: GIS data of the California Coastal Zone obtained from the California Coastal Commission.

[53] In the absence of a LCP for a specific city or county, coastal development permits are issued by the Coastal Commission.

[54] California Public Resources, Accessed November 26, 2008. http://law.justia.com/california/codes/prc /30240-30244.html

[55] California Public Resources, Accessed November 26, 2008. http://www.leginfo.ca.gov/cgi-bin/displaycode?section=prc&group=30001-31000&file=30240-30244

CHAPTER 4 | URBAN DEVELOPMENT

97. Urban development may result in the loss and fragmentation of frog habitat and may disrupt habitat connectivity.[56] Exhibit 4-1 presents an overall summary of impacts to development activities. This chapter first reviews past impacts to development projects in the study area. Next, the chapter summarizes the methodological steps necessary to estimate future development impacts. These steps are then applied and baseline and incremental post-designation impacts are presented separately. This chapter concludes with a discussion of the sources of uncertainty in this analysis.

EXHIBIT 4-1 SUMMARY OF IMPACTS TO DEVELOPMENT ACTIVITIES (2009 – 2030, 2009 DOLLARS)

VALUES	LOW	HIGH
Post-Designation Baseline Impacts (2009 – 2030)		
Present Value of Impacts	$257,000,000	$999,000,000
Annualized Impact Value	$23,200,000	$90,300,000
Incremental Impacts (2009 – 2030)		
Present Value of Impacts	$110,000,000	$451,000,000
Annualized Impact Value	$9,930,000	$40,700,000
Note: Impacts estimated in terms of the change in land prices immediately upon publication of the final rule. Because the loss occurs in first year of the analysis, no discounting is necessary to report present value losses. Annualized impacts estimated assuming a 7 percent discount rate.		

4.1 PRE-DESIGNATION IMPACTS

98. Since the listing of the species, there have been 31 consultations for the frog on development projects. Of these, approximately 29 consultations occurred within the study area, or approximately four per year. Exhibit 4-2 summarizes past consultations by county. Examples of conservation measures required in past consultations on development activities include:

- Pre-construction survey, capture and removal of any frogs by qualified biologists;
- Education of project personnel;
- Creation of frog habitat and/or additional open space or wildlife;

[56] 61 FR 25824

- Project site revegetation or habitat restoration;
- Exotic species removal; and
- Seasonal work restrictions.

EXHIBIT 4-2 PAST DEVELOPMENT CONSULTATIONS BY COUNTY (1996-2008)

COUNTY	NO. OF CONSULTATIONS
Alameda	6
Contra Costa	5
El Dorado	1
Monterey	1
Placer	1
San Benito	1
San Joaquin	1
San Mateo	2
Santa Barbara	4
Santa Clara	3
Santa Cruz	1
Solano	2
Sonoma	1
Total	**29**

99. In addition, as previously discussed in Chapter 2, there are two existing HCPs within the study area that affect urban development projects. The Western Riverside MSHCP and the East Contra Costa County HCP include conservation measures for the frog within acres considered for exclusion in RIV-1 (4,097 acres) and CCS-2 (92,592 acres), respectively. Below we describe each HCP in more detail.

- The **Western Riverside MSHCP** differs from other HCPs in that it is a criteria-based plan, wherein each cell (a geographical unit generally 160 acres in size) is ascribed specific conservation criteria. The Criteria Area is the area in which the MSHCP conservation criteria will be applied and in which 153,000 acres of new conservation will be designated to contribute toward assembly of the overall MSHCP conservation goals, including conserving the frog. The development of the Western Riverside MSHCP was completed and adopted in June 2003. It is unlikely that the plan will be revised based on the currently proposed revisions to critical habitat; as such no new project modifications are likely to result from the final rule. Costs resulting from the implementation of the plan are attributed to the existing, baseline regulation.
- The **East Contra Costa County HCP** is a comprehensive, multi-jurisdictional plan that encompasses 174,018 acres in eastern Contra Costa County. The plan provides for regional species conservation and habitat planning while allowing

local land-use authorities to manage future growth and development. Specifically, the plan establishes two permit areas: (1) an initial urban development area (IUDA) that authorizes development of 9,796 acres; and (2) a maximum urban development area (MUDA) that authorizes up to 13,029 acres of urban development. The primary conservation measure to offset development within these two permit areas involves the creation of a Preserve System in which new conservation of approximately 23,800 acres will be created within the IUDA and approximately 30,300 acres of land will be created under the MUDA. According to the Biological Opinion, the Preserve System will protect an estimated 28 or 36 acres of modeled non-stream breeding habitat, 85 or 98 miles of stream breeding habitat, and 24,455 or 29,467 acres of upland dispersal habitat within the IUDA and MUDA, respectively, specifically for the frog.[57] Funding of the Preserve System will be generated through payment of mitigation fees by developers, prior to issuance of development permits by local planning authorities. The plan was finalized and adopted in 2007. It is unlikely that the plan will be revised based on the currently proposed revisions to critical habitat; as such no new project modifications are likely to result from the final rule. Costs resulting from the implementation of the plan are attributed to the existing, baseline regulation.

4.2 METHODOLOGY FOR ESTIMATING POST-DESIGNATION IMPACTS

100. To identify and estimate future impacts to residential and commercial development projects in areas proposed for critical habitat designation, this analysis will employ a six-step process. These steps are summarized below. Note that information and data obtained in the first three steps are combined simultaneously to accomplish Steps 4, 5 and 6.

- **Step 1 – Forecast future development activity within the study area.** The identification of potentially affected developable land relies on two pieces of information: (1) projections of the amount of development forecast to occur over the next 22 years (i.e., through the year 2030); and (2) information about the geographic location of anticipated development. Specifically, this analysis relies on local planning authorities for estimates of the number of housing units projected to be built by 2030 in the census tracts encompassing the study area.[58]

[57] U.S. Fish and Wildlife Service. 2007. Intra-Service Biological Opinion on Issuance of Section 10(a)(B) Incidental Take Permit for the Contra Costa County, the Contra Costa Flood Control and Water Conservation District, the East Bay Regional Park District, and the Cities of Brentwood, Clayton, Oakley, and Pittsburg for Implementation of the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan. July 20, 2007.

[58] Use of data from local planning authorities incorporates expertise regarding local growth trends and development characteristics. This analysis gathered data from the following local planning authorities: The Association of Bay Area Governments (ABAG), The Sacramento Area Council of Governments (SACOG), the Association of Monterey Bay Area Governments (AMBAG), the San Luis Obispo Council of Governments (SLOCOG), the Santa Barbara County Association of Governments (SBCAG), and the Southern California Association of Governments (SCAG). Where these data are not available, supplemental demographic data was relied upon from Applied Geographic Solutions (AGS). See appendix E for a more detailed discussion.

The analysis relies on a statistically-based growth allocation model developed by BEC to allocate growth projection data spatially within census tracts.

- **Step 2 – Determine whether a Federal nexus is present**. Based on discussions with the Home Builders Association of Northern California, this analysis assumes that a Federal nexus would be present for 80 percent of projects within proposed critical habitat areas.[59]
- **Step 3 – Determine whether the frog will be detected in future development sites**. As previously described in Chapter 3, the Service issued guidance to aid landowners and project developers in assessing the likelihood of frog presence on a parcel of property. Accordingly, this analysis relies on the California Natural Diversity Database (CNDDB) to identify areas where landowners and project developers are likely to detect frogs.
- **Step 4 – Distinguish between actions resulting from baseline regulations and the proposed critical habitat rule**. Baseline impacts are expected to occur in areas where landowners and project developers can reasonably expect to detect frogs – that is, areas within a one-mile radius of the CNDDB. Incremental impacts occur in areas where the frog would not be detected – outside the one-mile radius of the CNDDB.
- **Step 5 – Estimate Direct Impacts**. Three types of direct impacts will be estimated:[60]

  (1) **Administrative costs** of participating in consultations.

  (2) **Project modifications** estimated by applying typical conservation measures defined by the Service to address development impacts.[61]

  (3) **Project delays** associated with section 7 consultation and the time required to comply with conservation measures (e.g., identify and purchase mitigation credits) are estimated based on the change in land value resulting from the delay.
- **Step 6 – Estimate Indirect Impacts.** Indirect impacts of administrative costs, delay costs and possible project modifications associated with the California Environmental Quality Act (CEQA) and other county permitting processes are

[59] Electronic communication from Senior Vice President of Governmental Affairs, Home Builders Association of Northern California, December 4, 2008.

[60] As previously described, two existing HCPs, the Western Riverside MSHCP and the East Contra Costa County HCP include conservation measures for the frog within acres considered for exclusion in RIV-1 (4,097 acres) and CCS-2 (92,592 acres), respectively. For areas covered by these HCPs, frog conservation efforts are unlikely to be altered by the designation of critical habitat, therefore costs associated with implementing these conservation efforts would be attributed to the baseline. Ideally, this analysis would quantify the future baseline protections measures undertaken for the frog in the area of critical habitat within the boundaries of existing HCPs. It is anticipated that any information received during the public comment period regarding the characterization and cost of project modifications required by these plans will be included in the final version of this report.

[61] U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. "Comments on how DEA Should Estimate Incremental Costs for the California Red-Legged Frog Critical Habitat Designation," provided via email on November 20, 2008.

quantified, and the potential for indirect impacts associated with the California Coastal Act (CCA) are discussed qualitatively.

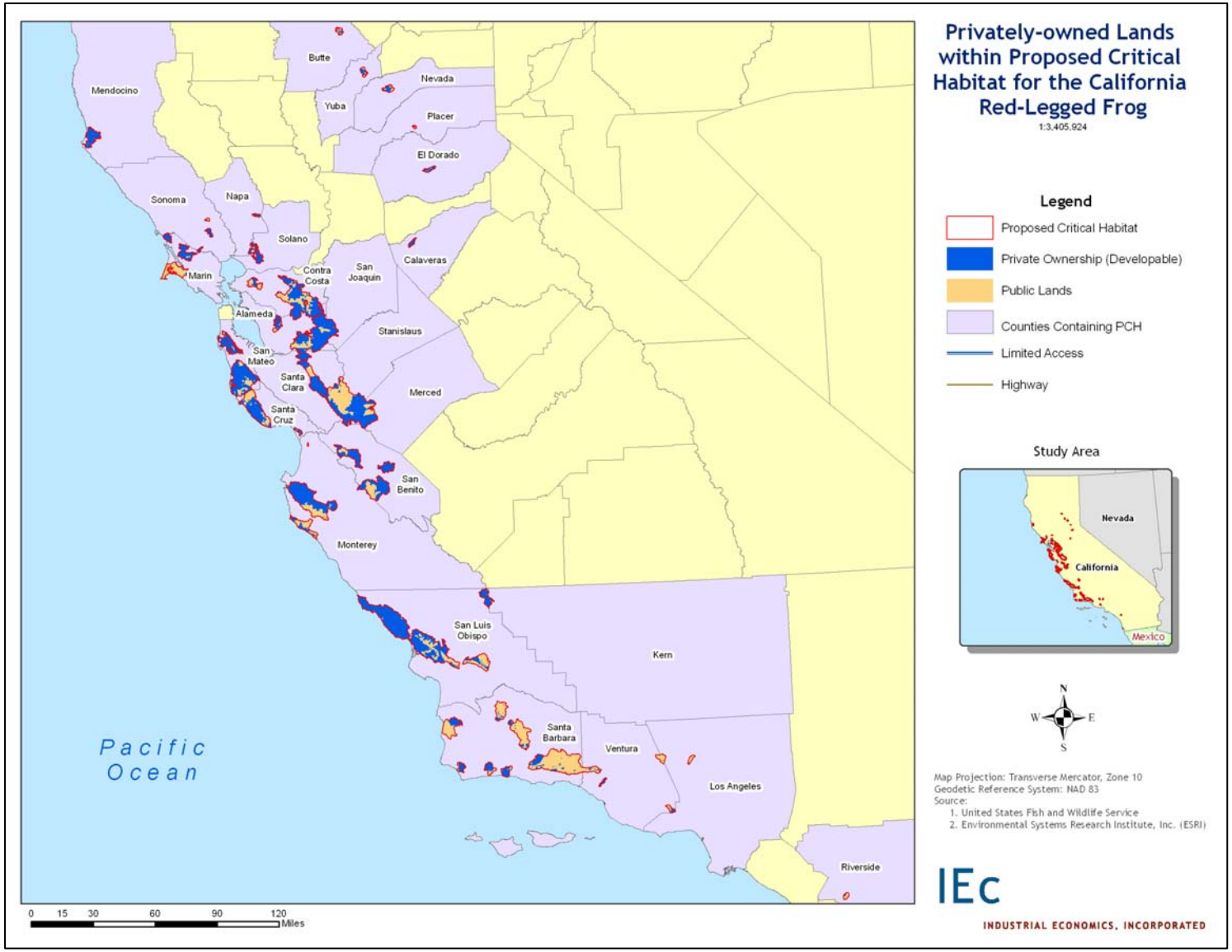
4.3 STEP ONE: FORECAST FUTURE DEVELOPMENT WITHIN THE STUDY AREA

101. Not all lands within the boundaries of proposed critical habitat for the frog can be developed in the future. For example, areas owned by Federal, State, or local governments are unlikely to be converted to housing and related uses. Accordingly, this analysis begins by limiting the study area for development activities to only privately owned lands (1,252,096 acres) based on spatial land ownership data. Exhibit 4-3 presents developable lands within the study area.

102. Not all of this land is likely to be developed within the reasonably foreseeable future. The identification of potentially affected developable land relies on two pieces of information: (1) projections of the amount of development forecast to occur over the next 22 years (i.e., through the year 2030); and (2) information about the geographic location of anticipated development. Specifically, this analysis relies on local planning authorities for estimates of the number of housing units projected to be built by 2030 in the census tracts encompassing the study area. The study area for this analysis extends across 28 counties from Mendocino and Butte Counties in the north to Riverside County in the south. As a result, available data varies significantly across the study area. A detailed explanation of available data and the methodology for projecting development by geographic region is presented in Appendix E.

103. Next, this analysis relies on a statistically-based growth allocation model developed by BEC to allocate growth projection data obtained from local planning authorities spatially within census tracts. This model incorporates demand variables (e.g., job accessibility and income level), location-specific variables (e.g., freeway proximity); current land-use classifications (e.g., farmland, flood plains); neighborhood variables (e.g., the location of nearest neighbors); and regulatory variables (e.g., incorporated boundaries of cities) to identify the probability that each grid cell of land in the State of California will be developed by 2030. A detailed explanation of the application of BEC's model is also presented in Appendix E.

EXHIBIT 4-3 MAP OF DEVELOPABLE LANDS IN STUDY AREA



104. Exhibit 4-4 summarizes the number of acres likely to be developed by critical habitat unit. As shown, the total number of acres likely to be developed in the next 22 years (5,746 acres) accounts for a small portion (less than one percent) relative to the total number of privately owned lands in the study area (approximately 1.3 million acres). Significant growth is not projected because, according to the local planning authorities' growth projections and the BEC growth allocation model, most proposed critical habitat areas are not desirable for development in the near term (e.g. outside the current urban growth boundaries, far from urbanized areas, or located in hilly terrain).

EXHIBIT 4-4 NUMBER OF ACRES FORECAST TO BE DEVELOPED BY UNIT

UNIT	ACRES
ALA-1A	157
ALA-1B	207
ALA-2	670
BUT-1	0
CAL-1	300
CCS-1	12
CCS-2	1,028
ELD-1	173
LOS-1	0
MEN-1	58
MNT-1	0
MNT-2	126
MNT-3	0
MRN-1	8
MRN-2	9
MRN-3	9
NAP-1	2
NEV-1	77
PLA-1	7
RIV-1	0
SCZ-1	627
SCZ-2	401
SLO-1	109
SLO-2	235
SLO-3	518
SLO-4	9
SNB-1	7
SNB-2	0
SNB-3	9
SNM-1	76

UNIT	ACRES
SNM-2	291
SOL-1	86
SOL-2	39
SOL-3	107
SON-1	1
SON-2	4
SON-3	22
STB-1	0
STB-2	56
STB-3	0
STB-4	0
STB-5	1
STB-6	37
STB-7	2
STC-1	42
STC-2	198
VEN-1	3
VEN-2	0
VEN-3	10
YUB-1	10
Grand Total	**5,746**

4.4 STEP TWO: IDENTIFY FEDERAL NEXUS

105. Development in red-legged frog habitat typically triggers a Federal nexus between the USACE and the Service. According to California developers, a Federal nexus is triggered in approximately 80 percent of development projects.[62] Therefore, this analysis assumes that a Federal nexus will be triggered on 80 percent of the acres projected for development. Based on this criterion, this analysis forecasts 4,596 acres that will be subject to consultation across the study area.

4.5 STEP THREE: DETERMINE WHETHER THE FROG WILL BE DETECTED AT FUTURE DEVELOPMENT SITES

106. As previously described in Chapter 3, the Service issued guidance to aid landowners and project developers in assessing the likelihood of frog presence on a parcel of property.[63] Specifically, this protocol recommends the use of the CNDDB to assist landowners and project developers to asses the likelihood of frog presence within a one-mile radius of the

[62] Electronic communication with Senior Vice President of Governmental Affairs & General Counsel, Home Builders Association of Northern California December 4, 2008.

[63] US Fish and Wildlife Service, Revised Guidance on Site Assessments and Field Surveys for the California Red-Legged Frog, August 2005, p 3.

project site. The CNDDB is a database repository of reported sightings of rare species and natural communities across California that has been in existence for about 30 years. It includes over 600 occurrence records for the frog. This analysis relies on the CNDDB and the Service's survey protocol to identify areas where landowners and project developers are likely to detect frogs. Based on this criterion, approximately 67 percent (or 3,075 acres) of the areas likely to be developed by 2030 with a Federal nexus fall within a one-mile radius of the CNDDB.

4.6 STEP FOUR: DISTINGUISH BETWEEN BASELINE AND INCREMENTAL IMPACTS

107. The preceding steps provide the information necessary to distinguish between baseline and incremental impacts. Activities in areas where the frog is likely to be found (i.e., areas within a one-mile buffer of the CNDDB) and subject to a Federal nexus are likely to incur administrative consultation costs and may be subject to project modifications. Costs in these areas would be incurred absent critical habitat based on the protection provided by the listing and the widespread knowledge of the potential presence of the species, described in Chapter 3.

108. Incremental impacts may arise from actions in areas where the frog is not likely to be detected (i.e., outside the one-mile radius of the CNDDB), but where a Federal nexus is present (80 percent of the time). As shown in Exhibit 3-1 of Chapter 3, absent critical habitat, explicit protection of the frog would not be anticipated in these situations. However, the designation compels Federal action agencies to consider the potential for land-altering activities to adversely modify critical habitat, even when the frog is not present. For these areas, the administrative costs of consultation and resulting project modifications are attributable to the proposed rule.

109. Additional incremental impacts may result indirectly as a result of requirements under CEQA and other local regulations. For areas where the frog is not likely to be detected, indirect impacts are expected to be triggered by critical habitat designation. In areas where the frog is likely to be detected, critical habitat designation is not likely to cause indirect impacts. The potential indirect impacts of the proposed designation are discussed in greater detail in Step 6.

110. Exhibit 4-5 summarizes the result of these first four steps.

EXHIBIT 4-5 FORECAST DEVELOPMENT BY PROJECT LOCATION AND FEDERAL NEXUS PRESENCE

PROJECT LOCATION	FEDERAL NEXUS (80 PERCENT OF THE TIME) (ACRES)	NO FEDERAL NEXUS (20 PERCENT OF THE TIME) (ACRES)	TOTAL (ACRES)
Frog Detected Based on CNDDB	3,075	769	**3,844**
Frog NOT Detected Based on CNDDB	1,521	380	**1,901**
Total	**4,596**	**1,149**	**5,746**

4.7 STEP FIVE: ESTIMATE DIRECT IMPACTS

111. The direct baseline and incremental impacts likely to be incurred as a result of urban development include administrative consultation costs, potential project modifications, and associated delay costs.

4.7.1 ADMINISTRATIVE COSTS OF CONSULTATION

112. The number of forecast consultations is based on the number of expected development projects that have a Federal nexus. The number of development projects is estimated by dividing the total forecast development acreage inside or outside of the 1-mile radius around the CNDDB by the average size of a development project. This analysis assumes that the average size of a project in the study area is approximately 100 acres.[64] As previously discussed, 80 percent of lands projected for development are expected to have a Federal nexus.

113. Impacts are reported as baseline or incremental based on the expected presence of the frog. That is, if a consultation occurs within the 1-mile radius of the CNDDB, the cost of the consultation is attributed to the baseline.[65] If a consultation is conducted in an area outside of the 1-mile radius around the CNDDB where the frog is not detected, the consultation is reported as incremental. Based on these criteria, approximately 31 consultations are forecast as baseline and 15 consultations as incremental. Average consultation costs (as shown in Exhibit 2-2 in Chapter 2) are applied to the number of predicted formal consultations. The number of consultations are spread evenly across years and over time. The total estimated post-designation consultation costs are presented in Exhibit 4-6.

EXHIBIT 4-6 TOTAL POST-DESIGNATION ADMINISTRATIVE COSTS OF DEVELOPMENT PROJECTS (2009 - 2030, 2009 DOLLARS)

UNIT	BASELINE	INCREMENTAL
ALA-1A	$8,550	$4,080
ALA-1B	$4,900	$11,700
ALA-2	$24,000	$29,800
BUT-1	$0	$0
CAL-1	$7,720	$16,400
CCS-1	$80	$907
CCS-2	$52,800	$29,700
ELD-1	$4,180	$9,700
LOS-1	$0	$0

[64] Industrial Economics, Incorporated, "Draft Economic Analysis of Proposed Critical Habitat Designation for the Quino Checkerspot Butterfly," prepared for the U.S. Fish and Wildlife Service, June 2001.

[65] Note that a small portion of the administrative costs associated with addressing the adverse modification standard during these consultations is attributed incrementally to critical habitat designation, as shown in Exhibit 2-2 in Chapter 2.

UNIT	BASELINE	INCREMENTAL
MEN-1	$21	$4,670
MNT-1	$10	$3
MNT-2	$4,510	$5,650
MNT-3	$15	$25
MRN-1	$361	$311
MRN-2	$35	$701
MRN-3	$330	$403
NAP-1	$89	$48
NEV-1	$1,700	$4,510
PLA-1	$398	$133
RIV-1	$0	$0
SCZ-1	$32,600	$17,800
SCZ-2	$23,900	$8,340
SLO-1	$4,030	$4,720
SLO-2	$10,900	$7,990
SLO-3	$17,200	$24,400
SLO-4	$113	$603
SNB-1	$254	$307
SNB-2	$1	$2
SNB-3	$22	$722
SNM-1	$3,010	$3,100
SNM-2	$8,060	$15,300
SOL-1	$4,140	$2,740
SOL-2	$807	$2,340
SOL-3	$4,660	$3,920
SON-1	$63	$21
SON-2	$107	$201
SON-3	$1,250	$551
STB-1	$0	$2
STB-2	$1,870	$2,620
STB-3	$1	$7
STB-4	$0	$0
STB-5	$27	$18
STB-6	$1,890	$1,090
STB-7	$45	$150
STC-1	$1,170	$2,230
STC-2	$5,320	$10,600
VEN-1	$129	$87
VEN-2	$0	$0

UNIT	BASELINE	INCREMENTAL
VEN-3	$0	$763
YUB-1	$329	$505
Total	**$232,000**	**$230,000**

Notes:
(1) Totals may not sum due to rounding.
(2) This analysis assumes these costs ultimately reduce existing land values (i.e., knowing that these costs will be incurred, a developer is likely to pay less for the land when he purchases it for development). Therefore, the impact on current land prices is estimated using developers' discount rate. Administrative costs are assumed to grow through time in nominal terms at the rate of inflation (2.99 percent), and the present value of these costs is estimated using developers' nominal discount rate of 15 percent (see Appendix E).

4.7.2 PROJECT MODIFICATIONS

114. Uncertainty regarding the type of project modifications required to offset impacts to the frog from urban development results in the evaluation of two scenarios.[66] Under the first scenario, the Service may recommend compensating for impacts to the frog and its habitat resulting from residential and commercial development by purchasing land and protecting it for the benefit of the frog. Habitat preservation ratios for the frog depend on three pieces of information: (a) whether the impact is temporary or permanent, (b) the type of frog habitat affected (e.g., aquatic breeding habitat, aquatic non-breeding habitat, or upland dispersal habitat), and (c) whether the frog would be initially detected based on the CNDDB.

115. The 2006 Final Economic Analysis assumed that 55 percent of projects will result in permanent impacts to the frog and 45 percent of projects will result in temporary impacts.[67] Because these are the best readily-available data, this analysis applies the same assumption. For proposed critical habitat where the frog is detected, this analysis assumes a habitat preservation ratio of 6:1 for permanent impacts and 2:1 for temporary

[66] The scenarios applied in this section are based on written guidance provided by the Service characterizing "typical" outcomes of section 7 consultations for the frog. The Service notes that the actual outcome of individual consultations will vary. For example, the consultation history for this species indicates that some past development projects were subject to avoidance recommendations (i.e., no homes can be built within the proposed project area), however the Service did not include an avoidance recommendation as a likely outcome of future consultations. (Personal and email communications with Arnold Roessler, U.S. Fish and Wildlife Service, Sacramento Field and Wildlife Office, December 2008)

[67] CRA International, "Economic Effects of Critical Habitat for the Red-Legged Frog in 23 California Counties," March 29, 2006.

impacts. For proposed critical habitat where the frog is not detected, this analysis assumes a habitat preservation ratio of 1:1 for both permanent and temporary impacts. [68]

116. The average price per acre at local land conservation banks depends on the type of compensating habitat required. The cost of purchasing land is significantly more expensive if compensation is required to offset impacts to breeding habitat versus dispersal habitat. The average price per acre for breeding habitat is approximately $140,000 per acre while the average price per acre of dispersal habitat is approximately $11,000 per acre.[69] A review of the consultation history for residential and commercial development projects revealed breeding habitat comprises, on average, about five percent of the total affected frog habitat. This analysis applies this ratio to estimate impacts to breeding habitat (five percent) versus dispersal habitat (95 percent).

117. Under the second scenario, the Service may recommend habitat restoration to offset development impacts. The cost of habitat restoration varies significantly depending on the type of habitat as well as the level of restoration required. In fact, preliminary discussions with frog stakeholders indicate that restoration costs for on-site habitat restoration during construction activities can range from $700 per acre to $1,700 per acre. However, the cost of restoring habitat off-site can range from $6,000 to $214,000 per acre.[70] The 2002 Draft Economic Analysis for the San Bernardino kangaroo rat, a species that also requires riparian and upland habitat features, assumed restoration costs of approximately $50,000 per acre based on interviews with several local firms providing restoration services.[71] This analysis applies the assumption that the cost of habitat restoration will be $50,000 per acre.[72]

118. As shown in Exhibit 4-7, the low- and high-end estimates differ depending on the likelihood that the frog will be detected because of differences in the amount of habitat preservation required for areas where the frog is detected (2:1 to 6:1) versus areas where the frog is not detected (1:1).

[68] The estimated impacts to development activities of this analysis differ significantly from the estimated impacts in the 2006 FEA primarily due to the difference in conservation measures specified by the Service. Specifically, habitat preservation ratios used in the 2006 FEA for development activities ranged from 1:1 to 3:1 depending on the following factors: type of impact (permanent or temporary), type of habitat impacted (breeding or non-breeding) and the location of the project (within the jurisdiction of the Sacramento or Ventura field office).

[69] Personal communication with Westervelt Ecological Services staff, Bay Area and Placer County, December 8, 2008. Several other conservation banks were contacted, but specific prices per acre for California red-legged frog habitat were not readily available.

[70] Personal communication, owner, Braddock & Logan, LLC, February 13, 2009; Personal communication, manager, San Juan Oaks Golf Club, February 10, 2009; Center for Biological Diversity, "Both Frogs and People Can Have Homes - Examples of Successful California Red-Legged Frog Habitat Protection Efforts," Press Release, April 13, 2006; NOAA Restoration Center, San Gregorio Creek Restoration Project; Personal communication, Environmental Defense Fund, January 19, 2009.

[71] Industrial Economics, Inc., "Addendum to the Economic Analysis of Critical Habitat Designation for the San Bernardino Kangaroo Rat," March 2002, pp 11-13.

[72] Additional data and/or information are invited on the cost per acre for restoration of frog habitat. It is anticipated that any new information received during the public comment period will be included in the final version of this report.

EXHIBIT 4-7 LOW- AND HIGH-END PROJECT MODIFICATION ESTIMATES BY PROJECT LOCATION

PROJECT LOCATION	LOW	HIGH
Frog Detected Based on CNDDB	Habitat restoration on-site	Habitat preservation off-site 6:1 for permanent impacts and 2:1 for temporary impacts
Frog NOT Detected Based on CNDDB	Habitat preservation off-site 1:1 for permanent and temporary impacts	Habitat restoration on-site

119. Because the exact timing of future development is unknown, this analysis spreads project modification costs evenly across years and over time. Exhibit 4-8 summarizes the project modification costs, which are attributed to the baseline or incrementally to critical habitat designation based on whether the project developer would likely detect the frog (i.e., areas within a one-mile buffer of the CNDDB).

EXHIBIT 4-8 DIRECT COSTS TO DEVELOPMENT ACTIVITIES FROM PROJECT MODIFICATIONS (2009-2030, 2009 DOLLARS)

UNIT	BASELINE		INCREMENTAL	
	LOW	HIGH	LOW	HIGH
ALA-1A	$2,120,000	$4,030,000	$104,000	$229,000
ALA-1B	$1,220,000	$2,310,000	$850,000	$1,880,000
ALA-2	$5,940,000	$11,300,000	$1,840,000	$4,050,000
BUT-1	$0	$0	$0	$0
CAL-1	$1,910,000	$3,640,000	$1,160,000	$2,570,000
CCS-1	$19,800	$37,600	$74,100	$164,000
CCS-2	$13,100,000	$24,900,000	$1,020,000	$2,240,000
ELD-1	$1,040,000	$1,970,000	$699,000	$1,540,000
LOS-1	$0	$0	$0	$0
MEN-1	$5,080	$9,670	$392,000	$866,000
MNT-1	$2,480	$4,730	$0	$0
MNT-2	$1,120,000	$2,130,000	$349,000	$770,000
MNT-3	$3,660	$6,970	$1,690	$3,720
MRN-1	$89,500	$170,000	$16,000	$35,400
MRN-2	$8,710	$16,600	$58,100	$128,000
MRN-3	$81,700	$156,000	$24,700	$54,500
NAP-1	$21,900	$41,700	$1,530	$3,380
NEV-1	$421,000	$800,000	$332,000	$732,000
PLA-1	$98,600	$188,000	$0	$0
RIV-1	$0	$0	$0	$0

UNIT	BASELINE		INCREMENTAL	
	LOW	HIGH	LOW	HIGH
SCZ-1	$8,070,000	$15,400,000	$583,000	$1,290,000
SCZ-2	$5,910,000	$11,300,000	$32,100	$70,800
SLO-1	$997,000	$1,900,000	$284,000	$628,000
SLO-2	$2,690,000	$5,120,000	$368,000	$813,000
SLO-3	$4,270,000	$8,120,000	$1,570,000	$3,470,000
SLO-4	$27,900	$53,200	$47,600	$105,000
SNB-1	$62,800	$120,000	$18,700	$41,300
SNB-2	$240	$458	$182	$402
SNB-3	$5,340	$10,200	$60,200	$133,000
SNM-1	$745,000	$1,420,000	$177,000	$390,000
SNM-2	$2,000,000	$3,800,000	$1,060,000	$2,350,000
SOL-1	$1,020,000	$1,950,000	$115,000	$253,000
SOL-2	$200,000	$381,000	$175,000	$386,000
SOL-3	$1,150,000	$2,200,000	$199,000	$439,000
SON-1	$15,600	$29,700	$0	$0
SON-2	$26,500	$50,400	$13,900	$30,800
SON-3	$308,000	$587,000	$11,400	$25,200
STB-1	$65	$123	$120	$265
STB-2	$464,000	$883,000	$168,000	$371,000
STB-3	$142	$269	$551	$1,220
STB-4	$0	$0	$0	$0
STB-5	$6,670	$12,700	$778	$1,720
STB-6	$468,000	$891,000	$38,500	$84,900
STB-7	$11,100	$21,200	$11,300	$25,000
STC-1	$290,000	$553,000	$155,000	$342,000
STC-2	$1,320,000	$2,510,000	$743,000	$1,640,000
VEN-1	$31,900	$60,800	$3,680	$8,110
VEN-2	$0	$0	$0	$0
VEN-3	$0	$0	$64,300	$142,000
YUB-1	$81,600	$155,000	$33,300	$73,400
Total	**$57,400,000**	**$109,000,000**	**$12,900,000**	**$28,400,000**

Notes:
(1) Totals may not sum due to rounding.
(2) This analysis assumes these costs ultimately reduce existing land values (i.e., knowing that these costs will be imposed, a developer is likely to pay less for the land when he purchases it for development). Therefore, the impact on current land prices is estimated using a developer's discount rate. The price of compensating acres and habitat restoration grows through time at nominal rates of 6.86 and 2.99 percent, respectively, and the present value of these costs is estimated using developers' nominal discount rate of 15 percent (see Appendix E).

4.7.3 IMPACTS FROM DEVELOPMENT DELAYS

120. In addition to the administrative costs of consultations and the project modifications necessary to satisfy consultation requirements, the consultation process also results in the delay of project completion. Based on a review of the consultation history, the average delay due to the consultation process for development projects is approximately nine months.[73] In addition to the time necessary to complete the consultation, approximately two years is needed for the developer to find and purchase offset land. This additional delay is assumed to occur only under the scenario in which the Service recommends compensating for impacts to the frog and its habitat resulting from residential and commercial development by purchasing land and protecting it for the benefit of the frog. This analysis assumes delays for consultation and for finding and purchasing offset land are sequential; in other words delays associated with land acquisition add to the time needed to complete consultation with the Service.[74]

121. The impact of project delays are estimated based on the opportunity costs of not being able to develop for some period of time. This analysis assumes that this cost is equivalent to the amount of interest that the value of the asset could have gained during the delay period. In addition, the consultation process exposes the developer to additional uncertainty about the magnitude and timing of development. Exhibit 4-9 summarizes the delay costs, which are attributed to the baseline or incrementally to critical habitat designation based on the same logic used to allocate project modification costs. The low end represents the scenario in which the Service only recommends habitat restoration. The high end of the range of impacts is associated with the scenario in which the Service recommends setting aside land to mitigate the impacts to the frog and its habitat caused by development.

[73] This analysis assumes the time to complete a consultation is the same for consultations that address jeopardy or adverse modification or both. Additional data and/or information are invited on the time required to complete a consultation. It is anticipated that any new information received during the public comment period will be included in the final version of this report.

[74] A delay of two years associated with purchasing offset land, sequential to section 7 consultation, is a reasonable assumption according to developers in San Benito County and peer reviewers. (Personal communication, General Manager, San Juan Oaks Golf Club, February 10, 2009; Personal communication, Owner, Braddock & Logan Homes, February 13, 2009; Personal communication with Jason Moody, Principal, Economic and Planning Systems, March 25, 2009.) Although this analysis assumes that development activities within the study area will be delayed by two years to comply with conservation measures from the consultation, additional data and/or information are invited on the time required to complete consultation and search for and acquire land to offset development impacts within the study area. It is anticipated that any new information received during the public comment period will be included in the final version of this report.

EXHIBIT 4-9 DIRECT COSTS TO DEVELOPMENT ACTIVITIES FROM DELAY (2009-2030, 2009 DOLLARS)

UNIT	BASELINE		INCREMENTAL	
	LOW	HIGH	LOW	HIGH
ALA-1A	$12,500,000	$45,700,000	$998,000	$3,660,000
ALA-1B	$8,000,000	$29,300,000	$9,870,000	$36,200,000
ALA-2	$22,900,000	$83,900,000	$17,000,000	$62,300,000
BUT-1	$0	$0	$0	$0
CAL-1	$712,000	$2,610,000	$956,000	$3,500,000
CCS-1	$51,300	$188,000	$658,000	$2,410,000
CCS-2	$52,500,000	$192,000,000	$7,530,000	$27,600,000
ELD-1	$1,210,000	$4,420,000	$1,790,000	$6,570,000
LOS-1	$0	$0	$0	$0
MEN-1	$10,200	$37,300	$1,730,000	$6,350,000
MNT-1	$2,810	$10,300	$0	$0
MNT-2	$5,830,000	$21,400,000	$3,200,000	$11,700,000
MNT-3	$8,790	$32,200	$8,930	$32,700
MRN-1	$299,000	$1,100,000	$120,000	$439,000
MRN-2	$29,500	$108,000	$434,000	$1,590,000
MRN-3	$254,000	$931,000	$169,000	$621,000
NAP-1	$78,500	$288,000	$11,000	$40,500
NEV-1	$603,000	$2,210,000	$1,050,000	$3,850,000
PLA-1	$75,800	$278,000	$0	$0
RIV-1	$0	$0	$0	$0
SCZ-1	$19,900,000	$72,900,000	$3,120,000	$11,400,000
SCZ-2	$14,200,000	$52,000,000	$170,000	$623,000
SLO-1	$1,570,000	$5,760,000	$953,000	$3,490,000
SLO-2	$11,900,000	$43,600,000	$3,570,000	$13,100,000
SLO-3	$19,000,000	$69,600,000	$15,200,000	$55,900,000
SLO-4	$123,000	$449,000	$461,000	$1,690,000
SNB-1	$151,000	$553,000	$99,100	$363,000
SNB-2	$577	$2,120	$966	$3,540
SNB-3	$12,800	$47,000	$313,000	$1,150,000
SNM-1	$4,420,000	$16,200,000	$2,520,000	$9,230,000
SNM-2	$9,770,000	$35,800,000	$11,600,000	$42,400,000
SOL-1	$738,000	$2,710,000	$186,000	$682,000
SOL-2	$123,000	$452,000	$251,000	$921,000
SOL-3	$779,000	$2,860,000	$299,000	$1,100,000
SON-1	$18,900	$69,200	$0	$0
SON-2	$27,700	$102,000	$30,200	$111,000
SON-3	$327,000	$1,200,000	$21,600	$79,200

UNIT	BASELINE		INCREMENTAL	
	LOW	HIGH	LOW	HIGH
STB-1	$186	$682	$759	$2,780
STB-2	$1,510,000	$5,550,000	$1,200,000	$4,400,000
STB-3	$406	$1,490	$3,490	$12,800
STB-4	$0	$0	$0	$0
STB-5	$19,100	$70,200	$4,920	$18,100
STB-6	$1,340,000	$4,920,000	$243,000	$892,000
STB-7	$31,900	$117,000	$71,700	$263,000
STC-1	$1,510,000	$5,540,000	$1,790,000	$6,560,000
STC-2	$6,290,000	$23,000,000	$8,180,000	$30,000,000
VEN-1	$98,800	$362,000	$25,100	$91,900
VEN-2	$0	$0	$0	$0
VEN-3	$0	$0	$613,000	$2,250,000
YUB-1	$163,000	$599,000	$147,000	$539,000
Total	**$199,000,000**	**$730,000,000**	**$97,000,000**	**$354,000,000**

Notes:
(1) Totals may not sum due to rounding.
(2) This analysis assumes these costs ultimately reduce existing land values (i.e., knowing that these costs will be incurred, a developer is likely to pay less for the land when he purchases it for development). Therefore, the impact on current land prices is estimated using a developer's discount rate. The analysis assumes the value of the asset (the land) grows through time at a nominal rate of 6.86 percent, and the present value of the delay costs is estimated using developers' nominal discount rate of 15 percent (see Appendix E).

4.8 STEP SIX: ESTIMATE INDIRECT IMPACTS

122. In addition to the costs incurred by private landowners and developers summarized in the previous three sections, private landowners may incur additional costs related to compliance under other State or local laws that would not have been triggered absent critical habitat designation. As discussed in Chapter 2, under certain circumstances, critical habitat designation may provide new information to a community about the sensitive ecological nature of a geographic area, potentially triggering additional economic impacts. In this case, these impacts are considered indirect, incremental impacts of the designation. The following sections consider potential indirect impacts on development from two State laws: CEQA and the CCA.

California Environmental Quality Act

123. CEQA requires proposed projects that have the potential to harm sensitive species or habitat (state- or federally-listed) to identify their environmental effects. CEQA requires State and local agencies ("the lead agency") to determine whether a proposed project would have a "significant" impact on the environment, and for any such impacts identified, determine whether feasible mitigation measures or alternatives will reduce the impact to a "less-than significant" level. Under CEQA, the lead agency typically requires projects that may impact sensitive species or habitat to sponsor a biological assessment

by a qualified biologist to determine the potential for impacts to all rare, threatened and endangered species. Section 15065 of Article 5 of CEQA states that a finding of significance is mandatory if the project will:

> "substantially reduce the habitat of a fish and 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."

If the lead agency finds that a project causes significant impacts, the project proponent must prepare an EIR. CEQA requirements already play a role in conservation for the red-legged frog by requiring an environmental review for projects that may impact the frog.

124. CEQA is implemented at a local level by county planning departments. Planners from seven counties were contacted and interviewed to determine whether critical habitat designation for the frog influences the way the county implements CEQA. If staff indicated that critical habitat is taken into consideration, they were asked to identify what additional measures would be required of the project proponent to comply with the CEQA review process in proposed critical habitat areas. The end result of the CEQA review process can vary significantly by county. Based on discussions with various counties, the two most common results of the CEQA review process after designation of critical habitat are described below.

- **"Mitigated Negative Declaration" Scenario**. Most county planners indicated that they would rely on the Service's critical habitat decision for the frog when considering proposed development. For development projects without a Federal nexus (20 percent of the time) that fall within critical habitat, county planners would typically require the preparation of an assessment by a qualified biologist detailing any impacts to the frog and its habitat, and any measures recommended to minimize identified impacts. Biological assessments would then be circulated to the Service as well as the California Department of Fish and Game for additional review and/or project modification recommendations. County planners state that in most cases, recommendations result in restoration, mitigation, avoidance, or some combination thereof.[75] By following these guidelines, the proposed development would usually claim a "mitigated negative declaration" as a result of the CEQA review process.[76] If the project cannot be mitigated at this stage of the CEQA process, an EIR must be prepared along with identification of feasible project alternatives or appropriate mitigation measures.[77]

[75] Personal communication with Paula Bradley, Monterey County Associate Planner, January 8, 2009; John Karamitsos, Santa Barbara County Planner, January 8, 2009; Lissette Knight, San Benito County Associate Planner, January 8, 2009; Bruce Jensen, Alameda County Senior Planner, January 9, 2009; Debbie Foley, Contra Costa County Senior Planning Technician, January 9, 2009.

[76] California Code of Regulations §15070

[77] California Code of Regulations §§15080 to 15097

- **"No Additional Action" Scenario**. In some cases, county planners indicated that although the designation of critical habitat for the frog might be taken into consideration in evaluating whether or not to protect a given area, the entire area of critical habitat would not necessarily be identified as sensitive habitat. For example, in Santa Cruz and San Mateo Counties local county policies or county designations of sensitive areas would trump information from the Service. In this case, the counties would not necessarily require surveys or the employment of qualified biologists if a proposed development fell within critical habitat, but not in an area the county previously identified as an environmentally sensitive habitat.[78]

In order to account for the different approaches counties may take in response to the designation of critical habitat for the frog, a range of impacts are presented. On the low end, counties may not incorporate federally-designated critical habitat into their CEQA review process. In this case, indirect impacts are limited to the additional administrative costs associated with addressing the frog and/or its habitat within the project area. On the high end, county planners may require project modifications for impacts to the frog and/or its habitat associated with development activities. This analysis assumes required conservation measures under CEQA would be similar to conservation measures used by the Service.[79] It also assumes that the two years needed to find and purchase land to offset the impacts of development would be incurred if the conservation measures under CEQA require land offsets.

125. County planners did indicate, however, that CEQA regulations would not duplicate conservation measures required as a result of section 7 consultation with the Service. That is, if a Federal nexus exists and the project applicant is required to consult with the Service, the county would not place any additional project modifications on the project beyond those already recommended by the Service. However, regardless of whether a Federal nexus exists, presence of the frog and/or its habitat adds an additional layer of administrative costs associated with the CEQA review process. Administrative costs associated with CEQA vary depending on the type of project. Based on discussions with consultants who specialize in CEQA, this analysis uses an average cost for developing CEQA-related documents of $19,333 per project.[80]

[78] Personal communication with Paula Bradley, Monterey County Associate Planner, January 8, 2009; Steve Monowitz, San Mateo County Long Range Planning, January 9, 2009.

[79] It is also legally feasible for counties to recommend that development be avoided entirely in critical habitat. This is possible under CEQA, but also under other local regulations. For example, under the Alameda County General Plan, development may be precluded in critical habitat (Personal communication, Planner, Alameda County Planning Department; Alameda County General Plan, East County Area Plan, page 79, accessed at: http://www.acgov.org/cda/planning/plans.htm.) Although it is unlikely that development would be precluded throughout the range of frog critical habitat, it is difficult to determine the extent to which complete avoidance would be recommended. The economic impact of such a policy, however, would be substantial.

[80] Industrial Economics, Incorporated, "Draft Economic Analysis of Proposed Critical Habitat Designation for the La Grosia Thistle," prepared for the U.S. Fish and Wildlife Service, November 2008.

126. Exhibit 4-10 summarizes the types of indirect, incremental impacts associated with the CEQA review as a result of critical habitat designation. Exhibits 4-11 and 4-12 summarize the indirect costs associated with CEQA where a Federal nexus exists (80 percent of the time) and where a Federal nexus does not exist (20 percent of the time), respectively. Indirect costs are attributed to the baseline or incrementally to critical habitat designation based on the same logic used for direct impacts.

EXHIBIT 4-10 TYPES OF INDIRECT IMPACTS ASSOCIATED WITH CEQA

PROJECT LOCATION	FEDERAL NEXUS (80 PERCENT OF THE TIME)	NO FEDERAL NEXUS (20 PERCENT OF THE TIME)
Frog Detected Based on CNDDB	✓ Administrative Costs	✓ Administrative Costs ✓ Project Modifications ranging from none to conservation measures similar to those required by the Service plus the associated delay costs
Frog NOT Detected Based on CNDDB	✓ Administrative Costs	✓ Administrative Costs ✓ Project Modifications ranging from none to conservation measures similar to those required by the Service plus the associated delay costs

EXHIBIT 4-11 INDIRECT COSTS OF CEQA ADMINISTRATIVE PROCEDURES ON LANDS WITH A FEDERAL NEXUS (2009-2030, 2009 DOLLARS)

UNIT	BASELINE	INCREMENTAL
ALA-1A	$8,190	$887
ALA-1B	$4,700	$7,250
ALA-2	$23,000	$15,700
BUT-1	$0	$0
CAL-1	$7,390	$9,920
CCS-1	$76	$632
CCS-2	$50,600	$8,670
ELD-1	$4,000	$5,970
LOS-1	$0	$0
MEN-1	$20	$3,350
MNT-1	$10	$0
MNT-2	$4,320	$2,980
MNT-3	$14	$14
MRN-1	$346	$137
MRN-2	$34	$496
MRN-3	$316	$211
NAP-1	$85	$13
NEV-1	$1,630	$2,830
PLA-1	$381	$0

UNIT	BASELINE	INCREMENTAL
RIV-1	$0	$0
SCZ-1	$31,200	$4,970
SCZ-2	$22,900	$274
SLO-1	$3,860	$2,430
SLO-2	$10,400	$3,140
SLO-3	$16,500	$13,400
SLO-4	$108	$406
SNB-1	$243	$160
SNB-2	$1	$2
SNB-3	$21	$513
SNM-1	$2,880	$1,510
SNM-2	$7,720	$9,070
SOL-1	$3,960	$980
SOL-2	$773	$1,490
SOL-3	$4,460	$1,700
SON-1	$60	$0
SON-2	$102	$119
SON-3	$1,190	$97
STB-1	$0	$1
STB-2	$1,790	$1,430
STB-3	$1	$5
STB-4	$0	$0
STB-5	$26	$7
STB-6	$1,810	$328
STB-7	$43	$97
STC-1	$1,120	$1,320
STC-2	$5,100	$6,340
VEN-1	$123	$31
VEN-2	$0	$0
VEN-3	$0	$548
YUB-1	$315	$284
Total	**$222,000**	**$110,000**

Note:
(1) Totals may not sum due to rounding.
(2) This analysis assumes these costs ultimately reduce existing land values (i.e., knowing that these costs will be incurred, a developer is likely to pay less for the land when he purchases it for development). Therefore, the impact on current land prices is estimated using developers' discount rate. Administrative costs are assumed to grow through time in nominal terms at the rate of inflation (2.99 percent), and the present value of these costs is estimated using developers' nominal discount rate of 15 percent (see Appendix E).

EXHIBIT 4-12 INDIRECT COSTS TO DEVELOPMENT ACTIVITIES FROM PROJECT MODIFICATIONS ON LANDS WITHOUT A FEDERAL NEXUS (2009-2030, 2009 DOLLARS)

	BASELINE		INCREMENTAL	
UNIT	LOW	HIGH	LOW	HIGH
ALA-1A	$2,050	$1,010,000	$222	$26,200
ALA-1B	$1,170	$579,000	$1,810	$214,000
ALA-2	$5,740	$2,830,000	$3,920	$463,000
BUT-1	$0	$0	$0	$0
CAL-1	$1,850	$912,000	$2,480	$293,000
CCS-1	$19	$9,420	$158	$18,700
CCS-2	$12,700	$6,240,000	$2,170	$256,000
ELD-1	$1,000	$494,000	$1,490	$176,000
LOS-1	$0	$0	$0	$0
MEN-1	$5	$2,420	$837	$98,900
MNT-1	$2	$1,180	$0	$0
MNT-2	$1,080	$533,000	$745	$88,000
MNT-3	$4	$1,750	$4	$425
MRN-1	$87	$42,700	$34	$4,040
MRN-2	$8	$4,150	$124	$14,600
MRN-3	$79	$39,000	$53	$6,230
NAP-1	$21	$10,500	$3	$386
NEV-1	$406	$201,000	$708	$83,700
PLA-1	$95	$47,000	$0	$0
RIV-1	$0	$0	$0	$0
SCZ-1	$7,800	$3,850,000	$1,240	$147,000
SCZ-2	$5,710	$2,820,000	$68	$8,090
SLO-1	$964	$476,000	$607	$71,700
SLO-2	$2,600	$1,280,000	$786	$92,900
SLO-3	$4,120	$2,030,000	$3,350	$396,000
SLO-4	$27	$13,300	$102	$12,000
SNB-1	$61	$30,000	$40	$4,720
SNB-2	$0	$115	$0	$46
SNB-3	$5	$2,550	$128	$15,200
SNM-1	$720	$355,000	$377	$44,500
SNM-2	$1,930	$952,000	$2,270	$268,000
SOL-1	$990	$488,000	$245	$29,000
SOL-2	$193	$95,400	$373	$44,100
SOL-3	$1,120	$551,000	$424	$50,200

UNIT	BASELINE		INCREMENTAL	
	LOW	HIGH	LOW	HIGH
SON-1	$15	$7,440	$0	$0
SON-2	$26	$12,600	$30	$3,520
SON-3	$298	$147,000	$24	$2,880
STB-1	$0	$31	$0	$30
STB-2	$448	$221,000	$359	$42,400
STB-3	$0	$68	$1	$139
STB-4	$0	$0	$0	$0
STB-5	$6	$3,180	$2	$196
STB-6	$453	$223,000	$82	$9,700
STB-7	$11	$5,300	$24	$2,860
STC-1	$281	$138,000	$331	$39,100
STC-2	$1,280	$629,000	$1,590	$187,000
VEN-1	$31	$15,200	$8	$927
VEN-2	$0	$0	$0	$0
VEN-3	$0	$0	$137	$16,200
YUB-1	$79	$38,900	$71	$8,390
Total	**$55,500**	**$27,400,000**	**$27,400**	**$3,240,000**

Notes:
(1) Totals may not sum due to rounding.
(2) This analysis assumes these costs ultimately reduce existing land values (i.e., knowing that these costs will be imposed, a developer is likely to pay less for the land when he purchases it for development). Therefore, the impact on current land prices is estimated using a developer's discount rate. The price of compensating acres and habitat restoration grows through time at nominal rates of 6.86 and 2.99 percent, respectively, and the present value of these costs is estimated using developers' nominal discount rate of 15 percent (see Appendix E).

EXHIBIT 4-13 INDIRECT COSTS TO DEVELOPMENT ACTIVITIES FROM DELAY (2009-2030, 2009 DOLLARS)

UNIT	BASELINE		INCREMENTAL	
	LOW	HIGH	LOW	HIGH
ALA-1A	$0	$8,310,000	$0	$665,000
ALA-1B	$0	$5,330,000	$0	$6,580,000
ALA-2	$0	$15,200,000	$0	$11,300,000
BUT-1	$0	$0	$0	$0
CAL-1	$0	$475,000	$0	$637,000
CCS-1	$0	$34,200	$0	$439,000
CCS-2	$0	$35,000,000	$0	$5,020,000
ELD-1	$0	$804,000	$0	$1,200,000
LOS-1	$0	$0	$0	$0
MEN-1	$0	$6,780	$0	$1,160,000
MNT-1	$0	$1,870	$0	$0
MNT-2	$0	$3,880,000	$0	$2,130,000
MNT-3	$0	$5,860	$0	$5,950
MRN-1	$0	$199,000	$0	$79,900
MRN-2	$0	$19,700	$0	$289,000
MRN-3	$0	$169,000	$0	$113,000
NAP-1	$0	$52,400	$0	$7,360
NEV-1	$0	$402,000	$0	$701,000
PLA-1	$0	$50,600	$0	$0
RIV-1	$0	$0	$0	$0
SCZ-1	$0	$13,300,000	$0	$2,080,000
SCZ-2	$0	$9,460,000	$0	$113,000
SLO-1	$0	$1,050,000	$0	$635,000
SLO-2	$0	$7,930,000	$0	$2,380,000
SLO-3	$0	$12,700,000	$0	$10,200,000
SLO-4	$0	$81,700	$0	$307,000
SNB-1	$0	$101,000	$0	$66,100
SNB-2	$0	$385	$0	$644
SNB-3	$0	$8,540	$0	$209,000
SNM-1	$0	$2,940,000	$0	$1,680,000
SNM-2	$0	$6,510,000	$0	$7,720,000
SOL-1	$0	$492,000	$0	$124,000
SOL-2	$0	$82,100	$0	$167,000
SOL-3	$0	$520,000	$0	$199,000
SON-1	$0	$12,600	$0	$0

UNIT	BASELINE		INCREMENTAL	
	LOW	HIGH	LOW	HIGH
SON-2	$0	$18,500	$0	$20,100
SON-3	$0	$218,000	$0	$14,400
STB-1	$0	$124	$0	$506
STB-2	$0	$1,010,000	$0	$801,000
STB-3	$0	$271	$0	$2,330
STB-4	$0	$0	$0	$0
STB-5	$0	$12,800	$0	$3,280
STB-6	$0	$895,000	$0	$162,000
STB-7	$0	$21,300	$0	$47,800
STC-1	$0	$1,010,000	$0	$1,190,000
STC-2	$0	$4,190,000	$0	$5,450,000
VEN-1	$0	$65,900	$0	$16,700
VEN-2	$0	$0	$0	$0
VEN-3	$0	$0	$0	$409,000
YUB-1	$0	$109,000	$0	$98,000
Total	**$0**	**$133,000,000**	**$0**	**$64,400,000**

Note:
(1) Totals may not sum due to rounding.
(2) This analysis assumes these costs ultimately reduce existing land values (i.e., knowing that these costs will be incurred, a developer is likely to pay less for the land when he purchases it for development). Therefore, the impact on current land prices is estimated using a developer's discount rate. The analysis assumes the value of the asset (the land) grows through time at a nominal rate of 6.86 percent, and the present value of the delay costs is estimated using developers' nominal discount rate of 15 percent (see Appendix E).

California Coastal Act

127. The California Coastal Commission can restrict development in Environmentally Sensitive Habitat Areas (ESHAs) under the CCA. The California Public Resources Code states,

> "Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas."[81]

The Coastal Commission determines whether or not an area is an environmentally sensitive habitat area based on its own surveys and reports; determination of an environmentally sensitive habitat area is typically not influenced by the designation of critical habitat.[82]

[81] California Public Resources Code, Article 5. Land Resources, §30240.

[82] Personal communication with Coastal Planner, California Coastal Commission, September 7, 2007.

128. Although the Coastal Commission is clearly allowed by law to preclude development in ESHAs, it is possible for the Coastal Commission to approve of development in an ESHA. In the past, the Coastal Commission has approved development conditional on adoption of certain mitigation measures. For example, in 2003, the Coastal Commission approved construction of a hospital addition with certain special conditions of approval. The project, undertaken by the Community Hospital of the Monterey Peninsula, was located within an ESHA near critical habitat unit MNT-2.[83]

129. It is difficult to accurately quantify the potential impacts to development within the jurisdiction of the Coastal Commission due to the uncertainty regarding whether or not the Coastal Commission will approve future development projects. Furthermore, the costs associated with compliance with the CCA are not all directly attributable to critical habitat designation for the frog. Accordingly, this analysis does not quantify potential indirect impacts associated with the CCA.

4.9 SOURCES OF UNCERTAINTY

130. It is important to recognize the uncertainty inherent in the assumptions underlying this analysis. Exhibit 4-14 summarizes these uncertainties and their potential effect on estimated economic impacts.

EXHIBIT 4-14 SUMMARY OF UNCERTAINTIES TO URBAN DEVELOPMENT ANALYSIS

ASSUMPTION	POTENTIAL EFFECT ON RESULTS
In areas without any reported frog sightings in the CNDDB, the Service typically requires focused field surveys as well as site-specific assessments of suitable habitat and habitat connectivity. Ideally, this analysis would rely on data about the frequency that these additional site assessment activities result in the detection of the frog. However, according to discussions with the Service, these data are not tracked. Accordingly, this analysis conservatively assumes that frogs will not likely be detected in these areas. To the extent that this approach under-estimates the likelihood that frogs will be detected in a proposed critical habitat unit, baseline impacts will be understated and incremental impacts will be overstated.	+/-
The application of different discount rates to estimate present value and annualized costs reveals another key source of uncertainty in the analysis. The cost of development delays drives the overall impact estimates. Delay costs are estimated by combining information about the value of land and the timing of future development. Consideration of timing relies on the increase in the value of land over time which is accounted for by applying the nominal land value growth rate to the estimated land value. The present value of delay impacts is estimated using developers' opportunity cost of capital (15 percent). The delay impacts will be underestimated if the growth rate in the value of land has been underestimated or if the developers' discount rate has been overestimated. Impacts will be overestimated if the opposite is true.	+/-

[83] Personal communication with the California Coastal Commission, December 10, 2003.

ASSUMPTION	POTENTIAL EFFECT ON RESULTS
The analysis uses the best readily available GIS information to calculate the acreage of developable land. These estimates may over- or understate the actual lands available for development. For example, the estimated acreage of developable lands may be overstated because some small parcels of privately owned lands may be unavailable for development. Because the ownership data for this analysis covers such a large area of California, details on small-scale protected lands may have been overlooked.	+/-
The analysis relies on projections of future development activity provided by ABAG, AMBAG, SACOG, SLOCOG, SBCAG, and AGS and allocates the development spatially using BEC's model. These data sources represent the best currently available information. However, if future development activity is significantly different from these projections or occurs in significantly different locations, impacts may be over- or understated.	+/-
Development activity is assumed to occur at a constant rate over the time period of the analysis. If projects occur more frequently in earlier periods, costs will be understated. Conversely, if development activity is more likely in later periods, impacts will be overstated.	+/-
The assumption that impacts to all developable lands within critical habitat can be offset by provision of conservation lands may not be true for all areas. Some developable lands may be too crucial for frog conservation and recovery, and may not be considered replaceable. In other cases, local planning authorities may recommend more stringent conservation measures (such as complete avoidance) as a result of the presence of the frog and/or its habitat. To the extent, that more stringent conservation measures are enforced, the impacts presented in this analysis may be understated.	-
The ratio between breeding and dispersal habitat applied in this analysis (5 percent and 95 percent, respectively) may be an under- or overestimate of the true ratio between breeding and dispersal habitat within the study area.	+/-
This analysis assumes habitat restoration costs of approximately $50,000 per acre. As discussed above, site-specific habitat restoration varies significantly depending on the type of habitat and the level of required restoration. To the extent that habitat restoration costs differ, impacts may be over- or understated.	+/-
This analysis applies a price per acre at local land conservation banks of $11,000 per acre for dispersal habitat and $140,000 per acre for breeding habitat. To the extent that these prices change over time, impacts may be over- or understated.	+/-
This analysis assumes projects delays associated with section 7 consultation and purchasing land to offset development impacts of nine months and two years, respectively. Furthermore, this analysis assumes delays for section 7 consultation and compliance with conservation measures are sequential; in other words consultation with the Service adds to conservation measure compliance delays. To the extent that actual delay time periods differ from these assumptions, impacts may be over- or understated.	+/-

ASSUMPTION	POTENTIAL EFFECT ON RESULTS
During the development of this analysis, consideration was given to the possibility that gains and losses experienced by existing home and landowners outside of critical habitat and consumers of new housing, would either offset or add to the welfare losses estimated in this report. Significant additional losses or offsetting gains in the markets for new and existing housing are unlikely because the conservation measures contemplated by the Service do not include on-site avoidance of frog habitat. Thus, the number of new homes constructed is not likely to change. Offsetting gains to landowners outside of designated critical habitat are also likely to be minimal due to the likelihood that adequate substitute sites exist (only 5,746 acres of the 1,252,096 acres of private land within proposed critical habitat are anticipated to be developed in the next 22 years). However, these potentially minor offsetting gains to non-critical habitat landowners are not captured in this analysis.	+/-
+: This assumption may result in an overestimate of real costs. -: This assumption may result in an understatement of real costs. +/-: The assumption has an unknown effect on estimates.	

CHAPTER 5 | WATER MANAGEMENT

131. This section describes how conservation efforts to protect the frog and its habitat may affect water management activities in the study area. Local water management districts, flood control districts, and public works departments are responsible for maintaining waterways and channels for flood control and water supply projects. According to the final rule listing the species as threatened, flood control maintenance activities, such as vegetation removal, channel maintenance, herbicide spraying, shaping of banks to control erosion and desilting of creeks may degrade frog habitat.[84]

132. Exhibit 5-1 provides an overall summary of impacts to water management activities as described in the remainder of the chapter. Based on a review of the consultation history, frog-specific conservation measures required for water management-related activities are primarily designed to reduce potential impacts to the frog in the project area during project activities. None of the conservation measures recommended by the Service in past consultations for projects located within or outside of designated critical habitat are specifically designed to address adverse modification. Accordingly, conservation measures for water management-related activities are expected to occur even in the absence of critical habitat designation and are attributed to the baseline. The incremental impacts of critical habitat designation are forecast to be limited to section 7 administrative costs.

5.1 BACKGROUND

133. Since critical habitat for the species was designated in 2001, there has been an average of eight section 7 consultations associated with water management activities per year. Conservation measures required for water management-related activities are primarily designed to protect the frog while project activity is underway. Conservation measures for water management-related activities include:

- Pre-construction survey, capture and removal of any frogs by qualified biologists;
- Pre-construction education of site workers by qualified biologists;
- Daily supervision of project activities by a qualified biologist;
- Construction confined to the dry season; and

[84] 73 FR 53492.

- Installation of temporary silt fences to minimize sedimentation.[85]

Based on discussions with local water management agencies, the average cost of implementing the conservation measures for water management-related activities is approximately $25,000 per project.[86]

134. In addition to the above frog-specific conservation measures, the Service may also require additional conservation measures designed to preserve water quality (e.g., prepare a spill prevention and clean up plan), and minimize sedimentation and stream bank erosion during construction activities. The majority of these conservation measures are likely to occur even in the absence of the frog and its habitat as part of best management practices followed by local water management agencies. Accordingly, no incremental impacts are anticipated, regardless of whether the project occurs in areas of critical habitat where no frogs are present (i.e., outside of the CNDDB footprint within the study area). The total post-designation costs are presented in Exhibit 5-1. Costs quantified include conservation measures required for water management-related activities. The analysis assumes that the only incremental impacts are administrative in nature. The cost of implementing best management practices not specifically related to the frog is not included in this analysis.

EXHIBIT 5-1 POST-DESIGNATION ECONOMIC IMPACTS TO WATER MANAGEMENT (2009-2030, 2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	BASELINE IMPACTS		INCREMENTAL IMPACTS	
	PRESENT VALUE	ANNUALIZED IMPACTS	PRESENT VALUE	ANNUALIZED IMPACTS
ALA-1A	$16,100	$1,460	$532	$48
ALA-1B	$62,500	$5,650	$1,460	$130
ALA-2	$138,000	$12,500	$17,100	$1,500
BUT-1	$43,600	$3,940	$0	$0
CAL-1	$29,000	$2,630	$0	$0
CCS-1	$80,100	$7,240	$2,490	$230
CCS-2	$246,000	$22,200	$23,900	$2,200
ELD-1	$43,600	$3,940	$0	$0
LOS-1	$29,000	$2,630	$0	$0
MEN-1	$58,100	$5,250	$0	$0
MNT-1	$29,300	$2,650	$86	$8
MNT-2	$146,000	$13,200	$19,800	$1,800
MNT-3	$71,800	$6,490	$4,550	$410

[85] Water management agencies and flood control districts schedule the majority of their projects in the dry season and impacts associated with seasonal restrictions can typically be mitigated with advanced planning, resulting in negligible impacts.

[86] Per project cost estimates include the costs of frog surveying and monitoring and erecting silt fencing. Cost information was obtained from the following sources: Rich Boyer, Water Resources Engineer, Monterey County Water Resources Agency on January 6, 2009; Chris Berry, Water Resource Manager, Santa Cruz City Water Department; and Maureen Spencer, Environmental Services Manager, Santa Barbara County Flood Control District on December 9, 2008.

UNIT	BASELINE IMPACTS		INCREMENTAL IMPACTS	
	PRESENT VALUE	ANNUALIZED IMPACTS	PRESENT VALUE	ANNUALIZED IMPACTS
MRN-1	$14,500	$1,310	$0	$0
MRN-2	$29,000	$2,630	$0	$0
MRN-3	$58,100	$5,250	$0	$0
NAP-1	$14,500	$1,310	$0	$0
NEV-1	$58,100	$5,250	$0	$0
PLA-1	$51,500	$4,650	$2,640	$240
RIV-1	$43,600	$3,940	$0	$0
SCZ-1	$120,000	$10,800	$15,700	$1,400
SCZ-2	$46,300	$4,180	$901	$81
SLO-1	$33,500	$3,030	$1,500	$140
SLO-2	$78,900	$7,140	$11,800	$1,100
SLO-3	$124,000	$11,200	$12,300	$1,100
SLO-4	$53,900	$4,880	$3,460	$310
SNB-1	$48,900	$4,420	$1,790	$160
SNB-2	$17,100	$1,540	$855	$77
SNB-3	$53,000	$4,800	$3,160	$290
SNM-1	$111,000	$10,000	$3,080	$280
SNM-2	$142,000	$12,800	$8,580	$780
SOL-1	$14,500	$1,310	$0	$0
SOL-2	$14,500	$1,310	$0	$0
SOL-3	$29,000	$2,630	$0	$0
SON-1	$29,000	$2,630	$0	$0
SON-2	$14,500	$1,310	$0	$0
SON-3	$29,000	$2,630	$0	$0
STB-1	$37,000	$3,350	$2,660	$240
STB-2	$40,500	$3,660	$3,800	$340
STB-3	$58,600	$5,300	$5,030	$450
STB-4	$31,800	$2,870	$919	$83
STB-5	$47,700	$4,310	$1,360	$120
STB-6	$47,400	$4,280	$1,270	$110
STB-7	$119,000	$10,800	$20,400	$1,800
STC-1	$65,600	$5,930	$2,500	$230
STC-2	$109,000	$9,900	$7,440	$670
VEN-1	$19,000	$1,720	$1,500	$140
VEN-2	$37,100	$3,360	$2,700	$240
VEN-3	$65,800	$5,950	$2,570	$230
YUB-1	$29,000	$2,630	$0	$0
Total	**$2,930,000**	**$265,000**	**$188,000**	**$17,000**

5.2 SOURCES OF UNCERTAINTY

135. The sources of uncertainty in the estimates provided in this Chapter primarily concern currently available data. To the extent that the past rate of consultation is not a good predictor of future water management project activity in the study area, impacts may be over- or understated. Furthermore, based on history and the specific characterization of the threat associated with water management activities (i.e., focus on flood control maintenance activities), this analysis assumes that management decisions regarding flow levels will not be affected by the presence of the frog or its critical habitat.

CHAPTER 6 | AGRICULTURAL CROP FARMING

136. This chapter considers potential economic impacts to agricultural crop farming activities resulting from frog conservation efforts. Agricultural pollution can result in direct toxic effects to frog or its prey base, and can also result in contamination of water with fertilizers and pesticides.[87]

137. This chapter begins with an overall summary of impacts to agricultural crop farming activities. Next, past and likely future agricultural crop farming activities within the study area are discussed. The chapter concludes with a detailed presentation, by critical habitat unit, of pre- and post-designation impacts.

138. Exhibit 6-1 summarizes total impacts incurred as a result of baseline protections and incrementally as a result of the critical habitat designation.. Exhibit 6-2 presents the top ten units ranked by incremental impacts. As shown, impacts in these top ten units account for approximately 93 to 94 percent of total impacts.

EXHIBIT 6-1 SUMMARY OF IMPACTS TO AGRICULTURAL CROP FARMING ACTIVITIES (2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

VALUES	LOW	HIGH
Pre-Designation Impacts (1996 - 2008)		
Present Value of Impacts	$48,700,000	$50,000,000
Post-Designation Baseline Impacts (2009 - 2030)		
Present Value of Impacts	$222,000,000	$229,000,000
Annualized Impact Value	$20,100,000	$20,700,000
Post-Designation Incremental Impacts (2009 - 2030)		
Present Value of Impacts	$48,380,000	$48,380,000
Annualized Impact Value	$4,370,000	$4,370,000

[87] 2002 Recovery Plan.

EXHIBIT 6-2 TOP TEN UNITS RANKED BY INCREMENTAL IMPACTS (PRESENT VALUE 2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	LOW	PERCENT OF IMPACTS	UNIT	HIGH	PERCENT OF IMPACTS
SLO-3	$13,700,000	28%	SLO-3	$13,500,000	28%
SCZ-1	$10,300,000	21%	SNB-1	$10,800,000	22%
SNB-1	$9,780,000	20%	SCZ-1	$10,100,000	21%
MNT-2	$2,810,000	6%	MNT-2	$2,690,000	6%
SLO-2	$2,660,000	5%	SLO-2	$2,650,000	5%
SNB-3	$1,450,000	3%	SNB-3	$1,590,000	3%
SNM-2	$1,230,000	3%	SNM-2	$1,210,000	2%
STB-7	$1,150,000	2%	STB-7	$1,130,000	2%
STB-6	$954,000	2%	STB-6	$817,000	2%
VEN-1	$759,000	2%	VEN-1	$575,000	1%
Percent of Total Impacts		**93%**	**Percent of Total Impacts**		**93%**

6.1 AGRICULTURAL CROP FARMING ACTIVITIES IN THE STUDY AREA

139. Under section 7, the U.S. Environmental Protection Agency (EPA) must consult with the Service to ensure that registration of products under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) complies with the Act. On April 2, 2002, the Center for Biological Diversity filed a lawsuit in Federal District Court for the Northern District of California, alleging that EPA failed to comply with section 7 by not ensuring that its registration of 66 named pesticide active ingredients will not result in adverse affects to the frog. On October 20, 2006, the U.S. District Court for the Northern District of California issued a Stipulated Injunction requiring EPA to determine the effects of 66 pesticide active ingredients on the frog under a court-ordered schedule of three years.[88] In addition, while EPA completes these consultations, the court's injunction disallows the use of the 66 named pesticide active ingredients within three identified areas:[89]

1. **Final Critical Habitat**, specified as all areas identified as frog habitat in the Service's 2006 critical habitat designation;
2. **Frog Populations Outside Final Critical Habitat** based on frog occurrence data contained in the California Department of Fish and Game's CNDDB; and [90]
3. **Buffer Areas**. For aerial applications, pesticides cannot be applied within 200 feet from the edge of frog habitat; and for ground applications, the buffer zone is 60 feet.

[88] Stipulated Injunction available at: http://www.epa.gov/espp/litstatus/stipulated-injunction.pdf.

[89] Some pesticide uses are exempt from the court's injunction, or have exceptions to the court's injunction. For more information, see Step 3 – Exceptions to the Injunction at: http://www.epa.gov/espp/litstatus/redleg-frog/steps-info.htm

[90] Includes areas identified under section 4(b) "California Red-Legged Frog Populations Outside Final Critical Habitat" of the Stipulated Injunction.

This analysis assumes that the proposed revision of critical habitat will alter and expand the existing geographic areas subject to the Stipulated Injunction. Furthermore, this analysis assumes that the court-ordered injunction restricting pesticide use represents the likely outcome of future section 7 consultations between EPA and the Service for this activity. To the extent that future consultations find more flexible ways to avoid jeopardy or adverse modification (e.g., adjustments in cropping or pesticide use practices), this analysis may overstate future economic impacts.

140. Another potential Federal nexus for section 7 consultation associated with agricultural crop farming activities is voluntary funding, or cost-sharing, from the Natural Resources Conservation Service (NRCS). Because there have been no consultations on NRCS-funded agricultural crop farming projects in the past in the study area, it is difficult to project the number of similar activities likely in the future.[91]

6.2 METHODS AND ASSUMPTIONS

141. To identify and estimate impacts to agricultural crop farming activities from the establishment of no pesticide use areas, this analysis employs a three-step process:

1. **Identify active crop farming land within the study area** based on spatial data from the California Department of Conservation's FMMP. Established in 1982, the FMMP produces maps and statistical data on the location, quality and quantity of agricultural lands across 47.9 million acres in 49 California counties.[92] FMMP maps and data are updated every two years and are based on a combination of soil data, land use data (e.g., satellite imagery), and site visits to review and verify areas without (or with questionable) photographic coverage. Public review also provides an important data source and the FMMP actively distributes new maps for review at the local level. Because the FMMP is updated on a biennial basis, 2006 is the most recent mapping data available for the study area.

   As shown in Exhibit 6-3, the FMMP classifies agricultural lands into five categories. This analysis focuses on agricultural lands used for irrigated and non-irrigated crop farming. Irrigated agriculture is assumed to include areas defined by FMMP as Prime Farmland, Farmland of Statewide Importance and Unique Farmland, all of which must have been used for agricultural production at some time during the four years prior to mapping.[93] Farmland of Local Importance (L) includes a combination of lands used for grazing activities and non-irrigated agricultural production (e.g., wheat, barley, oats, beans, safflower and grain hay). Agricultural lands used for grazing activities are addressed separately in Chapter 7. To separate grazing lands included in

[91] Additional data and/or information are invited on future NRCS projects and the potential economic impacts due to frog conservation. It is anticipated that any new information received during the public comment period will be included in the final version of this report.

[92] California Department of Conservation. FMMP – Program Background. Accessed on: September 4, 2009. Available online at: http://www.conservation.ca.gov/dlrp/fmmp/overview/Pages/background.aspx

[93] Note that estimates of irrigated agriculture presented in this Chapter may include non-irrigated orchards and vineyards classified as "Unique Farmland."

Farmland of Local Importance from non-irrigated crop activity, this analysis relies on geographic data obtained from FMMP staff.[94]

EXHIBIT 6-3 FMMP AGRICULTURAL LAND CLASSIFICATIONS

CATEGORY	DEFINITION
Prime Farmland (P)	Farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
Farmland of Statewide Importance (S)	Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
Unique Farmland (U)	Farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.
Farmland of Local Importance (L)	Farmland identified as important to the local agriculture as determined by each county's board of supervisors and a local advisory committee. Each county has its own definition of "local importance" but according to discussions with FMMP staff this category generally includes a combination of land used for grazing and non-irrigated (or dryland) farming.
Grazing Land (G)	Land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with the California Cattlemen's Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities.
Source: FMMP. Important Farmland Map Categories. Accessed on September 4, 2009. Available online at: http://www.conservation.ca.gov/dlrp/fmmp/mccu/Pages/map_categories.aspx	

As previously discussed, the court imposed two types of buffer areas on pesticide application depending on the type of application: 200 feet for aerial applications and 60 feet for ground applications. Data are unavailable on the proportion of land within the study area for which aerial applications is used versus ground applications. Accordingly, this analysis bounds impacts to agricultural activities based on these two buffer areas:

- At the lower bound, the analysis assumes that all areas use ground pesticide application and applies a buffer area of 60 feet to the study area.
- At the upper bound, the analysis assumes that all areas use aerial pesticide application and applies a buffer area of 200 feet to the study area.

Exhibits 6-4 and 6-5 summarize the affected acres by type of farming and unit for a buffer area of 60 feet and 200 feet, respectively.

[94] Personal communication with Molly Penberth, California Farmland Mapping and Monitoring Program (FMMP), September 1, 2009.

EXHIBIT 6-4 AFFECTED CROP FARMING ACRES, BY FARMING TYPE, BY UNIT: 60 FOOT BUFFER

UNIT	IRRIGATED FARMING			NON-IRRIGATED FARMING[2]	TOTAL ACRES
	PRIME FARMLAND	FARMLAND OF STATEWIDE IMPORTANCE	UNIQUE FARMLAND[1]		
ALA-2	0	0	1	35	36
CCS-1	9	0	0	298	307
CCS-2	70	3	67	478	618
ELD-1	20	0	5	0	25
MNT-2	519	43	159	0	721
MNT-3	9	224	0	0	233
MRN-1	0	0	0	0	0
MRN-2	0	29	9	119	156
MRN-3	0	0	0	483	483
NAP-1	0	0	0	0	0
RIV-1	0	0	0	0	0
SCZ-1	1,019	805	625	57	2,505
SCZ-2	717	255	509	0	1,481
SLO-1	0	0	18	504	522
SLO-2	972	59	392	517	1,940
SLO-3	1,805	342	641	953	3,742
SLO-4	0	0	0	64	64
SNB-1	1,034	12	333	762	2,141
SNB-2	0	0	0	37	37
SNB-3	30	0	0	837	867
SNM-1	193	10	114	48	365
SNM-2	253	40	341	1,698	2,332
SOL-1	0	0	11	0	11
SOL-2	3	0	1	0	4
SOL-3	0	0	30	9	39
SON-2	0	0	1	0	1
SON-3	0	0	20	83	103
STB-2	38	11	15	817	880
STB-3	0	0	0	25	25
STB-5	0	0	0	124	124
STB-6	305	0	633	0	938
STB-7	0	0	47	379	426
STC-1	0	0	8	758	766
STC-2	11	0	6	804	821
VEN-1	20	15	248	220	504
Total	**7,024**	**1,848**	**4,235**	**10,109**	**23,216**

(1) Land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California.
(2) Includes lands that produce the following agricultural commodities: wheat, barley, oats, dry beans, safflower, haylands, and other grains. This category also includes 13 acres of Christmas tree farming in SCZ-1.

EXHIBIT 6-5 AFFECTED CROP FARMING ACRES, BY FARMING TYPE, BY UNIT: 200 FOOT BUFFER

UNIT	IRRIGATED FARMING			NON-IRRIGATED FARMING[2]	TOTAL ACRES
	PRIME FARMLAND	FARMLAND OF STATEWIDE IMPORTANCE	UNIQUE FARMLAND[1]		
ALA-2	0	0	3	43	45
CCS-1	9	0	1	300	310
CCS-2	78	8	71	478	636
ELD-1	22	0	8	0	30
MNT-2	519	43	159	0	721
MNT-3	9	224	0	0	233
MRN-1	0	0	0	1	1
MRN-2	0	29	9	125	162
MRN-3	0	0	0	485	485
NAP-1	1	0	0	0	1
RIV-1	0	0	2	0	2
SCZ-1	1,023	808	637	65	2,534
SCZ-2	765	255	522	0	1,542
SLO-1	0	0	18	538	556
SLO-2	972	59	392	517	1,940
SLO-3	1,814	350	643	970	3,776
SLO-4	0	0	0	72	72
SNB-1	1,132	15	340	762	2,248
SNB-2	0	0	0	37	37
SNB-3	36	0	0	842	878
SNM-1	215	10	130	58	413
SNM-2	280	40	377	1,733	2,429
SOL-1	0	0	12	0	12
SOL-2	9	1	4	0	14
SOL-3	0	0	35	18	53
SON-2	0	0	3	0	3
SON-3	0	0	21	88	109
STB-2	46	13	23	823	905
STB-3	0	0	0	27	27
STB-5	0	0	0	126	126
STB-6	305	0	636	0	940
STB-7	0	0	47	379	426
STC-1	0	0	8	758	766
STC-2	36	0	7	813	856
VEN-1	20	15	248	234	517
Total	**7,289**	**1,870**	**4,357**	**10,289**	**23,805**

(1) Land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California.
(2) Includes lands that produce the following agricultural commodities: wheat, barley, oats, dry beans, safflower, haylands, and other grains. This category also includes 13 acres of Christmas tree farming in SCZ-1.

2. **Distinguish between actions resulting from the baseline regulations and the proposed critical habitat rule.** To distinguish between baseline and incremental impacts, this analysis uses the CNDDB to identify areas where the frog would be detected and therefore the injunction will apply regardless of the re-designation of critical habitat. This analysis assumes that implementation of the injunction in areas outside of the CNDDB footprint are incremental impacts because a decision by the Service not to designate those areas could mean the injunction does not apply. Based on this criterion, approximately 64 percent of farming areas affected by the pesticide use restrictions fall within a one-mile radius of the CNDDB. Exhibit 6-5 summarizes the results of these first two steps.

EXHIBIT 6-6 SUMMARY OF TOTAL AGRICULTURAL ACRES AFFECTED BY LOCATION

LOCATION	LOWER BOUND	UPPER BOUND
Frog Detected Based on CNDDB (Baseline)	15,934	16,519
Frog NOT Detected Based on CNDDB (Incremental)	7,282	7,286
Total	**23,216**	**23,805**

3. **Estimate impacts resulting from the implementation of no pesticide-use areas**. Three types of impacts are estimated:

   - **Pesticide Effects Determination Costs**. As previously discussed, under the stipulated injunction EPA is required to prepare effects determination for the 66 named pesticide active ingredients within three years. According to discussions with EPA staff, each pesticide assessment requires approximately 0.7 FTE at an average salary rate of GS Level 13, plus an additional $10,000 per assessment in data search fees. EPA completed 20 assessments in 2007, 21 in 2008 and expects to complete the final 25 in 2009.[95]

   - **Administrative Costs of Consultation**. The administrative costs of initiating section 7 consultation on the 66 pesticide active ingredients as required under the stipulated injunction are based on the consultation cost model presented in Chapter 2. According to discussions with EPA staff, while pesticide effects determinations for 41 pesticides have been submitted to the Service, section 7 consultation with the Service has not yet begun and is expected to over the next few years.[96]

   - **Project Modification Costs**. This analysis assumes that as a result of the section 7 consultation process, EPA will continue the implementation of no-pesticide use areas within newly designated critical habitat and the 60- or 200-foot buffer zones first applied under the Stipulated Injunction. These prohibitions will effectively

[95] Personal communication with Arty Williams, EPA, January 13, 2009.

[96] Ibid.

result in the loss of agricultural crop production.[97] The assumption that the prohibition will result in lost production is consistent with conversations with the California Department of Pesticide Regulation (DPR) as well as public comments submitted by affected stakeholders from Santa Barbara and San Luis Obispo counties.[98,99]

Three crop types are likely to be affected: (1) vegetable and melon farming, (2) fruit and tree nut farming and (3) oil seed and grain farming. As shown in Exhibit 6-7, irrigated agriculture is assumed to include crops associated with vegetable and melon farming, and fruit and tree nut farming. Non-irrigated agriculture is assumed to be associated with oil seed and grain farming.

EXHIBIT 6-7 SUMMARY OF AFFECTED CROP TYPES

FARMING TYPE	CROP TYPE	NAICS CODE	DESCRIPTION
Irrigated Agriculture	Vegetable and melon farming	1112	Operations engaged in (a) growing vegetables or melon crops, (b) producing vegetable and melon seeds, and/or (c) growing vegetable and/or melon bedding plants.
	Fruit and tree nut farming	1113	Operations engaged in growing fruit and/or tree nut crops.
Non-Irrigated Agriculture	Oil seed and grain farming	1111	Operations engaged in growing oilseed and/or grain crops, operations engaged in producing oilseed and/or grain seeds and corn silage and grain silage operations.

Source: FMMP. Important Farmland Map Categories. Accessed on September 4, 2009. Available online at: http://www.conservation.ca.gov/dlrp/fmmp/mccu/Pages/map_categories.aspx

To estimate the value of foregone agricultural production for each crop type, this analysis relies on county-specific data available from the USDA National Agriculture Statistics Service (NASS), 2007 Census of Agriculture ("Census"). Specifically, this analysis uses data regarding the acres of cropland per farm and net operational dollar gain (ignoring government payments) per farm. Dividing the latter by the former produces an estimate of the average net operational dollar gain

[97] To the extent that there are alternative beneficial uses of agricultural land (e.g., organic farming or grazing), this analysis may overstate future economic impacts. A summary of caveats to this analysis is presented in Exhibit 6-13.

[98] Personal communication with Polo Moreno, California Department of Pesticide Regulation, December 31, 2008.

[99] In these two counties, the average field size for cool season vegetables such as lettuce, celery, broccoli and cauliflower is 12 acres, with some fields as small as two to three acres. Depending on the type(s) of frog habitat contained on an affected field as well as the location of the pesticide use buffer zone(s) (i.e., in the middle of a field versus on the edge of a field), pesticide use restrictions may result in the removal of all agricultural production across a farmer's entire field. Public comment submitted in response to the Stipulated Injunction also reviewed possible alternatives to restricted pesticides for four major vegetable crops grown in the areas. The review concludes that substitutes for restricted pesticides are limited and in many cases, available substitutes are not equally effective and/or are unproven in vegetable systems. (Grower Shipper Association of Santa Barbara and San Luis Obispo Counties. Public Comment Submitted on Proposed Stipulated Injunction Involving Pesticides and the California Red-Legged Frog. EPA-HQ-OPP-2006-0702-0021. September 18, 2006.)

per acre, per year, by crop type (i.e., irrigated and non-irrigated farming), by county (Exhibits 6-8 and 6-9).

The FMMP does not break out agricultural lands used for irrigated farming by crop type. To arrive at a single value for economic impacts associated with irrigated farming by county, this analysis relies on Census data on the number of acres used for vegetable versus fruit farming to create a weighted average for the value of foregone agricultural production on lands used for irrigated farming (Exhibit 6-8).[100]

As shown in Exhibits 6-8 and 6-9, in some cases the Census data show a negative net operational dollar gain. This analysis sets net operational dollar gain to zero if it is negative for a particular county and crop type. For other counties and crop types where Census data are unavailable, this analysis uses the average value for that crop type across the 18 county study area.

[100] Department of Commerce, Bureau of Economic Analysis, 2008; USDA, National Agricultural Statistics Service. 2007 Census of Agriculture. Volume 1, Chapter 2: County Level Data, Table 25. Selected Crops Harvested: 2007.

EXHIBIT 6-8 ESTIMATED IMPACTS PER IRRIGATED ACRE PER YEAR BY COUNTY (2009 DOLLARS)

COUNTY	VEGETABLE AND MELON FARMING			FRUIT AND TREE NUT FARMING			PERCENT OF ACRES		WEIGHTED AVERAGE NET OPERATIONAL DOLLAR GAIN PER IRRIGATED ACRE
	AVERAGE ACRES OF CROPLAND PER FARM	AVERAGE NET OPERATIONAL DOLLAR GAIN PER FARM	AVERAGE NET OPERATIONAL DOLLAR GAIN PER ACRE OF CROPLAND	AVERAGE ACRES OF CROPLAND PER FARM	AVERAGE NET OPERATIONAL DOLLAR GAIN PER FARM	AVERAGE NET OPERATIONAL DOLLAR GAIN PER ACRE OF CROPLAND	HARVESTED FOR VEGETABLE	IRRIGATED FOR ORCHARDS	
Alameda				35	-$2,501.81	-$70.60	0%	100%	-$70.60
Contra Costa	418	$312,193	$747.37	62	$5,967	$96.14	56%	44%	$463.20
El Dorado	3	$396	$133.40	14	$475	$34.96	2%	98%	$37.10
Kern	1,555	$1,531,912	$985.36	604	$644,559.29	$1,067.55	17%	83%	$1,053.53
Marin	11	$23,703	$2,204.91	7	-$18,084	-$2,615.52	46%	54%	-$396.26
Monterey	962	$2,103,087	$2,185.22	213	$543,575	$2,554.32	85%	15%	$2,239.77
Napa	4	$10,511	$2,537.02	42	$28,757	$689.18	0%	100%	$690.24
Riverside	435	$766,190	$1,760.16	37	$20,516.68	$560.77	33%	67%	$956.92
San Benito	366	$913,442	$2,497.67	46	$8,993	$195.46	78%	22%	$1,998.20
San Joaquin	891	$655,466	$735.66	90	$58,989	$658.36	27%	73%	$679.24
San Luis Obispo	191	$286,645	$1,497.71	68	$26,804	$394.86	36%	64%	$788.75
San Mateo	112	$72,523	$649.11	23	-$10,484	-$457.65	82%	18%	$451.08
Santa Barbara	464	$771,825	$1,664.72	51	$79,237	$1,562.95	70%	30%	$1,634.35
Santa Clara	146	$225,601	$1,546.33	14	-$3,521	-$246.87	73%	27%	$1,067.15
Santa Cruz	256	$420,125	$1,639.71	29	$265,359	$9,041.86	82%	18%	$2,975.07
Solano	641	$137,440	$214.32	87	$38,561	$441.36	40%	60%	$350.67
Sonoma	11	$8,867	$774.07	44	$18,356	$414.89	1%	99%	$419.65
Ventura	303	$1,384,308	$4,573.70	40	$80,869	$2,038.49	40%	60%	$3,052.72
California	**504**	**$597,044**	**$1,183.91**	**86**	**$69,012**	**$806.67**	**29%**	**71%**	**$917.10**

Note: Values adjusted using the GDP Deflator, Budget of the United States Government, Second Quarter 2009, Historical Tables. Numbers may not calculate due to inflation procedure.
Sources: Department of Commerce, Bureau of Economic Analysis, 2008; USDA, National Agricultural Statistics Service. 2007 Census of Agriculture.

EXHIBIT 6-9 ESTIMATED IMPACTS PER NON-IRRIGATED ACRE PER YEAR BY COUNTY (2009 DOLLARS)

COUNTY	AVERAGE ACRES OF CROPLAND PER FARM	AVERAGE NET OPERATIONAL DOLLAR GAIN PER FARM	AVERAGE NET OPERATIONAL DOLLAR GAIN PER NON-IRRIGATED ACRE OF CROPLAND
Alameda			
Contra Costa	492	$20,936	$42.55
El Dorado			
Kern	682	$45,536	$66.76
Marin			
Monterey			
Napa			
Riverside			
San Benito			
San Joaquin	669	$106,087	$158.66
San Luis Obispo	1068	-$33,831	-$31.69
San Mateo			
Santa Barbara	100	-$21,249	$112.11
Santa Clara			
Santa Cruz			
Solano	1024	$97,679	$95.37
Sonoma			
Ventura			
Study Area Average			**$74.83**
California	**499**	**$120,595**	**$241.86**

Note: Values adjusted using the GDP Deflator, Budget of the United States Government, Second Quarter 2009, Historical Tables. Numbers may not calculate due to inflation procedure.
Sources: Department of Commerce, Bureau of Economic Analysis, 2008; USDA, National Agricultural Statistics Service. 2007 Census of Agriculture.

6.3 PRE-DESIGNATION IMPACTS

142. The pre-designation period in this case begins in 2007, the year following the effective date of the stipulated injunction (October 20, 2006), and continues to 2008. Exhibit 6-10 presents total undiscounted and present value costs of pre-designation frog conservation on agricultural crop farming activities by unit.

EXHIBIT 6-10 AGRICULTURAL CROP FARMING PRE-DESIGNATION ECONOMIC IMPACTS (2007-2008, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	UNDISCOUNTED COST		PRESENT VALUE COST	
	LOW	HIGH	LOW	HIGH
ALA-2	$418	$1,110	$462	$1,230
CCS-1	$120,000	$119,000	$133,000	$132,000
CCS-2	$383,000	$397,000	$424,000	$439,000
MNT-2	$3,040,000	$3,050,000	$3,360,000	$3,370,000
MNT-3	$1,150,000	$1,140,000	$1,270,000	$1,270,000
MRN-3	$61,400	$64,400	$67,900	$71,200
NAP-1	$596	$1,510	$660	$1,670
RIV-1	$178	$5,140	$197	$5,690
SCZ-1	$11,200,000	$11,200,000	$12,400,000	$12,500,000
SCZ-2	$9,350,000	$9,790,000	$10,400,000	$10,800,000
SLO-1	$153,000	$159,000	$169,000	$176,000
SLO-2	$2,540,000	$2,520,000	$2,810,000	$2,790,000
SLO-3	$2,960,000	$3,010,000	$3,280,000	$3,340,000
SNB-1	$4,610,000	$4,890,000	$5,110,000	$5,410,000
SNB-2	$22,300	$21,700	$24,700	$24,000
SNB-3	$9,910	$10,700	$11,000	$11,800
SNM-1	$337,000	$380,000	$373,000	$421,000
SNM-2	$1,380,000	$1,470,000	$1,530,000	$1,620,000
SOL-1	$12,600	$13,800	$13,900	$15,300
SOL-2	$2,150	$5,400	$2,380	$5,970
SOL-3	$5,740	$10,500	$6,350	$11,600
SON-2	$1,420	$3,670	$1,570	$4,060
SON-3	$59,300	$60,900	$65,600	$67,400
STB-2	$521,000	$586,000	$577,000	$648,000
STB-6	$3,310,000	$3,330,000	$3,670,000	$3,690,000
STC-1	$367,000	$365,000	$407,000	$404,000
STC-2	$317,000	$428,000	$351,000	$474,000
VEN-1	$1,840,000	$1,880,000	$2,040,000	$2,080,000
Total			**$48,500,000**	**$49,800,000**

Note: Totals may not sum due to rounding.

6.4 POST-DESIGNATION IMPACTS

143. The post-designation period for this analysis is 2009 to 2030. Post-designation impacts are categorized as either occurring in the baseline or as incremental to the proposed critical habitat designation. During the post-designation time period, this analysis assumes that the pesticide use restrictions established by the Stipulated Injunction would continue to provide sufficient protection for the frog. Furthermore, this analysis assumes that the proposed revision of critical habitat will alter and expand the existing geographic areas subject to the pesticide use restrictions. Exhibit 6-11 summarizes the post-designation baseline impacts and Exhibit 6-12 summarizes the incremental impacts to agricultural crop farming activities. Post-designation baseline and incremental impacts by census tract are presented in Appendix B.

EXHIBIT 6-11 AGRICULTURAL CROP FARMING POST-DESIGNATION BASELINE ECONOMIC IMPACTS: (2009 - 2030, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	UNDISCOUNTED COST*		PRESENT VALUE COST		ANNUALIZED	
	LOW	HIGH	LOW	HIGH	LOW	HIGH
ALA-2	$34,900	$35,300	$32,700	$33,100	$2,960	$2,990
CCS-1	$337,000	$341,000	$210,000	$212,000	$19,000	$19,200
CCS-2	$1,620,000	$1,770,000	$963,000	$1,040,000	$87,000	$94,400
ELD-1	$1,910	$1,910	$1,790	$1,790	$161	$161
MNT-2	$30,500,000	$30,700,000	$16,500,000	$16,600,000	$1,490,000	$1,500,000
MNT-3	$11,500,000	$11,500,000	$6,240,000	$6,240,000	$564,000	$564,000
MRN-1	$2,710	$2,710	$2,530	$2,530	$229	$229
MRN-2	$7,790	$7,790	$7,290	$7,290	$659	$659
MRN-3	$207,000	$221,000	$129,000	$137,000	$11,700	$12,400
NAP-1	$5,890	$13,700	$3,560	$7,800	$322	$705
NEV-1	$2,850	$2,850	$2,670	$2,670	$242	$242
RIV-1	$3,020	$48,000	$2,200	$26,700	$198	$2,410
SCZ-1	$113,000,000	$114,000,000	$61,000,000	$61,400,000	$5,520,000	$5,550,000
SCZ-2	$95,900,000	$101,000,000	$51,800,000	$54,400,000	$4,680,000	$4,920,000
SLO-1	$99,300	$103,000	$98,900	$103,000	$8,940	$9,290
SLO-2	$20,300,000	$20,300,000	$11,100,000	$11,100,000	$1,010,000	$1,010,000
SLO-3	$23,500,000	$24,200,000	$12,900,000	$13,300,000	$1,170,000	$1,200,000
SLO-4	$11,400	$11,400	$10,700	$10,700	$968	$968
SNB-1	$44,100,000	$47,000,000	$23,900,000	$25,500,000	$2,160,000	$2,300,000
SNB-2	$77,000	$76,600	$48,500	$48,200	$4,390	$4,350
SNB-3	$53,500	$56,700	$39,600	$41,500	$3,580	$3,750
SNM-1	$2,530,000	$2,880,000	$1,400,000	$1,590,000	$126,000	$143,000
SNM-2	$7,310,000	$8,050,000	$4,160,000	$4,560,000	$376,000	$413,000
SOL-1	$90,100	$100,000	$51,100	$56,500	$4,620	$5,110
SOL-2	$15,500	$38,400	$8,870	$21,500	$802	$1,950
SOL-3	$19,000	$34,900	$11,800	$21,300	$1,060	$1,930
SON-1	$540	$540	$506	$506	$46	$46
SON-2	$11,000	$27,800	$6,290	$15,500	$568	$1,400
SON-3	$166,000	$174,000	$103,000	$107,000	$9,310	$9,710
STB-2	$3,470,000	$4,150,000	$1,930,000	$2,300,000	$175,000	$208,000
STB-3	$15,800	$15,800	$14,800	$14,800	$1,330	$1,330
STB-5	$299,000	$303,000	$176,000	$178,000	$15,900	$16,100
STB-6	$32,200,000	$32,500,000	$17,400,000	$17,600,000	$1,580,000	$1,590,000
STB-7	$624,000	$647,000	$379,000	$391,000	$34,200	$35,400
STC-1	$1,310,000	$1,330,000	$787,000	$795,000	$71,100	$71,900
STC-2	$1,480,000	$2,520,000	$874,000	$1,440,000	$79,000	$130,000
VEN-1	$18,100,000	$18,500,000	$9,810,000	$10,000,000	$887,000	$904,000
VEN-3	$1,290	$1,290	$1,210	$1,210	$110	$110
Total			**$222,000,000**	**$229,000,000**	**$20,100,000**	**$20,700,000**

Notes:
(1) Totals may not sum due to rounding.
(2) Pesticide assessment costs are distributed across units according to the percent of affected agricultural lands contained within each unit. To the extent that the percentage of affected agricultural lands within each unit is greater applying a 60-foot buffer rather than a 200-foot buffer, impacts under the low scenario exceed impacts under the high scenario for individual units.

EXHIBIT 6-12 AGRICULTURAL CROP FARMING POST-DESIGNATION INCREMENTAL ECONOMIC IMPACTS (2009 - 2030, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	UNDISCOUNTED COST		PRESENT VALUE COST		ANNUALIZED	
	LOW	HIGH	LOW	HIGH	LOW	HIGH
ALA-2	$137,000	$166,000	$78,400	$94,100	$7,080	$8,510
CCS-1	$95,400	$104,000	$51,900	$56,500	$4,700	$5,110
CCS-2	$453,000	$449,000	$250,000	$248,000	$22,600	$22,400
ELD-1	$20,900	$25,500	$11,500	$14,000	$1,040	$1,260
MNT-2	$5,220,000	$4,990,000	$2,810,000	$2,690,000	$254,000	$243,000
MNT-3	$3,140	$3,140	$2,940	$2,940	$266	$266
MRN-1	$1,190	$2,690	$1,000	$1,810	$91	$163
MRN-2	$198,000	$209,000	$108,000	$113,000	$9,730	$10,200
MRN-3	$632,000	$622,000	$341,000	$336,000	$30,900	$30,400
NAP-1	$291	$291	$272	$272	$25	$25
NEV-1	$952	$952	$891	$891	$81	$81
RIV-1	$472	$472	$441	$441	$40	$40
SCZ-1	$19,100,000	$18,800,000	$10,300,000	$10,100,000	$930,000	$913,000
SCZ-2	$1,400,000	$608,000	$755,000	$327,000	$68,300	$29,600
SLO-1	$311,000	$311,000	$168,000	$168,000	$15,200	$15,200
SLO-2	$4,930,000	$4,910,000	$2,660,000	$2,650,000	$240,000	$239,000
SLO-3	$25,400,000	$25,100,000	$13,700,000	$13,500,000	$1,240,000	$1,220,000
SLO-4	$3,810	$3,810	$3,570	$3,570	$323	$323
SNB-1	$18,200,000	$20,000,000	$9,780,000	$10,800,000	$884,000	$974,000
SNB-2	$2,000	$2,000	$1,870	$1,870	$169	$169
SNB-3	$2,690,000	$2,940,000	$1,450,000	$1,590,000	$131,000	$143,000
SNM-1	$782,000	$842,000	$422,000	$454,000	$38,100	$41,100
SNM-2	$2,290,000	$2,240,000	$1,230,000	$1,210,000	$112,000	$109,000
SOL-1	$1,050	$1,050	$981	$981	$89	$89
SOL-2	$23,600	$108,000	$12,800	$58,000	$1,160	$5,240
SOL-3	$452,000	$535,000	$243,000	$288,000	$22,000	$26,000
SON-1	$180	$180	$169	$169	$15	$15
SON-2	$188	$188	$176	$176	$16	$16
SON-3	$257	$257	$240	$240	$22	$22
STB-2	$987,000	$988,000	$532,000	$533,000	$48,100	$48,200
STB-3	$67,100	$72,000	$38,200	$40,800	$3,450	$3,690
STB-5	$41,900	$40,800	$23,000	$22,400	$2,080	$2,020
STB-6	$1,770,000	$1,520,000	$954,000	$817,000	$86,200	$73,900
STB-7	$2,120,000	$2,100,000	$1,150,000	$1,130,000	$104,000	$103,000
STC-1	$311,000	$291,000	$170,000	$159,000	$15,300	$14,400
STC-2	$741,000	$789,000	$406,000	$432,000	$36,700	$39,000
VEN-1	$1,410,000	$1,070,000	$759,000	$575,000	$68,600	$52,000
VEN-3	$431	$431	$404	$404	$37	$37
Total			**$48,400,000**	**$48,400,000**	**$4,370,000**	**$4,370,000**

Notes:
(1) Totals may not sum due to rounding.
(2) 60-foot and 200-foot buffers are applied to agricultural lands within the study area for baseline areas and incremental areas. In some cases, baseline buffer areas overlap with incremental buffer areas. In these cases, the area of overlap is classified as part of the baseline. Thus, some areas classified as incremental applying a 60-foot buffer, are classified as baseline applying a 200-foot buffer due to additional overlap with baseline areas. To the extent that areas classified as incremental applying a 60-foot buffer are classified as baseline applying a 200-foot buffer, incremental impacts related to project modification are higher under the low scenario than the high scenario.

6.5 REGIONAL ECONOMIC IMPACTS

144. This section presents the regional economic impacts expected to result from the implementation of no-pesticide use areas for 66 active pesticide ingredients in the study area. To estimate the regional economic impact of grazing restrictions, this analysis relies upon the number of acres estimated to be lost from irrigated and non-irrigated agricultural production as a result for frog conservation activities in the above analysis. Direct effects are calculated by converting this lost acreage to an estimated loss in irrigated and non-irrigated agricultural sales. Next, the analysis utilizes IMPLAN to estimate indirect and induced impacts, by county, in terms of output and jobs.

Running the IMPLAN Model

145. For purposes of this regional economic impact analysis, the study area includes the 18 counties where this analysis estimates agricultural impacts due to the frog-related conservation activities. Reductions in agricultural activity will primarily affect the agriculture-related sectors of the economy. Decreased operations in these industries would also result in secondary effects on related sectors in the study area.

146. This analysis relies on regional economic modeling to estimate the economic impacts of these initial and secondary effects. In particular, it utilizes a software package called IMPLAN to estimate the total economic effects of the reduction in economic activity in the agriculture-related industries in the study area. IMPLAN is commonly used by State and Federal agencies for policy planning and evaluation purposes. The model draws upon data from several Federal and State agencies, including the Bureau of Economic Analysis and the Bureau of Labor Statistics.

147. IMPLAN translates initial changes in expenditures into changes from demand for inputs to affected industries. These effects can be described as direct, indirect, or induced, depending on the nature of the change:

- *Direct effects* represent changes in output attributable to a change in demand or a supply shock. These are specified initially by the modeler (e.g., the change in farming expenditures on goods and services, by sector);
- *Indirect effects* are changes in output industries that supply goods and services to those that directly affected by the initial change in expenditures; and
- *Induced effects* reflect changes in household consumption, arising from changes in employment (which in turn are the result of direct and indirect effects). For example, changes in employment in a region may affect the consumption of certain goods and services.

148. These categories are calculated for all industries to determine the regional economic impact of lost agricultural production resulting from frog conservation activities.

Caveats to the IMPLAN Model

149. There are two important caveats relevant to the interpretation of IMPLAN model estimates, generally, and within the context of this analysis. The first is that the model is

static in nature and measures only those effects resulting from a specific policy change (or the functional equivalent specified by the modeler) at a single point in time. Thus, IMPLAN does not account for posterior adjustments that may occur, such as the subsequent re-employment of workers displaced by the original policy change. In the present analysis, this caveat suggests that the long-run net output and employment effects resulting from farming restrictions are likely to be smaller than those estimated in the model, which implies an upward bias in the estimates.

150. A second caveat to the IMPLAN analysis is related to the model data. The IMPLAN analysis relies upon input/output relationships derived from 2004 data. Thus, this analysis assumes that this historical characterization of the affected counties' economies is a reasonable approximation of current conditions. If significant changes have occurred since 2004 in the structure of the economies of the counties in the study area, the results may be sensitive to this assumption. The magnitude and direction of any such bias are unknown.

Regional Economic Analysis for Lost Agricultural Production

151. To estimate the regional economic impacts of lost agricultural production due to the implementation of no-pesticide use areas for 66 active pesticide ingredients in the study area, this analysis employs the following four steps, by county:

Step 1 – Identify the acreage subject to post-designation baseline and incremental impacts, by county. As discussed above, over the next 20 years, this analysis estimates 16,519 acres lost from agricultural production under the baseline; and 7,286 acres incrementally lost from agricultural production at the upper bound. Exhibit 6-13 summarizes the affected acres, by county.[101]

Step 2 – Estimate the average sales (i.e., revenues) per acre, by farming type, by county. The Census includes a breakdown of total sales by crop type and county. As previously discussed, this analysis considers three crop types likely to be affected:

- **Irrigated agriculture** includes vegetable and melon (NAICS Code 1112) and fruit and nut tree farming (NAICS Code 1113); and
- **Non-irrigated agriculture** includes oilseed and grain farming (NAICS Code 1111).

To generate a per acre estimate, this analysis divides the total sales for each affected crop type by the total acres harvested for that crop type in each county (Exhibits 6-14 and 6-15). For some counties, Census data were unavailable on either the total sales or harvested acres for non-irrigated crop types. For these counties where Census data are unavailable, this analysis uses the average value for non-irrigated crop types across the 18 county study area (or $999 per acre, 2009 dollars).

[101] The methodology to arrive at this acreage is identified in section 6.2.

Step 3 – Estimate the total agricultural sales lost due to frog conservation activities, by county. The preceding steps provide the information necessary to estimate the agricultural sales lost due to frog conservation activities, by county. These estimates represent the direct effect (i.e., inputs to IMPLAN) of lost agricultural production due to frog conservation activities in each county.

Step 4 – Estimate the regional economic impacts of lost agricultural sales, by county. Exhibits 6-16 and 6-17 present the post-designation baseline and incremental results of the IMPLAN analysis. The regional economic impact estimates represent separate, distinct measures of economic impact. Thus, the regional impacts are not summed with the efficiency effects quantified in this analysis. Furthermore, these estimates represent one-year snapshots of the regional impacts resulting from the protective measures for the frog. These impacts will occur once and persist for some period of time until the economy adjusts to the change.[102]

EXHIBIT 6-13 AGRICULTURAL ACRES AFFECTED BY FARMING TYPE, BY COUNTY

COUNTY	BASELINE			INCREMENTAL		
	IRRIGATED	NON-IRRIGATED	TOTAL AFFECTED ACRES	IRRIGATED	NON-IRRIGATED	TOTAL AFFECTED ACRES
Alameda	7	0	7	0	0	0
Contra Costa	120	667	787	42	111	154
El Dorado	0	0	0	30	0	30
Kern	0.00	0.06	0.06	0	0	0
Marin	21	197	218	37	502	539
Monterey	852	0	852	101	0	101
Napa	1	18	19	40	0	40
Riverside	2	0	2	0	0	0
San Benito	1,076	498	1,574	484	1,142	1,626
San Joaquin	0	0	0	0	43	43
San Luis Obispo	2,503	1,460	3,962	1,744	638	2,381
San Mateo	1,367	1,269	2,636	225	557	782
Santa Barbara	980	755	1,736	89	599	688
Santa Clara	14	1,038	1,052	0	536	536
Santa Cruz	3,178	0	3,178	294	25	319
Solano	17	0	17	4	0	4
Sonoma	3	0	3	0	0	0
Ventura	268	207	476	15	26	42
Total	**10,409**	**6,110**	**16,519**	**3,106**	**4,180**	**7,286**

[102] IMPLAN does not account for long-term adjustments made by the regional economy in response to the initial change in output by agricultural operations.

EXHIBIT 6-14 TOTAL SALES PER IRRIGATED ACRE, BY CROP TYPE, BY COUNTY

COUNTY	VEGETABLES AND MELONS (NAICS CODE 1112)				FRUITS, TREE NUTS, AND BERRIES (NAICS CODE 1113)			
	TOTAL SALES ($2007)	VEGETABLE HARVESTED FOR SALE (ACRES)	SALES PER ACRE ($2007)	SALES PER ACRE ($2009)	TOTAL SALES ($2007)	LAND IN ORCHARDS (ACRES)	SALES PER ACRE ($2007)	SALES PER ACRE ($2009)
Alameda	[D]	[D]	$4,647	$4,799	$14,355,000	4,074	$3,524	$3,639
Contra Costa	$22,268,000	6,315	$3,526	$3,642	$16,278,000	4,889	$3,330	$3,439
El Dorado	$435,000	88	$4,943	$5,105	$13,886,000	3,954	$3,512	$3,627
Kern	$404,609,000	83,755	$4,831	$4,989	$1,764,557,000	407,208	$4,333	$4,475
Marin	$2,388,000	215	$11,107	$11,471	$1,049,000	252	$4,163	$4,299
Monterey	$1,298,956,000	253,704	$5,120	$5,288	$593,137,000	43,998	$13,481	$13,923
Napa	$272,000	29	$9,379	$9,687	$365,342,000	50,533	$7,230	$7,467
Riverside	$193,466,000	26,667	$7,255	$7,493	$262,693,000	54,070	$4,858	$5,018
San Benito	$147,302,000	26,878	$5,480	$5,660	$26,253,000	7,447	$3,525	$3,641
San Joaquin	$241,581,000	69,433	$3,479	$3,593	$537,452,000	187,613	$2,865	$2,959
San Luis Obispo	$189,713,000	29,819	$6,362	$6,571	$204,011,000	53,671	$3,801	$3,926
San Mateo	$11,262,000	1,808	$6,229	$6,433	$3,532,000	394	$8,964	$9,258
Santa Barbara	$372,768,000	65,953	$5,652	$5,837	$318,907,000	28,044	$11,372	$11,745
Santa Clara	$94,194,000	11,594	$8,124	$8,391	$16,091,000	4,228	$3,806	$3,931
Santa Cruz	$74,288,000	16,619	$4,470	$4,617	$259,273,000	3,658	$70,878	$73,202
Solano	$33,885,000	12,147	$2,790	$2,881	$45,746,000	18,264	$2,505	$2,587
Sonoma	$6,436,000	919	$7,003	$7,233	$359,858,000	68,425	$5,259	$5,432
Ventura	$322,374,000	35,330	$9,125	$9,424	$667,428,000	52,983	$12,597	$13,010
California	**$5,435,521,000**	**1,169,786**	**$4,647**	**$4,799**	**$11,054,581,000**	**1,169,786**	**$9,450**	**$9,760**

Note: Values adjusted using the GDP Deflator, Budget of the United States Government, Second Quarter 2009, Historical Tables. Numbers
Sources: Department of Commerce, Bureau of Economic Analysis, 2008; USDA, National Agricultural Statistics Service. 2007 Census of Agriculture. Volume 1, Chapter 2: County Level Data, Table 2. Market Value of Agricultural Products Sold Including Direct Sales: 2007 and 2002 and Table 25 Selected Crops Harvested: 2007.

EXHIBIT 6-15 TOTAL SALES PER NON-IRRIGATED ACRE, BY COUNTY

COUNTY	OILSEED AND GRAINING (NAICS CODE 1111)			
	TOTAL SALES ($2007)	ACRES HARVESTED	SALES PER ACRE ($2007)	SALES PER ACRE ($2009)
Alameda	$0	0	N/A	N/A
Contra Costa	$2,518,000	2,660	$947	$978
El Dorado	$0	0	N/A	N/A
Kern	$95,167,000	53,830	$1,768	$1,826
Marin	$0	0	N/A	N/A
Monterey	$3,129,000	2,916	$1,073	$1,108
Napa	$176,000	13	$13,538	$13,982
Riverside	$2,425,000	6,759	$359	$371
San Benito	$194,000	250	$776	$801
San Joaquin	$134,653,000	72,773	$1,850	$1,911
San Luis Obispo	$1,268,000	12,994	$98	$101
San Mateo	$109,000	128	$852	$879
Santa Barbara	$7,503,000	4,128	$1,818	$1,877
Santa Clara	$2,224,000	0	N/A	N/A
Santa Cruz	$0	0	N/A	N/A
Solano	$39,085,000	34,354	$1,138	$1,175
Sonoma	$1,089,000	1,968	$553	$571
Ventura	$190,000	507	$375	$387
California	**$2,210,740,000**	**1,190,234**	**$1,857**	**$1,918**
			Study Area Average	**$998.81**

Note: Values adjusted using the GDP Deflator, Budget of the United States Government, Second Quarter 2009, Historical Tables. Numbers
Sources: Department of Commerce, Bureau of Economic Analysis, 2008; USDA, National Agricultural Statistics Service. 2007 Census of Agriculture. Volume 1, Chapter 2: County Level Data, Table 2. Market Value of Agricultural Products Sold Including Direct Sales: 2007 and 2002 and Table 25 Selected Crops Harvested: 2007.

EXHIBIT 6-16 POST-DESIGNATION BASELINE REGIONAL ECONOMIC IMPACTS OF LOST AGRICULTURAL PRODUCTION (2009 DOLLARS)

COUNTY	OUTPUT				EMPLOYMENT (JOBS)			
	DIRECT	INDIRECT	INDUCED	TOTAL	DIRECT	INDIRECT	INDUCED	TOTAL
Alameda	$27,000	$3,000	$11,000	$41,000	0.4	0.0	0.1	0.5
Contra Costa	$1,080,000	$161,000	$270,000	$1,511,000	15.0	0.7	2.0	17.7
Kern	$0	$0	$0	$0	0.0	0.0	0.0	0.0
Marin	$358,000	$35,000	$128,000	$521,000	6.9	0.2	1.0	8.1
Monterey	$5,594,000	$1,126,000	$1,821,000	$8,540,000	33.5	13.4	15.9	62.7
Napa	$24,000	$4,000	$8,000	$37,000	1.2	0.1	0.1	1.3
Riverside	$13,000	$2,000	$5,000	$20,000	0.1	0.0	0.0	0.2
San Benito	$6,016,000	$917,000	$1,331,000	$8,264,000	39.8	11.2	11.6	62.6
San Luis Obispo	$12,336,000	$2,540,000	$4,024,000	$18,901,000	62.2	32.6	36.0	130.8
San Mateo	$10,600,000	$892,000	$3,139,000	$14,631,000	104.3	5.4	22.3	132.0
Santa Barbara	$8,870,000	$1,905,000	$3,644,000	$14,419,000	114.0	23.6	30.2	167.8
Santa Clara	$1,137,000	$138,000	$242,000	$1,518,000	27.7	0.7	1.7	30.1
Santa Cruz	$53,986,000	$8,216,000	$22,469,000	$84,670,000	1,098.5	91.8	198.4	1,388.7
Solano	$46,000	$8,000	$14,000	$68,000	0.3	0.1	0.1	0.5
Sonoma	$16,000	$3,000	$8,000	$26,000	0.2	0.0	0.1	0.3
Ventura	$3,185,000	$602,000	$1,253,000	$5,041,000	39.9	8.4	10.5	58.8
TOTAL	**$103,287,000**	**$16,553,000**	**$38,368,000**	**$158,208,000**	**1,544.0**	**188.2**	**330.0**	**2,062.1**

Note: Totals may not sum due to rounding.

EXHIBIT 6-17 POST-DESIGNATION INCREMENTAL REGIONAL ECONOMIC IMPACTS OF LOST AGRICULTURAL PRODUCTION (2009 DOLLARS)

COUNTY	OUTPUT				EMPLOYMENT (JOBS)			
	DIRECT	INDIRECT	INDUCED	TOTAL	DIRECT	INDIRECT	INDUCED	TOTAL
Contra Costa	$260,000	$36,000	$70,000	$365,000	3.1	0.2	0.5	3.7
El Dorado	$112,000	$15,000	$32,000	$158,000	2.4	0.2	0.3	2.9
Marin	$784,000	$79,000	$263,000	$1,125,000	16.7	0.5	2	19.1
Monterey	$664,000	$134,000	$216,000	$1,013,000	4	1.6	1.9	7.4
Napa	$300,000	$57,000	$168,000	$525,000	6.8	0.8	1.4	9
San Benito	$3,441,000	$534,000	$705,000	$4,680,000	33	6.3	6.1	45.4
San Joaquin	$82,000	$20,000	$22,000	$123,000	1.2	0.2	0.2	1.5
San Luis Obispo	$8,558,000	$1,762,000	$2,795,000	$13,115,000	42.8	22.6	25	90.5
San Mateo	$2,048,000	$182,000	$575,000	$2,804,000	26	1.1	4.1	31.2
Santa Barbara	$1,804,000	$409,000	$602,000	$2,816,000	37	4.3	5	46.3
Santa Clara	$536,000	$67,000	$107,000	$710,000	13.9	0.3	0.7	15
Santa Cruz	$4,993,000	$760,000	$2,078,000	$7,832,000	101.6	8.5	18.4	128.4
Solano	$11,000	$2,000	$3,000	$17,000	0.1	0	0	0.1
Ventura	$187,000	$35,000	$73,000	$295,000	2.5	0.5	0.6	3.6
TOTAL	**$23,779,000**	**$4,092,000**	**$7,708,000**	**$35,579,000**	291.1	47.1	66.2	404.1

Note: Totals may not sum due to rounding.

6.6 SOURCES OF UNCERTAINTY

152. It is important to recognize the uncertainty inherent in the assumptions underlying this analysis. Exhibit 6-18 summarizes these uncertainties and their potential effect on estimated economic impacts.

EXHIBIT 6-18 SUMMARY OF CAVEATS TO AGRICULTURAL CROP FARMING ANALYSIS

ASSUMPTION	POTENTIAL EFFECT ON RESULTS
This analysis assumes farmers are aware and fully comply with the court-ordered injunction establishing no pesticide use areas. However, according to discussions with stakeholders, there is no ongoing enforcement of the court-ordered injunction by either the California Department of Pesticide Regulation or the EPA.[103] To the extent that farmers are not aware or do not comply with the court-ordered injunction, this analysis may overstate economic impacts.	+
This analysis assumes that the court-ordered injunction restricting pesticide use represents the likely outcome of future section 7 consultations between EPA and the Service for this activity. To the extent that future consultations find more flexible ways to avoid jeopardy or adverse modification (e.g., adjustments in cropping or pesticide use practices), this analysis may overstate future economic impacts.	+
To the extent that there are alternative beneficial uses of agricultural land (e.g., organic farming or grazing), this analysis may overstate future economic impacts.	+
This analysis is not able to forecast whether pesticide use restrictions will result in additional acres lost from agricultural production outside of the buffer areas. To the extent that limitations on pesticide use in the study area result in economic conditions that preclude the grower to use additional acres of farming land outside the study area (e.g., remaining area unavailable is economically unviable to cultivate), this analysis may understate economic impacts.	-
The administrative costs of consultation are based on the average estimated administrative costs presented in Exhibit 2-2. However, discussions with EPA staff suggest that the administrative costs of consultation for the review of pesticide effect determinations may be greater than for an average project-based consultation due to the complexity of the information collected and analyzed in each pesticide assessment. For example, the geographic scope for each assessment includes all areas identified in the court-ordered injunction, whereas a typical project modification generally involves a defined project action and associated project area. To the extent that administrative costs for consultations on each pesticide effects determination is greater than the average administrative costs of consultation presented in Exhibit 2-2, this analysis may underestimate future economic costs.[104]	-
This analysis assumes that EPA will not have to reinitiate effects determination for pesticides already completed due to the designation of critical habitat. To the extent that critical habitat designation, requires EPA to revisit pesticide effects determinations previously completed, this analysis may underestimate future economic costs.	-
This analysis assumes that impacts to NRCS projects are relatively small. To the extent that NRCS projects are affected more significantly, this analysis may underestimate future economic costs.	-
+: This assumption may result in an overestimate of real costs. -: This assumption may result in an understatement of real costs. +/-: The assumption has an unknown effect on estimates.	

[103] Personal communication with Arty Williams, EPA, January 13, 2009; Personal communication with Polo Moreno, California Department of Pesticide Regulation, December 31, 2008.

[104] Personal communication with Arty Williams, EPA, January 13, 2009.

CHAPTER 7 | GRAZING & RANCHING

153. Grazing and ranching are major land uses in the study area. Based on the California Department of Conservation's FMMP, approximately 810,000 acres on private lands and 156,000 acres on public lands are used for grazing and ranching activities within the study area.

154. Livestock grazing can both directly and indirectly impact the frog. Some of the impacts of overgrazed (or unmanaged) grazing include:

- Higher instream water temperatures resulting from reduction or removal of vegetation;
- Channel downcutting;
- Lowered water tables;
- Loss of plunge pools, which results in direct loss of pool habitats for the frog; and
- Diminished water quality through increased sediment loads and nutrient levels.[105]

155. Although grazing and ranching activities are listed as threats in the proposed rule, historically, the frog has had little impact on grazing and ranching activities. These activities fall mainly outside of the purview of the Service because they lack a Federal nexus. Moreover, in 2006 the Service issued a Special Rule under Section 4(d) exempting take of the frog due to routine ranching activities on non-Federal lands in order to encourage continued responsible land uses that provide an overall benefit to the species.[106]

156. However, there are other ways that grazing and ranching activities may be affected by the designation of critical habitat. Based on a review of public comments and conversations with several private ranchers in Calaveras County, of most concern to private landowners is the potential decline in wealth resulting from a reduced ability to convert ranching land to alternative uses such as residential or commercial development. These potential impacts are estimated as part of the residential and commercial development analysis presented in Chapter 4.

157. An additional way that grazing and ranching activities may be affected is through section 7 consultation on grazing and ranching projects that receive Federal funding (e.g., through the NRCS) or grazing activities that occur on Federal lands. Impacts to grazing

[105] 71 FR 19244

[106] 71 FR 19285

and ranching activities are summarized in Exhibit 7-1 and discussed in detail in the following sections.

EXHIBIT 7-1 SUMMARY OF IMPACTS TO GRAZING ACTIVITIES, BY UNIT (2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE IMPACTS	
	LOW	HIGH
Pre-Designation Impacts (1996 - 2008)		
ALA-1A	$6,490	$6,490
ALA-1B	$17,600	$17,600
ALA-2	$239,000	$239,000
CAL-1	$18,400	$29,400
ELD-1	$4,740	$4,740
NEV-1	$10,400	$10,400
PLA-1	$4,640	$4,640
Total	**$301,000**	**$312,000**
Post-Designation Incremental Impacts (2009 - 2030)		
ALA-1A	$6,350	$6,350
ALA-1B	$17,700	$17,700
ALA-2	$267,000	$267,000
Total	**$291,000**	**$291,000**
Annualized Impact Value	**$26,300**	**$26,300**
Note: Totals may not sum due to rounding.		

7.1 PRE-DESIGNATION IMPACTS

7.1.1 GRAZING AND RANCHING ACTIVITIES ON PRIVATE LANDS

158. In the 1996 final listing rule for the frog, the Service cited livestock grazing as a contributing factor in the decline of the frog.[107] Grazing livestock in frog-occupied areas may trample individual frogs or frog egg masses. Overgrazing of riparian areas may cause detrimental affects to aquatic systems and negatively affect riparian and instream aquatic habitat.

159. However, since the final listing of the frog, the Service's understanding of the impact of livestock grazing has substantially evolved. Stock pond and small reservoir impoundments created as a part of livestock ranching activities can provide suitable breeding habitat for the frog. The Service's research found that in many areas, the presence of the frog is due solely to the construction of these small ponded habitats. Accordingly, in recognition of the beneficial (or neutral) impact that managed livestock

[107] 61 FR 25813.

grazing at low to moderate levels has on frog habitat, the Service issued a Special Rule under Section 4(d) exempting take of the frog due to routine ranching activities on non-Federal lands in order to encourage continued responsible land uses that provide an overall benefit to the species.[108] Accordingly, under the Special Rule Exemption for routine ranching activities, this analysis assumes ranchers on non-Federal lands will not experience economic impacts with respect to routine ranching activities due to critical habitat designation.[109]

160. As discussed in Chapter 6, on April 2, 2002, the Center for Biological Diversity filed a lawsuit in Federal District Court for the Northern District of California, alleging that EPA failed to comply with section 7 by not ensuring that its registration of 66 named pesticide active ingredients will not result in adverse affects to the frog. On October 20, 2006, the U.S. District Court for the Northern District of California issued a Stipulated Injunction requiring EPA to determine the effects of 66 pesticide active ingredients on the frog within identified areas of California under a court-ordered schedule of three years.[110] As part of the stipulated injunction, the court disallowed the use of the 66 named pesticide active ingredients within specified areas until EPA completed its section 7 consultations. The 66 named pesticides include a number of herbicides, some of which are used on grazing lands to control for noxious weeds.

161. The restrictions on the use of the 66 named active ingredients will continue until EPA completes its section 7 consultations. As discussed in Chapter 6, this analysis assumes that the court ordered injunction restricting pesticide use represents the likely outcome of future section 7 consultations between EPA and the Service. According to discussions with representatives of Agricultural Commissioner offices in some counties, the stipulated injunction is being enforced on grazing lands but the impact has been relatively minor as herbicide use for noxious weeds on most grazing lands is done through spot application.[111] To further minimize the impact of the stipulated injunction, some Agricultural Commissioner offices are also working with affected ranchers to identify alternative herbicides not named in the stipulated injunction.[112] Accordingly, while ranchers may be affected by frog-related herbicide use restrictions, the nature of the use of herbicides by ranchers is likely to vary depending on the specific ranching operation and result in minor economic impacts. Given their insignificance relative to categories of impact in this report, these costs are not quantified.

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[108] 71 FR 19244.

[109] As previously discussed, owners of ranching land may experience a decline in wealth resulting from a reduced ability to convert ranching land to alternatives uses such as residential or commercial development. These potential impacts are estimated as part of the residential and commercial development analysis presented in Chapter 4.

[110] Stipulated Injunction available at: http://www.epa.gov/espp/litstatus/stipulated-injunction.pdf.

[111] Personal communication with Fred Crowder, Deputy Agricultural Commissioner for Marin County, August 31, 2009; Personal communication with Larry Yost, Pesticide Use Enforcement, Contra Costa County Agricultural Commissioner, September 1, 2009.

[112] Personal communication with Fred Crowder, Deputy Agricultural Commissioner for Marin County, August 31, 2009.

162. The grazing and ranching sector may also be affected by the designation of critical habitat through section 7 consultation on grazing and ranching projects that receive Federal funding. This potential nexus is usually established through programs such as the Environmental Quality Incentives Program (EQIP) and the Wildlife Habitat Incentives Program (WHIP), cost share programs that provide ranchers and farmers with access to financial, educational and technical assistance. Since the species listing in 1996, there have been three section 7 consultations for the frog and/or its habitat with the NRCS on programs that assist landowners on private lands with projects designed to restore habitat or control erosion and sedimentation. However, two of these consultations were conducted outside the study area. The third consultation involved approval of a Coordinated Permit Program for Alameda County's Wildlife-friendly Pond Restoration Program.[113] This program offers Alameda County ranchers cost-share funding and technical assistance for livestock pond restoration specifically designed to benefit the frog as well as the California tiger salamander. Under the coordinated permit program, NRCS provides funding for five to six livestock pond restoration projects each year. According to discussions with NRCS staff, the administrative cost of preparing and participating in the consultation on the Coordinated Permit Program was $175,000 over three years from 2002 to 2004.[114]

Indirect impacts

163. Grazing and ranching landowners may also be indirectly affected as a result of frog conservation efforts. In Calaveras County (CAL-1), one landowner reported economic impacts as a result of delays in repair and maintenance of the ranch's single access road due to section 7 consultation for the frog. Based on discussions with the landowner, road delays persisted for three years. During this time the road's condition continued to deteriorate, eventually prohibiting use of the road by large trucks that deliver hay for the ranch and transport cattle to auction. The affected landowner estimated indirect economic impacts of $5,000 to $8,000 per year from 2005 to 2007.[115]

7.1.2 GRAZING AND RANCHING ACTIVITIES ON FEDERAL LANDS

164. Grazing activities on Federal lands are not subject to the Special Rule Exemption for routine ranching activities. According to the proposed rule, grazing activities are a threat to the frog in 12 critical habitat units.[116] Based on available GIS data, of these units, only two units contain Federal lands used for grazing activities. Exhibit 7-2 provides detailed information on the number of acres of Federal grazing lands included in the proposed designation by allotment and critical habitat unit.

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[113] For more detail, see Alameda County Resource Conservation District. Wildlife-friendly Pond Program. Accessed on December 27, 2008. http://www.acrcd.org/ForRuralLandowners/WildlifeFriendlyPondsProgram/tabid/85/Default.aspx

[114] Personal communication with Terrence Huff, USDA, Natural Resources Conservation Service, District Conservationist, January 5, 2009.

[115] Personal communication with Franciska Schabram, January 12, 2009.

[116] Excludes one unit (SNB-3, Pinnacles National Monument) where the identified grazing threat is from feral pigs (73 FR 53492).

EXHIBIT 7-2 CHD UNITS THREATENED BY GRAZING ACTIVITIES (ACRES)

UNIT	FEDERAL LAND MANAGER	ALLOTMENT NAME	TOTAL ALLOTMENT AREA (ACRES)	AREA PROPOSED AS CRITICAL HABITAT (ACRES)	% OF ALLOTMENT PROPOSED AS CRITICAL HABITAT
SOL-1	BLM	Bluestone Ridge	2,953	159	5.4%
SOL-3	USFS	Big & Little Falls	2,223	1,481	66.6%
		Tule	2,512	34	1.3%
		Upper Lopez	1,303	1,075	82.5%
		Morro Creek	4,966	4,966	100.0%
		Pine Knob	1,338	1,338	100.0%
		Salsipuedes	1,235	157	12.7%
		TOTAL	**18,594**	**9,221**	**49.6%**

Source: Grazing allotment data obtained from the following sources:

BLM: BLM California Range Allotments (GIS coverage); available at: http://www.blm.gov/ca/gis/index.html

USFS: Rangeland Management Units (GIS Coverage); available at: http://www.fs.fed.us/r5/rsl/clearinghouse/gis-download.shtml#rangemgt

165. Since the species listing in 1996, there has been only one section 7 consultation for the frog on grazing activities on Federal lands. The consultation, conducted in 2002, addressed grazing in the Tahoe and Eldorado National Forests. Conservation measures to protect the frog and/or its habitat from grazing activities are limited to implementation of best management practices in Riparian Conservation Areas as described in the Sierra Nevada Forest Plan Amendment Standards and Guidelines for Aquatic and Riparian Ecosystems and conducting surveys of suitable frog habitat. According to discussions with U.S. Forest Service (USFS) and BLM staff, past conservation measures undertaken for the frog have not resulted in any reduction in the number of available grazing animal unit months (AUMs).[117] Accordingly, past conservation activities to protect the frog are limited to the section 7 administrative costs of approximately $12,000 and frog survey and monitoring costs estimated in Chapter 12.

7.2 POST-DESIGNATION IMPACTS

166. The most likely Federal nexus for future section 7 consultations with grazing and ranching lands is through projects receiving Federal funding through the NRCS. The coordinated permit currently in place for the Alameda County Wildlife-friendly Pond Restoration Program is set to expire at the end of 2009. According to NRCS staff, due to the administrative costs associated with the previous consultation for the coordinated

[117] Personal communication with: Valerie Hubbartt, Wildlife Biologist, Los Padres National Forest, on December 1, 2008; Amy Fesnock, Threatened and Endangered Species Specialist, California Bureau of Land Management, on January 5, 2009; Dawn Lipton, Wildlife Biologist, Eldorado National Forest, on January 6, 2009; and, Tina Mark, Wildlife Biologist, Tahoe National Forest, on January 7, 2009.

program, NRCS is not currently planning on initiating another consultation to extend the existing coordinated permit program. Accordingly, with the designation of critical habitat, NRCS will be required to consult on a project-by-project basis for all future projects initiated under the Wildlife-friendly Pond Restoration Program. As a result of the additional administrative costs and delay associated with project-by-project section 7 consultation, NRCS anticipates reducing the number of projects funded to one to two per year.[118] Accordingly, these administrative costs from section 7 consultation are considered incremental as NRCS would not be required to consult in the absence of critical habitat designation.[119]

7.3 SOURCES OF UNCERTAINTY

167. The sources of uncertainty in the estimates provided in this Chapter primarily concern currently available data and the difficulty of forecasting future projects in the study area. To the extent that future projects were not identified, total impact estimates may increase as information becomes available.[120]

[118] While the potential loss of NRCS funding for additional wildlife-friendly projects represents a potential impact due to critical habitat designation, the distribution of Federal funding to private landowners represents a transfer of money and not a change in real resources. Accordingly, this impact is not quantified in this analysis. If the activities undertaken through those projects results in the creation of value for recipients landowners, additional economic impacts may result.

[119] Personal communication with Terrence Huff, USDA, Natural Resources Conservation Service, District Conservationist, January 5, 2009.

[120] For example, NRCS staff report expressed interest in the Wildlife-friendly Pond Restoration Program by additional ranchers in Santa Barbara, Calaveras, El Dorado, and Shasta Counties. (Personal communication with Terrence Huff, USDA, Natural Resources Conservation Service, District Conservationist, January 5, 2009)

CHAPTER 8 | TIMBER HARVEST ACTIVITIES

168. This section describes the potential economic impacts of frog conservation on timber harvest activities in the study area. Timber operations can both directly and indirectly affect the frog. According to the Recovery Plan, some of the impacts of timber operations include:

> "Access roads, haul roads, skid trails, and ground based [tractor] yarding systems have great impacts related to sedimentation and compaction. Wet weather operations also have more potential for impacts. Timber harvesting in upland habitat can also impact California red-legged frogs by causing direct harm or injury to frogs that may be dispersing or sheltering."[121]

169. Through review of the proposed rule, direct communication with the Service, and review of past and ongoing timber harvests in proposed critical habitat, this analysis concludes that timber harvest activities may affect the frog in eight proposed critical habitat units: BUT-1, YUB-1, NEV-1, PLA-1, ELD-1, MEN-1, SCZ-1, and SNM-2. Within these units, approximately 23,900 acres (11 percent of the eight critical habitat units threatened by timber activities, but only one percent of the study area) are currently managed or have the potential to be managed for timber harvest.

170. Exhibit 8-1 provides an overall summary of impacts to timber harvest activities as described in the remainder of this chapter. Significant frog conservation measures are required under existing Federal and State regulations. Specifically, the Sierra Nevada Forest Plan Amendment (SNFPA) and the California Environmental Quality Act (CEQA) provide significant protection of the frog and frog habitat during timber harvest activities on Federal, State, and private lands. Because of the level of existing measures that result in protection of frog habitat, the incremental impacts of critical habitat designation are forecast to be administrative and relatively minor.

171. This chapter begins with a description of timber harvest activities in the eight critical habitat units where timber harvest is identified as a threat to the frog and its habitat. Second, it describes current Federal and State regulations affecting timber harvest activities in the study area. The third section describes the analytic approach applied to quantify impacts of frog conservation on timber harvest activities. The final sections present the results of the analysis by critical habitat unit and highlight the major assumptions and caveats of the analysis.

[121] U.S. Fish and Wildlife Service. 2002. Recovery Plan for the California Red-legged Frog (Rana aurora draytonii). U.S. Fish and Wildlife Service, Portland, Oregon. viii + 173 pp.

EXHIBIT 8-1 SUMMARY OF IMPACTS TO TIMBER HARVEST ACTIVITIES (2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

VALUES	LOW	HIGH
Pre-Designation Impacts (1996 – 2008)		
Present Value of Impacts	$1,290,000	$13,300,000
Post-Designation Baseline Impacts (2009 – 2030)		
Present Value of Impacts	$4,130,000	$8,950,000
Annualized Impact Value	$373,000	$809,000
Incremental Impacts (2009 – 2030)		
Present Value of Impacts	$11,200	$11,200
Annualized Impact Value	$1,010	$1,010

8.1 TIMBER HARVEST ACTIVITIES IN THE STUDY AREA[122]

172. The proposed critical habitat units where timber harvest activities may affect the frog can be grouped into two distinct geographic regions: the Sierra Nevada region (BUT-1, ELD-1, NEV-1, PLA-1, and YUB-1) and the Central Coast region (MEN-1, SCZ-1, and SNM-2). Timber harvest activities in both regions range from selective harvests, where only a few trees are harvested, to large-scale clearcuts, where all trees in a given area are harvested.[123] Frog conservation measures affect timber harvest activities in the two regions differently due to differences in the timber harvest strategies implemented and varying levels of frog occurrence in the two regions.

173. The primary landowners in the eight critical habitat units where timber harvest activities are identified as a threat to the frog, include private owners (approximately 179,000 acres), the USFS (approximately 8,600 acres), BLM (approximately 1,970 acres), and the California Department of Parks and Recreation (CDPR, approximately 296 acres).[124] The USFS land contains portions of three National Forests, including Plumas (BUT-1 and YUB-1), Eldorado (ELD-1), and Tahoe (NEV-1 and PLA-1).

174. Commercial timber harvest occurs on private timberlands and National Forest land within the eight critical habitat units threatened by timber activities. Although the majority of timber harvests are implemented for commercial purposes, some timber harvests are implemented to maintain specific natural communities of ecological value, as well as to minimize the risk of future wildland fires.[125] Timber harvests have occurred or are

[122] The study area for timber harvest activities is limited to the five critical habitat units where timber harvest activities are identified as a threat to the frog and its habitat in the proposed rule: BUT-1, YUB-1, NEV-1, PLA-1, and ELD-1. (73 FR 53492)

[123] Based on a review of past timber harvest plans on State and private timberlands. Accessed online at: ftp://thp.fire.ca.gov/THPLibrary/ on January 2, 2009.

[124] Based on GIS analysis using proposed critical habitat and ownership data received from the Service on September 22, 2008 and December 16, 2008.

[125] Personal communication with Amy Fesnock, Threatened and Endangered Species Specialist, California Bureau of Land Management, on January 5, 2009; and, Dawn Lipton, Wildlife Biologist, Eldorado National Forest, on January 6, 2009.

currently occurring on a total of 23,000 acres of private timberland. Additionally, timber harvest activities may occur on approximately 994 acres of the Plumas National Forest, which are considered suitable for commercial timber harvest.[126] The remaining forested areas in Plumas, Eldorado, and Tahoe National Forests are not considered suitable for timber harvest due to forest conditions and existing management objectives. Exhibits 8-2 and 8-3 illustrate the areas currently or potentially managed for commercial timber harvest on private land and National Forests in the five critical habitat units threatened by timber harvest activities. Impacts to timber harvest activities in these areas are quantified in section 8.4.

175. CAL FIRE actively manages State forestland for research purposes and to demonstrate different management techniques, however, CAL FIRE does not implement commercial timber harvests on State lands.[127] The experimental forest management activities occurring on State forestland are affected by frog conservation measures (section 8.3.2); thus, impacts to CAL FIRE are quantified along with impacts to the USFS and private timberland owners in section 8.4.

176. Although the BLM engages in forest management activities designed to maintain natural communities of interest and limit the potential for wildland fires, they do not actively manage their land for timber harvest in the study area.[128] General forest management activities on BLM land, such as wildfire control, are not affected by frog conservation. Thus, no impacts to the BLM are quantified in this chapter.

[126] Based on GIS analysis using spatial data from the California Department of Forestry and Fire Protection accessed online at: ftp://ftp.fire.ca.gov/forest/ on December 22, 2008; and, the U.S. Forest Service accessed online at: http://www.fs.fed.us/r5/rsl/clearinghouse/gis-download.shtml on January 7, 2009.

[127] Written communication with Chris Browder, California Department of Forestry and Fire Protection, January 9, 2009.

[128] Personal communication with Amy Fesnock, Threatened and Endangered Species Specialist, California Bureau of Land Management, on January 5, 2009.

EXHIBIT 8-2 AREAS MANAGED FOR TIMBER ON FEDERAL AND PRIVATE LANDS BY UNIT

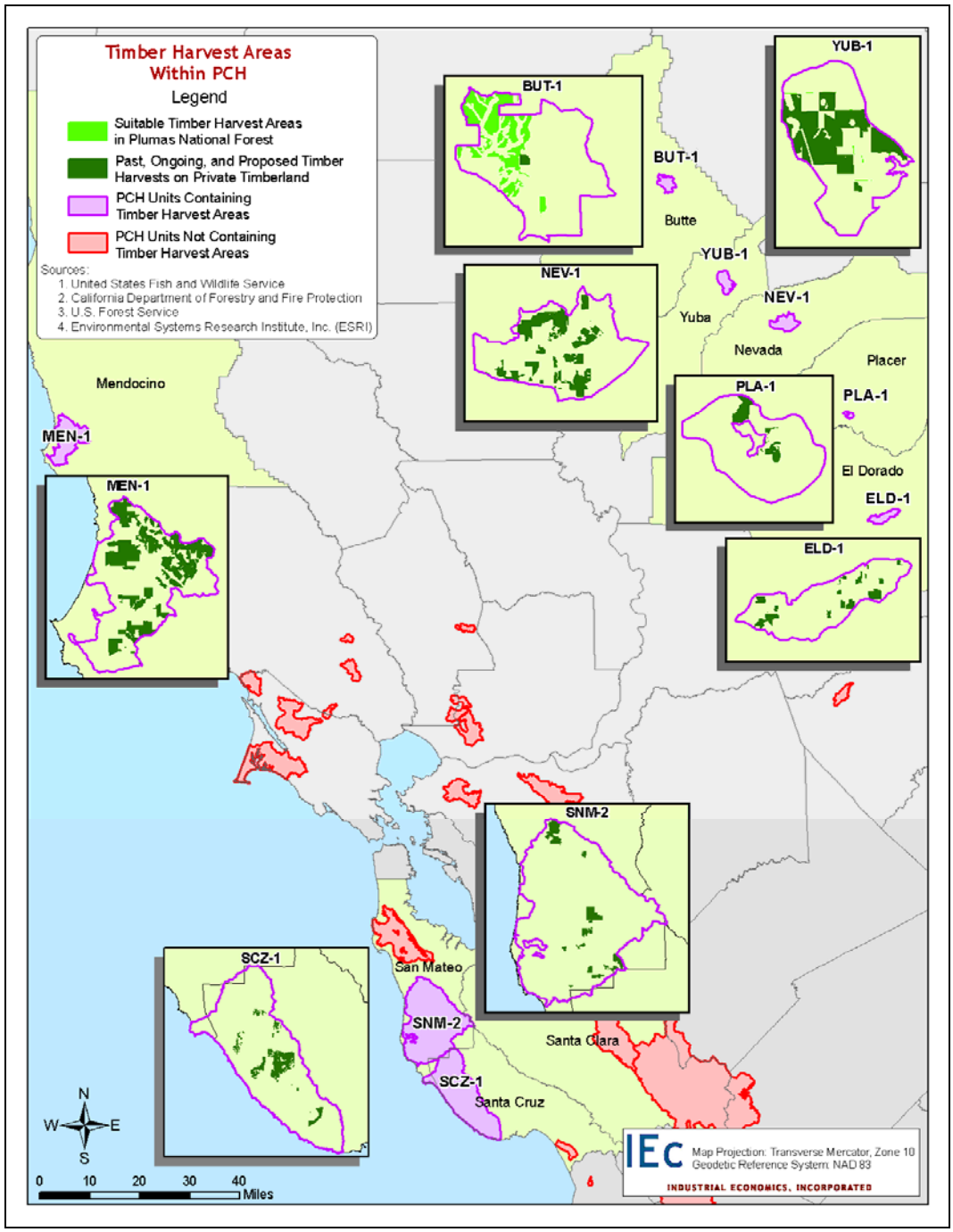
UNIT	TOTAL ACRES	ACRES MANAGED FOR TIMBER			PERCENT OF UNIT MANAGED FOR TIMBER
		FEDERAL	PRIVATE	TOTAL	
SIERRA NEVADA REGION					
BUT-1	5,290	964	38	1,000	19%
ELD-1	5,530	0	556	556	10%
NEV-1	8,290	0	1,800	1,800	22%
PLA-1	1,240	0	82	82	7%
YUB-1	6,320	30	2,090	2,120	34%
Subtotal	*26,700*	*994*	*4,570*	*5,560*	*21%*
CENTRAL COAST REGION					
MEN-1	26,900	0	8,900	8,900	33%
SCZ-1	72,300	0	5,250	5,250	7%
SNM-2	96,100	0	4,240	4,240	4%
Subtotal	*195,000*	*0*	*18,400*	*18,400*	*9%*
Total	**222,000**	**994**	**23,000**	**23,900**	**11%**

Source(s):

(1) California Department of Forestry and Fire Protection. 2008. Timber Harvest Plan GIS Data for Butte, Eldorado, Nevada, Placer, and Yuba Counties. Accessed online at: ftp://ftp.fire.ca.gov/forest/ on December 22, 2008.

(2) U.S. Forest Service. 2006. Land & Resource Management Plan, Land Suitability Class, Region 5, National Forest, California. Accessed online at: http://www.fs.fed.us/r5/rsl/clearinghouse/gis-download.shtml on January 7, 2009.

EXHIBIT 8-3 TIMBER HARVEST AREAS WITHIN PROPOSED CRITICAL HABITAT



8.2 BASELINE REGULATIONS AFFECTING TIMBER HARVEST ACTIVITIES

177. Conservation measures required to protect the frog are primarily designed to preserve water quality and protect forested areas immediately adjacent to waterbodies. Accordingly, many of these conservation measures are expected to occur even in the absence of the frog and its habitat as a result of existing Federal and State regulations designed to protect water quality, aquatic and riparian areas, and streambed structure in forested areas used for timber harvest activities. This section describes existing baseline protections provided by Federal and State regulations that may affect proposed critical habitat areas used for timber harvest activities.

8.2.1 TIMBER HARVEST ACTIVITIES ON THE PLUMAS NATIONAL FOREST

178. The Plumas National Forest is covered by the Sierra Nevada Forest Plan Amendment (SNFPA) and, as such, is subject to the standards and guidelines included in the SNFPA.[129] The SNFPA standards and guidelines include detailed measures for protecting aquatic and riparian habitats and the species that inhabit such areas.[130] These measures provide significant baseline conservation benefits to the frog and its habitat within timber harvest areas on Federal lands. The specific aquatic and riparian standards and guidelines included in the SNFPA that also benefit the frog and its habitat include:

- Establish riparian conservation area (RCA) buffers as follows:

  Perennial Streams/Special Aquatic Features: 300 feet on each side of waterbody;

  Seasonal Streams: 150 feet on each side of stream;

  Streams in Inner Gorge: Top of inner gorge; and

  Other: RCA width and protection measures determined through project level analysis.

- Assess and document aquatic conditions following the Regional Stream Condition Inventory protocol prior to implementing ground disturbing activities within suitable habitat for the frog.

- Limit application of pesticides in RCAs and critical aquatic refuges (CARs) to cases where project-level analysis indicates their application is consistent with the Riparian Conservation Objectives.[131]

- Avoid application of pesticides to areas within 500 feet of known occupied sites for the frog, unless environmental analysis documents pesticides are needed to restore or enhance habitat for the frog.

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[129] U.S. Forest Service. 2004. Record of Decision: Sierra Nevada Forest Plan Amendment – Final Supplemental Environmental Impact Statement. United States Department of Agriculture, Forest Service, Pacific Southwest Region.

[130] U.S. Forest Service. 2004. Record of Decision: Sierra Nevada Forest Plan Amendment – Final Supplemental Environmental Impact Statement. United States Department of Agriculture, Forest Service, Pacific Southwest Region.

[131] CARs are designated for areas containing known populations of threatened or endangered amphibians (i.e., the frog, foothill and mountain yellow-legged frog, Yosemite toad, Cascades frog, and the northern leopard frog). The objective of RCAs is to maintain the ecological integrity of aquatic, riparian, and meadow ecosystems.

- Ensure that appropriate mitigation measures (e.g., utilize low ground pressure equipment, helicopters, over the snow logging, or other non-ground disturbing actions to operate off of existing roads; and, ensure that existing roads, landings, and skid trails meet Best Management Practices) are enacted within RCAs and CARs to: minimize the risk of activity-related sediment entering aquatic systems; and, minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species.
- Ensure management activities do not adversely affect water temperatures necessary for local aquatic- and riparian-dependent species assemblages.
- Prohibit storage of fuels and other toxic materials within RCAs and CARs except at designated administrative sites.

The majority of timber harvest activities in the Plumas National Forest occur outside of RCAs and CARs. For example, of the 990 acres in Plumas National Forest considered suitable for timber harvest, only eight acres are located within CAR areas.[132,133] None of the suitable timber harvest areas are located within RCAs.

8.2.2 TIMBER HARVEST ACTIVITIES ON STATE AND PRIVATE TIMBERLANDS

179. All timber harvests on State and private timberlands in California must comply with the California Forest Practice Rules (CFPR). The CFPR establish guidelines for managing timber in California with the goal of achieving:

> "maximum sustained production of high-quality timber products…while giving consideration to values relating to recreation, watershed, wildlife, range and forage, fisheries, regional economic vitality, employment, and aesthetic enjoyment."[134]

180. Article 6 of the CFPR includes guidelines addressing watercourse and lake protection during timber harvest activities in and around aquatic and riparian habitats. These measures provide significant baseline conservation benefits to the frog and its habitat within timber harvest areas on State and private lands. The specific watercourse and lake protection guidelines included in the CFPR that also benefit the frog and its habitat include:[135]

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[132] Based on GIS analysis using spatial data from the U.S. Forest Service accessed online at: http://www.fs.fed.us/r5/rsl/clearinghouse/gis-download.shtml on January 7, 2009.

[133] The eight acres on suitable timber harvest land in Plumas National Forest located within CAR areas is likely due to a spatial data alignment issue. It is unlikely that any suitable timberland in Plumas National Forest is located in CAR areas.

[134] California Department of Forestry and Fire Protection. 2008. California Forest Practice Rules 2008. Title 14, California Code of Regulations: Chapters 4, 4.5, and 10. California Department of Forestry and Fire Protection, Resource Management, Forest Practice Program. Sacramento, California.

[135] California Department of Forestry and Fire Protection. 2008. California Forest Practice Rules 2008. Title 14, California Code of Regulations: Chapters 4, 4.5, and 10. California Department of Forestry and Fire Protection, Resource Management, Forest Practice Program. Sacramento, California.

- Establish watercourse and lake protection zone (WLPZ) buffer areas as follows:[136]

  Class I Waterbodies: 75 to 150 feet depending on the slope of the land adjacent to the waterbody;

  Class II Waterbodies: 50 to 100 feet depending on the slope of the land adjacent to the waterbody;

  Class III & Class IV Waterbodies: Buffer areas determined based on site inspections.

- Within WLPZ buffer areas:
  - At least 75 percent surface cover and undisturbed area shall be retained.
  - For Class I waterbodies, at least 50 percent of the overstory and 50 percent of the understory canopy covering the ground and adjacent waters shall be left in a well distributed multi-storied stand, similar to that found before the start of operations. The residual overstory canopy shall be composed of at least 25 percent of the existing overstory conifers.
  - For Class II and Class IV waterbodies, at least 50 percent of the total canopy covering the ground shall be left in a well distributed multi-storied stand, similar to that found before the start of operations. The residual overstory canopy shall be composed of at least 25 percent of the existing overstory conifers.
  - For Class III waterbodies, at least 50 percent of the understory vegetation present before timber operations shall be left living and well distributed.
- Trees cut within WLPZ buffer areas shall be felled away from the watercourse by pulling or other mechanical methods.
- Heavy equipment shall not be used in timber falling, yarding, or site preparation within WLPZ buffer areas.

[136] Water classes are defined as follows: **Class I**: Domestic water supplies, including springs, onsite and/or within 100 feet downstream of the operations area and/or, those waterbodies where fish are always or seasonally present onsite, including habitat to sustain fish migration and spawning; **Class II**: Those waterbodies where fish are always or seasonally present offsite within 1,000 feet downstream and/or, waterbodies which contain aquatic habitat for non-fish aquatic species; **Class III**: Waterbodies with no aquatic life present, watercourse showing evidence of being capable of sediment transport to Class I and II waters under normal high water flow conditions after completion of timber operations; and, **Class IV**: Man-made watercourses, usually supplying downstream, established domestic, agricultural, hydroelectric supply or other beneficial uses.

8.3 ANALYTIC APPROACH

181. The following subsections describe the analytic approach applied for timber harvest activities on USFS lands, State lands, and private timberlands within the eight proposed critical habitat units where timber harvest activities are identified as a threat to the frog and its habitat.

8.3.1 TIMBER HARVEST ACTIVITIES ON NATIONAL FORESTS

182. As previously discussed, standards and guidelines under the SNFPA include detailed measures for protecting aquatic and riparian habitats. Given the comprehensive set of conservation measures protecting the aquatic and riparian habitats included in the SNFPA, few additional conservation measures are required specifically for the frog.[137] A review of the consultation history, as well as discussions with USFS staff, indicate that measures outlined in the SNFPA are sufficient to protect the frog during timber harvests in the Plumas National Forest. To date, the Service has not required any additional frog-specific conservation measures be implemented as part of section 7 consultation.[138,139,140] Rather, the standards and guidelines of the SNFPA are implemented as part of general management objectives to preserve aquatic and riparian habitats and associated species. These standards and guidelines would be implemented even in the absence of the frog and its habitat. Further, no national forest covered by the SNFPA and intersecting proposed critical habitat for the frog expects to implement additional conservation measures for the frog in the future beyond the SNFPA standards and guidelines.[141] Accordingly, impacts on timber harvest activities on USFS lands is limited to frog surveying efforts (quantified in Chapter 12) and the administrative costs of section 7 consultation quantified in this section.

8.3.2 TIMBER HARVEST ACTIVITIES ON STATE LANDS

183. Non-commercial timber harvest occurs on State lands in the study area for research purposes and to demonstrate different management techniques. This analysis relies on personal communication with CAL FIRE, the responsible State agency, to estimate impacts related to frog conservation on non-commercial timber management on State lands. Impacts on timber management activities are related to implementing measures to

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[137] Personal communication with Dawn Lipton, Wildlife Biologist, Eldorado National Forest, on January 6, 2009; and, Tina Mark, Wildlife Biologist, Tahoe National Forest, on January 7, 2009.

[138] Review of Formal Consultation History from 1996 through 2008.

[139] Personal communication with Dawn Lipton, Wildlife Biologist, Eldorado National Forest, on January 6, 2009; and, Tina Mark, Wildlife Biologist, Tahoe National Forest, on January 7, 2009.

[140] Eldorado National Forest noted that the standard, which limits pesticide application to areas at least 500 feet away from known occupied sites for the frog and other endangered or threatened amphibians, is implemented specifically for the frog. However, there are no economic impacts associated with the implementation of this standard. Personal communication with Dawn Lipton, Wildlife Biologist, Eldorado National Forest, on January 6, 2009.

[141] Personal communication with Dawn Lipton, Wildlife Biologist, Eldorado National Forest, on January 6, 2009; and, Tina Mark, Wildlife Biologist, Tahoe National Forest, on January 7, 2009.

avoid take of the frog similar to those detailed for timber harvests on private lands in the following section.[142]

8.3.3 TIMBER HARVEST ACTIVITIES ON PRIVATE LANDS

184. Under the CFPR, a timber harvest plan (THP) must be prepared by a registered professional forester (RPF) and submitted to CAL FIRE, the authorized oversight agency, for approval. THPs are environmental review documents that outline what timber will be harvested, how it will be harvested, and the steps that will be taken to prevent damage to the environment. CAL FIRE reviews THPs under CEQA as a 'responsible agency' and trustee of the State's natural resources. As a result of its review, CAL FIRE may recommend changes to the THP so that significant impacts to natural resources, or take of a listed species, will be avoided.[143]

185. There are no section 7 administrative costs quantified for timber harvests on private timberlands because, as of February 1, 2008, the Service no longer accepts technical assistance requests from private timberland owners on THPs.[144] Instead, CAL FIRE reviews THPs and requires measures to avoid take of the frog under CEQA. Impacts to timber harvest activities on private timberlands are due to modifying timber harvests to limit take of the frog. The administrative costs incurred by CAL FIRE associated with reviewing THPs and by private timberland owners associated with incorporating frog-specific measures into THPs are quantified in section 8.4; however, these costs are unrelated to the section 7 consultation process.

186. To identify and estimate impacts associated with modifying timber harvest activities on private timberlands, this analysis employs a five-step process:

Step 1: Determine Where Conservation Measures Will Be Required During Timber Harvest

187. The Service issued Take Avoidance Scenarios for timber harvest plans for the frog on March 25, 2008.[145] Based on this memorandum, CAL FIRE issued additional guidance on July 28, 2008 providing recommendations to project proponents based on the location of proposed timber operations within the current or historic ranges of the frog as defined in the 2002 Recovery Plan.[146,147] The end result of following this guidance varies, but

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[142] Written communication with Chris Browder, California Department of Forestry and Fire Protection, January 9, 2009.

[143] California Department of Forestry and Fire Protection, Resource Management: Forest Practice. Accessed online at: http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice.php on January 7, 2009.

[144] U.S. Fish and Wildlife Service. Letter to Mr. Bill Snyder of the California Department of Forestry and Fire Protection regarding: U.S. Fish and Wildlife Service review of timber harvest plans and non-industrial timber management plans, transition documents. February 1, 2008. U.S. Fish and Wildlife Service, California and Nevada Region, Sacramento, California.

[145] U.S. FWS. "Revised CRLF Information Needs and Take Avoidance Scenarios. Available at: http://www.fire.ca.gov/resource_mgt/downloads/USFWS_Revised_CRLF_InfoNeeds&TakeAvoidanceScenarios_032508.pdf.

[146] California Department of Forestry and Fire Protection. 2008. Recommendations for Addressing California Red-Legged Frog Take Avoidance in Timber Harvesting Documents. Accessed online at: http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice_pubsmemos_memos.php on November 25, 2008.

may include the development of a formal consultation and associated project modifications. Exhibit 8-4 demonstrates the three most common results of following the CAL FIRE guidance. Conservation measures required for the frog during timber harvest activities differ for each of the three pathways as discussed below.

- **Frogs Present Scenario:** Frogs are assumed to be present in a timber harvest area if the area falls within the current range of the frog, as defined by the 2002 Recovery Plan. In this case, landowners are required to implement frog conservation measures during timber harvest activities.

  In areas that fall outside of the current range of the frog, but within the historic range, CAL FIRE recommends conducting "scoping" surveys to determine frog presence.[148] However, in the Central Coast region, personal communication with private timberland owners and CAL FIRE indicate that the frog is assumed to be present in any timber harvest area intersecting the historic range for the frog, even if scoping surveys do not locate any frogs, due to the high level of frog occurrence in the region.[149] Thus, all timber harvest activities in the current and historic ranges for the frog fall under the "Frogs Present" scenario in the Central Coast region.

  In the Sierra Nevada region, this analysis would ideally rely on data about the frequency that scoping surveys result in detection of the frog; however, according to discussions with CAL FIRE, data on the results of scoping surveys are not tracked. Accordingly, this analysis relies on the CNDDB to identify areas where frogs are assumed to be present in the Sierra Nevada region. Specifically, this analysis assumes that surveys conducted within one mile of past frog occurrences documented in the CNDDB will detect the frog (i.e., the frog is assumed to be present in the timber harvest area). In these cases, landowners will implement the same conservation measures as required for timber harvest activities occurring within the current range of the frog in the Sierra Nevada region.

- **No Frogs Scenario:** For timber harvests located within the historic range of the frog but outside of the CNDDB footprint in the Sierra Nevada region, this analysis conservatively assumes that no frogs will be detected during a frog survey. In this case, CAL FIRE's July 2008 guidance states:

[147] U.S. Fish and Wildlife Service. 2002. Recovery Plan for the California Red-legged Frog (Rana aurora draytonii). U.S. Fish and Wildlife Service, Portland, Oregon. viii + 173 pp

[148] California Department of Forestry and Fire Protection. 2008. Recommendations for Addressing California Red-Legged Frog Take Avoidance in Timber Harvesting Documents. Accessed online at: http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice_pubsmemos_memos.php on November 25, 2008.

[149] Written and personal communication with Matt Dias of the Big Creek Lumber Company on May 5, 2009 and May 18, 2009 and personal communication with Chris Browder, California Department of Forestry and Fire Protection, May 18, 2009.

> "If the [frog] is not present on site nor within the biological assessment area, then timber operations should not cause harassment within aquatic and upland areas."[150]

Accordingly, under this scenario, landowners are required to highlight protections for aquatic and riparian habitat included in their THP; however, no specific frog conservation measures are required.[151]

- **Outside of Frog Range Scenario:** For timber harvests located outside of the current and historic ranges of the frog, CAL FIRE does not normally require any frog conservation measures on the part of the landowner.[152]

188. Exhibits 8-5 and 8-6 detail proposed and ongoing timber harvests on private timberland under each of these three scenarios. As shown in Exhibit 8-6, of the 23,000 acres of private land managed for timber activities, the majority of the land (52 percent or 11,900) falls within the CNDDB footprint where frogs are assumed to be present in the timber harvest area, 44 percent (or 10,200 acres) falls outside the current or historic ranges of the frog, and 3.6 percent (or 837 acres) falls within the frog's historic range but outside the CNDDB footprint.

[150] California Department of Forestry and Fire Protection. 2008. Recommendations for Addressing California Red-Legged Frog Take Avoidance in Timber Harvesting Documents. Accessed online at: http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice_pubsmemos_memos.php on November 25, 2008.

[151] Written communication with Chris Browder, California Department of Forestry and Fire Protection, December 30, 2008.

[152] Written communication with Chris Browder, California Department of Forestry and Fire Protection, December 30, 2008.

EXHIBIT 8-4 METHODOLOGY USED TO DETERMINE WHETHER CONSERVATION MEASURES WILL BE REQUIRED DURING TIMBER HARVEST

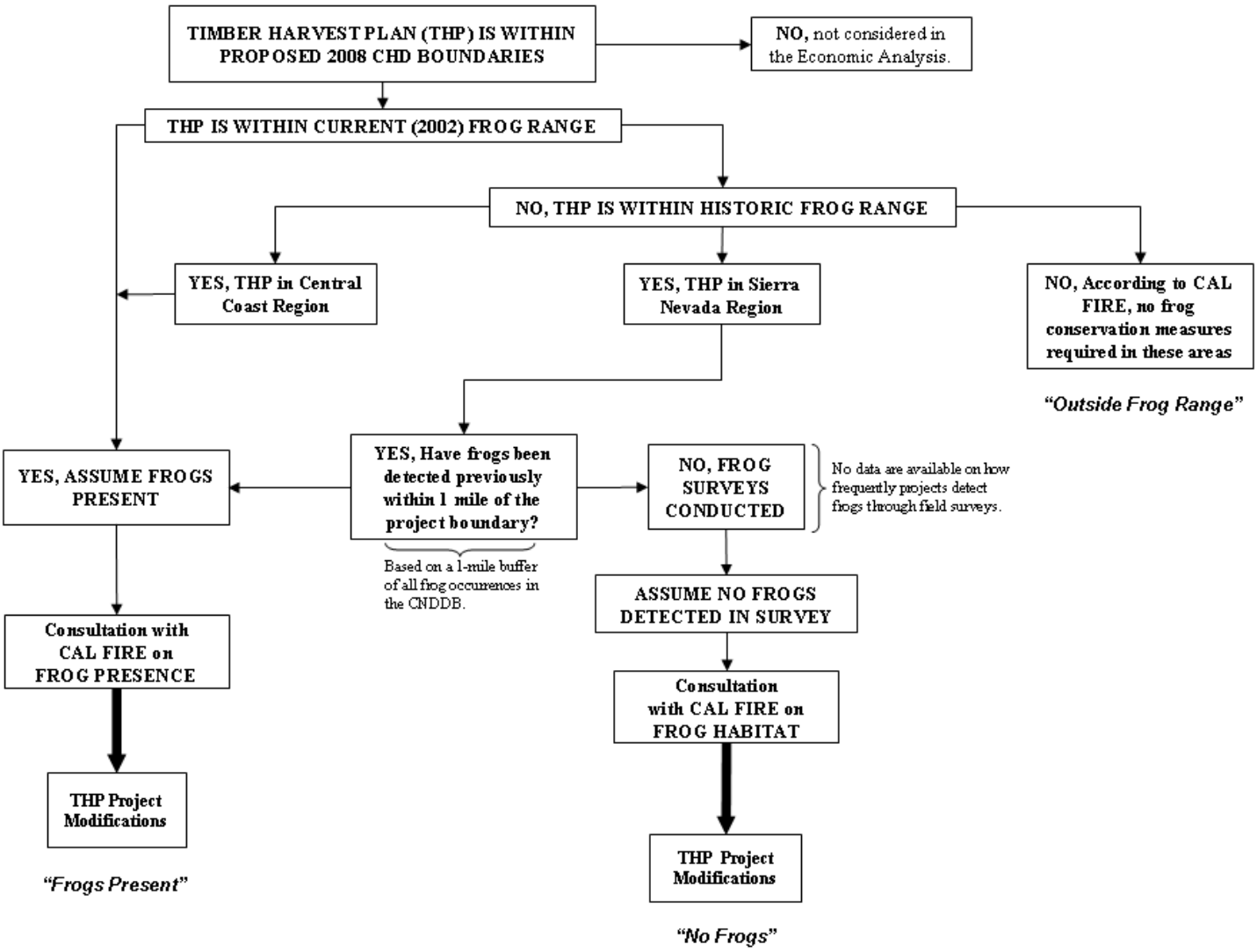


EXHIBIT 8-5 TIMBER HARVEST AREAS ON PRIVATE TIMBERLANDS UNDER EACH POTENTIAL REGULATORY SCENARIO

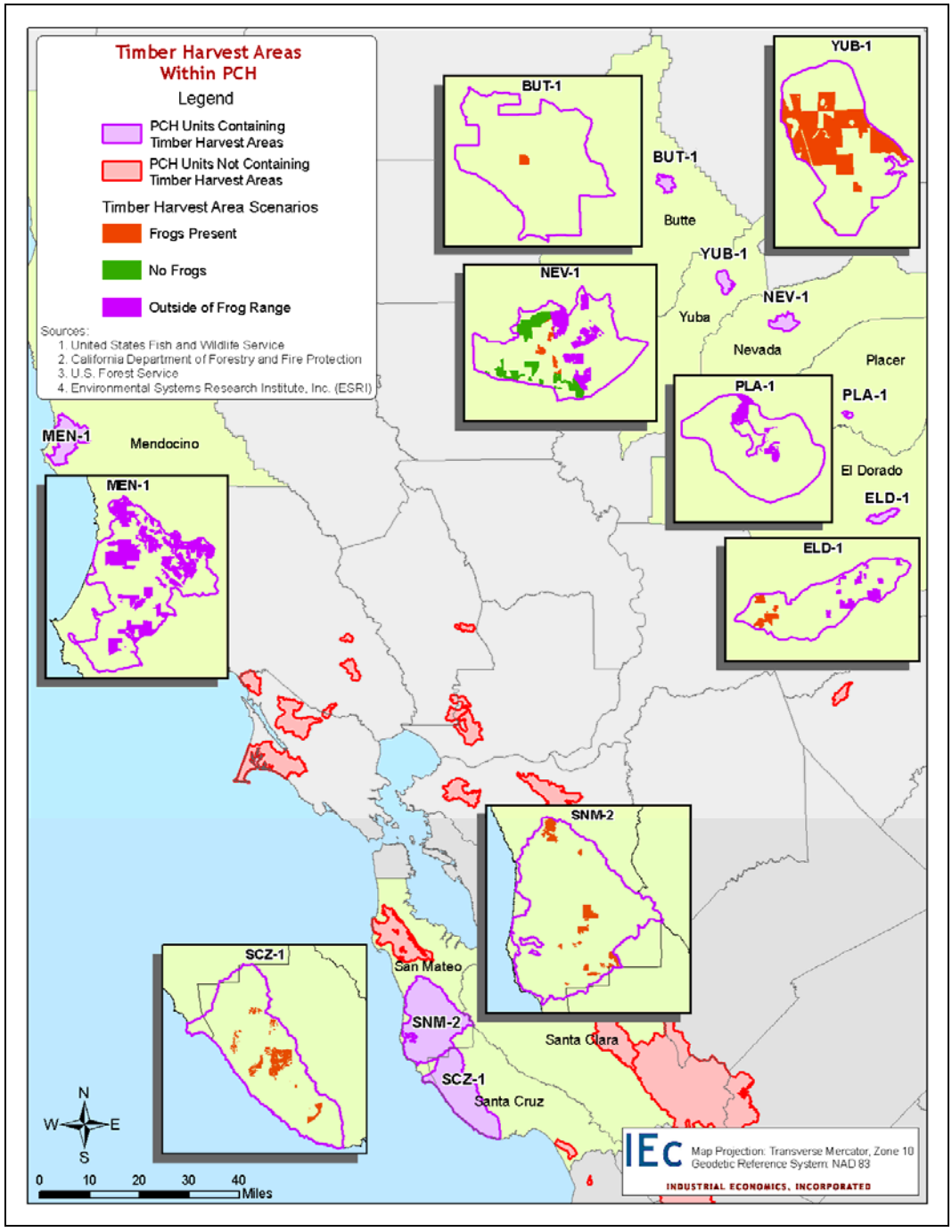


EXHIBIT 8-6 TIMBER HARVEST AREAS ON PRIVATE TIMBERLANDS UNDER EACH POTENTIAL REGULATORY SCENARIO

UNIT	TIMBER HARVEST AREAS BY SCENARIO			TOTAL TIMBER HARVEST AREA
	FROGS PRESENT	NO FROGS	OUTSIDE OF FROG RANGE	
SIERRA NEVADA REGION				
BUT-1	38	0	0	38
ELD-1	212	0	344	556
NEV-1	115	837	846	1,800
PLA-1	0	0	82	82
YUB-1	2,090	0	0	2,090
Subtotal	*2,460*	*837*	*1,270*	*4,570*
CENTRAL COAST REGION				
MEN-1	0	0	8,900	8,900
SCZ-1	5,250	0	0	5,250
SNM-2	4,240	0	0	4,240
Subtotal	*9,490*	*0*	*8,900*	*18,400*
Total	**11,900**	**837**	**10,200**	**23,000**

Source(s):
(1) Maps of the current and historic range of the frog by county at: http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice_pubsmemos_memos.php
(2) CNDDB GIS data obtained from the U.S. Fish and Wildlife Service.
(3) California Department of Forestry and Fire Protection. 2008. Timber Harvest Plan GIS Data for Butte, Eldorado, Nevada, Placer, and Yuba Counties. Accessed online at: ftp://ftp.fire.ca.gov/forest/ on December 22, 2008.

Step 2: Determine Frog-Specific Conservation Measures Required During Timber Harvest Activities

189. Private timberland owners and CAL FIRE determine the appropriate conservation measures to implement during a given timber harvest by considering the size, extent, and location of the timber harvest. Exhibit 8-7 details the conservation measures required for timber harvests occurring at different times of the year and in different locations in relation to suitable habitat for the frog.[153]

[153] Landowners are allowed to develop their own site-specific conservation measures for the frog and its habitat, rather than implementing the conservation measures defined by CAL FIRE. Alternatively, a landowner may request technical assistance from the Service in order to determine the specific conservation measures necessary to adequately protect the frog and its habitat. However, the Service may deny a landowner's request for technical assistance if they are inundated with section 7 consultations. Thus, CAL FIRE recommends landowners adopt the conservation measures developed by CAL FIRE in conjunction with the Service or develop their own measures independently.

EXHIBIT 8-7 FROG CONSERVATION MEASURES REQUIRED DEPENDING ON THE TIMING AND LOCATION OF TIMBER HARVESTS

CONSERVATION MEASURES	HARVEST AREA DESCRIPTION						
	NO SUITABLE HABITAT WITHIN TWO MILES OF HARVEST AREA	SUITABLE HABITAT WITHIN TWO MILES OF HARVEST AREA, BUT NO HARVEST PLANNED WITHIN 300 FEET OF SUITABLE HABITAT	WITHIN TWO MILES OF SUITABLE HABITAT AND HARVEST PLANNED WITHIN 300 FEET OF SUITABLE HABITAT DURING THE WET SEASON				WITHIN TWO MILES OF SUITABLE HABITAT AND HARVEST PLANNED WITHIN 300 FEET OF SUITABLE HABITAT DURING THE DRY SEASON
			WATER CLASS I	WATER CLASS II	WATER CLASS III	WATER CLASS IV	
Maintain a 30-foot no harvest and no equipment buffer around suitable habitat. Fell trees away from suitable habitat.	No specific conservation measures required for the frog or its habitat.				✓	No specific conservation measures required for the frog or its habitat.	✓
Where water is present maintain a 300-foot no harvest buffer around suitable habitat; where dry, maintain a 30-foot no harvest buffer around suitable habitat. No equipment allowed within 75 feet of annual high water mark. Fell trees away form suitable habitat.				✓			
Maintain a 300-foot no harvest and no equipment buffer around suitable habitat.			✓				

Note(s):

(1) Suitable frog habitat is defined as: i) Permanent water greater than 12 inches deep; ii) Permanent water less than 12 inches deep with suitable shelter/cover available (e.g., over-hanging vegetation, emergent vegetation, over-hung branches, etc.); iii) Permanent wet ground with vegetative or other cover; or, iv) Intermittent water that persists through late July.
(2) The wet season starts with the first frontal rain system depositing a minimum of 0.25 inches of rain after October 15 and ends on April 15. The dry season starts on April 16 and ends with the first frontal rain system.
(3) Water classes are defined as follows: **Class I**: Domestic water supplies, including springs, onsite and/or within 100 feet downstream of the operations area and/or, those waterbodies where fish are always or seasonally present onsite, including habitat to sustain fish migration and spawning; **Class II**: Those waterbodies where fish are always or seasonally present offsite within 1,000 feet downstream and/or, waterbodies which contain aquatic habitat for non-fish aquatic species; **Class III**: Waterbodies with no aquatic life present, watercourse showing evidence of being capable of sediment transport to Class I and II waters under normal high water flow conditions after completion of timber operations; and, **Class IV**: Man-made watercourses, usually supplying downstream, established domestic, agricultural, hydroelectric supply or other beneficial uses.

Source(s):

(1) U.S. Fish and Wildlife Service. 2008. California Red Legged Frog Take Avoidance Scenarios. U.S. Department of the Interior, Fish and Wildlife Service. Sacramento, California. Accessed online at: http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice_pubsmemos_memos.php on November 25, 2008.
(2) California Department of Forestry and Fire Protection. 2008. Recommendations for Addressing California Red-Legged Frog Take Avoidance in Timber Harvesting Documents. Accessed online at: http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice_pubsmemos_memos.php on November 25, 2008.

190. Several conservation measures are required of all timber harvests where frogs are assumed to be present and suitable habitat for the frog is located within two miles of the timber harvest area, including:[154]

- Pile burning cannot occur within 300 feet of suitable habitat.
- No herbicide use allowed within 300 feet of suitable habitat except for direct application to stumps.
- If constructing new roads and landings, they must be located 300 feet from suitable habitat and can only be constructed during the dry season.
- Water drafting from suitable habitat must be done with a hose placed in a bucket in a deep pool. The bucket must be covered by < 1 inch mesh, and the mouth of the hose must be covered by quarter inch mesh.

191. Additionally, the Service provides guidance to CAL FIRE on the types of conservation measures that should be included in THPs depending on the type of habitat (aquatic, riparian, or upland) present within the timber harvest area. The additional measures suggested by the Service are summarized as follows:[155]

Aquatic Habitat

- Implement erosion control measures as necessary to prevent sediment movement into aquatic habitat;
- Use road rocking with the WLPZ;
- Mulch or slash pack tractor roads, cable roads, and skid trails in the WLPZ;
- Mulch or slash pack all areas of exposed mineral soil that may contribute sediment movement into aquatic habitat;
- Establish road maintenance programs that provide permanent protection from sediment movement into aquatic habitat; and
- If the likelihood of take of the frog is high, plan all timber harvest activities to occur during the dry season.

Riparian Habitat

- Pile slash outside of riparian habitat, including springs, seeps, bogs, and any other wet areas;
- Use directional felling to avoid damaging riparian habitat; and

[154] U.S. Fish and Wildlife Service. 2008. California Red Legged Frog Take Avoidance Scenarios. U.S. Department of the Interior, Fish and Wildlife Service. Sacramento, California. Accessed online at: http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice_pubsmemos_memos.php on November 25, 2008.

[155] U.S. Fish and Wildlife Service. 1996. Interim Guidelines for Determining Protective Measures for Timber Harvest Plans to Avoid Take of the California Red-legged Frog. U.S. Department of the Interior, Fish and Wildlife Service. Sacramento, California.

- If the likelihood of take of the frog is high, plan all timber harvest activities to occur during the dry season.

Upland Habitat

- All off-road driving and ground disturbing construction-related activities—including road construction, skid trail construction, and construction of landings—should occur during the dry season;
- All yarding and skidding activities should occur during the dry season;
- If implementing a selective harvest, trees should be felled by hand during the wet season;
- If implementing a clearcut, no timber harvest should occur during the wet season;
- During the wet season, hauling and loading of logs should occur during daylight hours only; and
- If the likelihood of take of the frog is high, plan all timber harvest activities to occur during the dry season.

192. As previously described, the CFPR includes guidelines addressing watercourse and lake protection during timber harvest activities in and around aquatic and riparian habitats. Such guidelines are very similar to the frog conservation measures required by CAL FIRE.

Step 3: Distinguish between actions resulting from baseline regulations and the proposed critical habitat rule

193. This analysis quantifies baseline impacts associated with conservation measures for the frog that are more stringent than the watercourse and lake protection guidelines included in the CFPR, which are designed to protect "the beneficial uses of water, native aquatic and riparian species, and the beneficial functions of riparian zones" from timber harvest activities.[156] Impacts associated with implementing frog conservation measures, that are equivalent to the CFPR watercourse and lake protection guidelines, are not quantified because such measures would occur even in the absence of the frog or its habitat.

194. Given that the frog conservation measures required by CAL FIRE for timber harvests on private lands (outlined in step 2, above) are designed to protect suitable frog habitat, as well as individual frogs, no additional conservation measures are expected to be required to prevent the adverse modification of critical habitat within the current or historic range of the frog, regardless of frog presence. Furthermore, CAL FIRE does not expect to require specific conservation measures for the frog during timber harvests that are outside of the current and historic frog range, but within critical habitat designated for the frog.[157]

[156] California Department of Forestry and Fire Protection. 2008. California Forest Practice Rules 2008. Title 14, California Code of Regulations: Chapters 4, 4.5, and 10. California Department of Forestry and Fire Protection, Resource Management, Forest Practice Program. Sacramento, California.

[157] Written communication with Chris Browder, California Department of Forestry and Fire Protection, December 30, 2008.

Therefore, there are no incremental impacts of critical habitat designation forecast on private timberlands in the study area.

Step 4: Estimate Impacts

195. Impacts to timber harvest activities on private timberlands result from modifying timber harvests to protect the frog and its habitat. To estimate the cost of project modifications the following information is required:

- An estimate of the number of individual timber harvests likely to occur over the next 22 years in the study area under each of the three regulatory scenarios outlined in Step 1: Frogs Present, No Frogs, Outside of Frog Range; and,
- An estimate of the average cost of implementing conservation measures for timber harvest activities.

196. The estimated number of future harvests under each scenario is based on the frequency of past timber harvests since the frog was listed in 1996 (i.e., 13 years). Exhibit 8-8 presents the total number of past harvests that occurred in the study area since the frog was listed under each regulatory scenario, and the number of timber harvests forecast to occur annually.

197. Timber harvest activities differ between the Sierra Nevada Region and Central Coast Region. Specifically, timber harvest activities commence at the end of winter in the Central Coast region (i.e., late February and early March) where winters are relatively mild; conversely, timber harvest activities do not begin until later in the spring in the Sierra Nevada region (i.e., April and May) where winters are more severe. Further, the majority of timber harvested in the Central Coast region is located near waterbodies, whereas, the much of the timber harvested in the Sierra Nevada region is located away from waterbodies due to drier conditions. Finally, there are differences in the value of timber in the two regions, the harvest costs, and the wages paid to foresters and loggers. Accordingly, this analysis uses information obtained from private timberlands owners in each geographic region to estimate the cost of conservation measures for timber harvest activities.

EXHIBIT 8-8 NUMBER OF PAST AND FORECAST ANNUAL TIMBER HARVESTS BY REGULATORY SCENARIO AND PROPOSED CRITICAL HABITAT UNIT

UNIT	FROGS PRESENT		NO FROGS		OUTSIDE OF FROG RANGE	
	TOTAL NUMBER OF PAST HARVESTS	FORECAST FUTURE NUMBER OF HARVESTS PER YEAR	TOTAL NUMBER OF PAST HARVESTS	FORECAST FUTURE NUMBER OF HARVESTS PER YEAR	TOTAL NUMBER OF PAST HARVESTS	FORECAST FUTURE NUMBER OF HARVESTS PER YEAR
SIERRA NEVADA REGION						
BUT-1	1.0	0.1	0.0	0.0	0.0	0.0
ELD-1	3.0	0.2	0.0	0.0	14.0	1.1
NEV-1	4.9	0.4	6.3	0.5	4.1	0.3
PLA-1	0.0	0.0	0.0	0.0	2.2	0.2
YUB-1	9.3	0.7	0.0	0.0	0.0	0.0
Subtotal	*18.2*	*1.4*	*6.3*	*0.5*	*20.4*	*1.6*
CENTRAL COAST REGION						
MEN-1	0.0	0.0	0.0	0.0	48.1	3.7
SCZ-1	17.0	1.3	0.0	0.0	0.0	0.0
SNM-2	22.0	1.7	0.0	0.0	0.0	0.0
Subtotal	*39.0*	*3.0*	*0.0*	*0.0*	*48.1*	*3.7*
Total	**57.2**	**4.4**	**6.3**	**0.5**	**68.4**	**5.3**

Note(s):

(1) In some cases the number of past and/or future harvests is not a whole number because some harvest areas overlapped critical habitat boundaries. In these cases, only the portion of the harvest area in proposed critical habitat was counted. Further, some harvest areas overlapped multiple critical habitat units. In these cases, the harvest was assigned across units based on the percentage of the harvest area occurring within each unit.

Source(s):

(1) California Department of Forestry and Fire Protection. 2008. Timber Harvest Plan GIS Data for Butte, Eldorado, Nevada, Placer, Yuba, Mendocino, San Cruz, and San Mateo Counties. Accessed online at: ftp://ftp.fire.ca.gov/forest/ on December 22, 2008 and April 23, 2009.

198. In the Sierra Nevada region, impacts to timber harvest activities stem from: 1.) conducting surveys for the frog; 2.) incorporating frog-specific conservation measures into THPs; and, 3.) modifying timber harvests to minimize impacts to the frog. In the Central Coast region, impacts to timber harvest activities are due to: 1.) the delay of timber harvest activities until the dry season; 2.) modifying timber harvests to minimize impacts to the frog; 3.) incorporating frog-specific conservation measures into THPs; and, 4.) educating foresters and loggers on frog identification and take avoidance. Exhibits 8-9 and 8-10 summarize the average cost of implementing frog conservation measures under each regulatory scenario in the Sierra Nevada Region and Central Coast Region, respectively. As previously discussed, no frog conservation measures are expected for timber harvest activities located outside of the current and historic ranges of the frog ("Outside of Frog Range").

EXHIBIT 8-9 ESTIMATED FROG CONSERVATION MEASURE COSTS FOR TIMBER HARVEST ACTIVITIES: SIERRA NEVADA REGION (2009 DOLLARS)

IMPACT TYPE	DESCRIPTION	ESTIMATE	APPLICABLE REGULATORY SCENARIO	
			FROGS PRESENT	NO FROGS
Frog Surveys	Survey efforts depend on the specific timber harvest, but range from review the CNDDB for past occurrences of the frog in and around the timber harvest area, having a registered professional forester, trained in frog identification, conduct scoping surveys within the timber harvest area, and having a biologist conduct formal surveys for the presence of the frog and suitable frog habitat within two miles of the harvest area.	$2,000 to $6,000 with an average cost of $4,000 per survey.	✓	✓
THP Development	Cost of developing and incorporating frog-specific conservation measures into THPs by a registered professional forester in accordance with the CAL FIRE's 2008 "No Take Guidelines."	$1,000 to $3,000 with an average cost of $2,000 per THP.	✓	
Modification to Timber Harvests	Installment of 300-foot no harvest buffer areas around Class I and II waterbodies during the wet season and 30-foot no harvest buffer areas around Class I, II, and III waterbodies during the dry season (see Exhibit 8-7). ➢ These no harvest buffer areas are larger than the WLPZ buffer areas required under the CFPR (see section 8.2.2), and thus, result in reduced harvest volumes during timber harvests. ➢ Landowners are generally able to alter the sequence of harvests to minimize impacts associated with the timing restrictions.	Reduced harvest volume is expected to result in reductions of $5 per thousand board feet (MBF) on the low-end, and $100 per MBF on the high-end.	✓	
	The magnitude of losses associated with reduced harvest volumes depends on the type of wood being harvested, the volume of the proposed harvest, and the amount of wood in the no harvest buffer area that would have been harvested if the frog was not present.	Given an average timber harvest volume of 750 MBF in the Sierra Nevada region, timber harvest modification impacts are expected to range from $3,750 to $75,000.		

Note(s):
(1) No impacts are expected for timber harvests occurring under the "Outside of Frog Range" regulatory scenario.
Source(s):
(1) Personal communication with private timberland landowners in the Sierra Nevada region, including: Paul Violet of the Soper-Wheeler Company on April 20, 2009; Rick Frey of Siller Brothers Inc. on April 21, 2009; and, Stevan Andrews of Applied Forest Management LLC on April 23, 2009.

EXHIBIT 8-10 ESTIMATED FROG CONSERVATION MEASURE COSTS FOR TIMBER HARVEST ACTIVITIES: CENTRAL COAST REGION (2009 DOLLARS)

IMPACT TYPE	DESCRIPTION	ESTIMATE
THP Development	Cost of developing and incorporating frog-specific conservation measures into THPs by a registered professional forester in accordance with the CAL FIRE's 2008 "No Take Guidelines."	$2,340 per THP
Frog Education Programs	Training foresters and loggers in frog identification and take avoidance. Training foresters may reduce the need to hire biologists to conduct site surveys and monitor timber operations; while, training loggers may reduce the potential for take during timber harvest. In the future, logger education is expected to occur annually, while the frequency of future forester education is unknown (may occur periodically or not at all). Thus, this analysis only quantifies costs associated with educating loggers in the future. The cost of forester education is quantified as a one time cost in 2008.	$7,390 per forester education workshop $2,390 per logger education workshop
Timber Harvest Delays	Installation of 300-foot no harvest buffers around Class I and II waterbodies during the wet season results in the delay of timber harvest operations until the dry season. ➢ Much of the timber harvested in the Central Coast region falls within 300 feet of Class I and II waterbodies; thus, restricting timber harvest activities to areas beyond 300 feet of Class I and II waterbodies frequently reduces the value of individual harvests to the point that they are no longer profitable. ➢ Landowners are unable to alter their harvest patterns to minimize impacts (e.g., begin harvest activities outside of the 300-foot no harvest buffer areas during the wet season and work their way into the no harvest buffer areas during the dry season) because timber harvest activities need to start at the lowest elevational point (i.e., frequently found in Class I and II waterbodies). Thus, private landowners contacted for this analysis indicate they often choose to avoid installation of 300-foot no harvest buffers by delaying harvest activities until the dry season when no-harvest buffer areas are reduced to 30 feet. Delaying timber harvest activities until the dry season subjects landowners to additional restrictions intended to protect the marbled murrelet. Specifically, harvest activities are prohibited around murrelet nesting sites at this time of year. Thus, the delays effectively result in foregone timber harvest volumes.	Private timberland owners estimate that over all the timber harvest areas in Santa Cruz, San Mateo, and Santa Clara counties, approximately 1,500 MBF of timber is not able to be harvested annually resulting in roughly $1.03 million in lost timber production profits over the three counties. After accounting for the percentage of harvest areas in the three counties expected to occur in proposed critical habitat (approximately 31 percent), private timberland owners are expected to lose approximately $315,000 in profits due to delaying timber harvests in proposed critical habitat.
Modification to Timber Harvests	In addition to reductions in harvest volumes caused by delaying harvest operations until the dry season, timberland owners in Central Coast region also incur reduced harvest volumes due to installation of 30-foot no harvest buffer areas around Class I, II, and III waterbodies during the dry season. The amount timber harvests are reduced due to installing buffer areas for the frog depends on the proposed timber harvest.	Reductions in timber harvest volume are expected to range from zero to 150 MBF, which results in timber production profit losses of zero to $103,000 per harvest.

Note(s):

(1) Timber harvest delays are not incurred in the Sierra Nevada region because timber operations in the Sierra Nevada region do not face additional restrictions during the dry season due to the marbled murrelet. Additionally, a lesser percentage of timber harvests in the Sierra Nevada region are affected by the frog. Thus, timberland owners are able to schedule harvests so that those unaffected by the frog are completed during the wet season, while those affected by the frog are completed during the dry season (personal communication with Stevan Andrews of Applied Forest Management LLC on April 23, 2009).

(2) No impacts are expected for timber harvests occurring under the "Outside of Frog Range" regulatory scenario. All other timber harvests in the Central Coast region fall under the "Frogs Present" regulatory scenario and, thus, are subject to all the impacts detailed above.

Source(s): Written and personal communication with Matt Dias of the Big Creek Lumber Company on May 5, 2009 and May 18, 2009 and personal communication with Chris Browder, California Department of Forestry and Fire Protection, May 18, 2009.

199. Other potential impacts to timber harvest activities from frog conservation measures includes the application of no herbicide use buffers of 300 feet around suitable frog habitat and employing a qualified biologist to monitor timber harvest operations that take place near suitable frog habitat. To date, timberland owners in both regions have not experienced impacts associated with restrictions on herbicide application. In addition, timberland owners were unable to predict how often biologists would be needed to monitor timber operations in the future because biologists were employed only sporadically in the past. Thus, this analysis does not attempt to quantify impacts associated with herbicide-use restrictions and the use of on-site biologists during timber harvest operations.

Step 5: Estimate Regional Economic Impacts

200. Regional economic modeling accounts for the interconnectedness of industries within a geographic area. That is, industries not only supply goods and services to consumers but also to each other. Thus decreased spending in one economic sector has a larger impact on the regional economy as a whole. This concept is commonly referred to as the "multiplier effect."

201. In addition to the on-the-ground impacts associated with reduced timber production in the Central Coast region caused by delaying timber harvests to the dry season and modifying timber harvests to conserve the frog, this analysis estimates the regional economic impacts associated with reduced timber production. Specifically, this analysis employs IMPLAN, a commonly used regional economic modeling tool, to quantify the regional impacts associated with reduced timber production in the Central Coast region. A regional economic impact analysis was not conducted for the Sierra Nevada region because estimates of reduced timber production due to frog conservation were not available for the region. That is, impacts to private landowners in the Sierra Nevada region are estimated from reduced timber harvest values, but impacts to wood product producers (i.e., sawmills) are unknown.

202. For purposes of this regional economic analysis, the Central Coast region includes Santa Cruz, San Mateo, and Santa Clara counties, which overlap units SCZ-1 and SNM-2, where post-designation baseline impacts associated with reduced timber production are expected to occur. The model draws upon data from several Federal and State agencies, including the Bureau of Economic Analysis and the Bureau of Labor Statistics. IMPLAN translates the lost expenditures (i.e., the decreased spending on timber harvest activities, such as, felling, yarding, trucking, and processing) into changes in demand for inputs to the forest products industry. These effects can be described as direct, indirect, or induced, depending on the nature of the change:

- *Direct effects* represent changes in output attributable to a change in demand or a supply shock. These are specified initially by the modeler (e.g., the change in ranching expenditures on goods and services, by sector);
- *Indirect effects* are changes in output industries that supply goods and services to those that are directly affected by the initial change in expenditures;

- *Induced effects* reflect changes in household consumption, arising from changes in employment (which in turn are the result of direct and indirect effects). For example, changes in employment in a region may affect the consumption of certain goods and services.

203. There are two important caveats relevant to the interpretation of IMPLAN model estimates, generally, and within the context of this analysis. The first is that the model is static in nature and measures only those effects resulting from a specific policy change (or the functional equivalent specified by the modeler) at a single point in time. Thus, IMPLAN does not account for posterior adjustments that may occur, such as the subsequent re-employment of workers displaced by the original policy change. A second caveat to the IMPLAN analysis is related to the model data. The IMPLAN analysis relies upon input/output relationships derived from 2004 data. Thus, this analysis assumes that this historical characterization of the affected counties' economies is a reasonable approximation of current and future conditions. If significant changes have occurred since 2004 in the structure of the economies of the counties in the study area, the results may be sensitive to this assumption.

204. The results of the regional economic impact analyses are presented in section 8.4. The regional economic impact estimates represent separate, distinct measures of economic impact. Thus, the regional impacts are not summed with the efficiency effects quantified in this analysis.

8.4 IMPACTS

205. This section presents pre-designation, post-designation baseline, and post-designation incremental welfare impacts resulting from modified timber harvest activities by unit for the eight critical habitat units where timber harvest activities are identified as a threat to the frog and its habitat. Additionally, this section presents regional economic impacts to the Central Coast region associated with post-designation baseline impacts to timber harvest activities caused by frog conservation in the region.

Pre-Designation Welfare Impacts

206. Pre-designation impacts to timber harvest activities have been incurred by private timberland owners, CAL FIRE, and the USFS. The pre-designation period for this analysis extends from the listing of the species in 1996 to 2008. To estimate pre-designation impacts for private timberland owners, this analysis applies the range of costs listed in Exhibits 8-9 and 8-10.

207. Pre-designation impacts to CAL FIRE stem from the review of THPs for timber harvests on private timberlands within the study area (approximately $6,590 since 1996, undiscounted) and from implementing measures to avoid take of the frog on State lands (approximately $49,400 since 1996, undiscounted).[158,159]

[158] Written communication with Chris Browder, California Department of Forestry and Fire Protection, January 9, 2009.

208. Impacts on the USFS are due to the administrative costs of section 7 consultation (approximately $36,900 since 1996, undiscounted). Exhibit 8-11 presents pre-designation impacts by unit.

EXHIBIT 8-11 PRE-DESIGNATION IMPACTS ON TIMBER HARVEST ACTIVITIES BY UNIT (1996-2008, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE IMPACTS	
	LOW	HIGH
SIERRA NEVADA REGION		
BUT-1	$29,400	$129,000
ELD-1	$218,000	$1,760,000
NEV-1	$215,000	$1,660,000
PLA-1	$54,700	$398,000
YUB-1	$184,000	$1,450,000
Subtotal	*$702,000*	*$5,390,000*
CENTRAL COAST REGION		
MEN-1	$52,200	$2,340,000
SNM-2	$268,000	$2,910,000
SCZ-1	$267,000	$2,630,000
Subtotal	*$587,000*	*$7,880,000*
Total	**$1,290,000**	**$13,300,000**

Post-Designation Baseline Welfare Impacts

209. The post-designation period for this analysis is 2009 to 2030. Post-designation baseline impacts are forecast to be incurred by private timberland owners, CAL FIRE, and the USFS. Impacts to private timberland owners are due to the impacts to timber harvest activities presented in Exhibits 8-9 and 8-10. Impacts to CAL FIRE are due to future reviews of THPs for timber harvests on private timberlands (approximately $4,090 annually, undiscounted) and the future implementation of measures to avoid take of the frog on State lands (approximately $3,800 annually, undiscounted). Impacts to the USFS are due to future administrative costs of consultation for the frog (approximately $2,840 annually, undiscounted). Exhibit 8-12 presents post-designation baseline impacts by unit.[160]

[159] Estimates of impacts related the avoidance of take of the frog on State lands were provided for State lands across both the current and historic frog ranges. Such estimates could not be reduced to impacts incurred within the study area only. Thus, this analysis conservatively assumes that all take avoidance measures implemented on State lands occurred or will occur within the study area.

[160] The entire MEN-1 unit is located outside of both the current and historic frog ranges. Given its location, all timber harvest activities in MEN-1 fall under the "Outside Frog Range" scenario and are unaffected by frog conservation (Exhibits 8-5 and 8-6). Thus, there are no post-designation impacts estimated to timber harvest activities in MEN-1.

EXHIBIT 8-12 POST-DESIGNATION BASELINE IMPACTS ON TIMBER HARVEST ACTIVITIES BY UNIT (2009-2028, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE IMPACTS		ANNUALIZED IMPACTS	
	LOW	HIGH	LOW	HIGH
SIERRA NEVADA REGION				
BUT-1	$18,200	$83,100	$1,650	$7,510
ELD-1	$31,700	$229,000	$2,860	$20,700
NEV-1	$76,600	$394,000	$6,920	$35,600
PLA-1	$4,400	$4,400	$398	$398
YUB-1	$89,500	$690,000	$8,090	$62,400
Subtotal	*$220,000*	*$1,400,000*	*$19,900*	*$127,000*
CENTRAL COAST REGION				
MEN-1	$0	$0	$0	$0
SNM-2	$2,210,000	$4,270,000	$200,000	$386,000
SCZ-1	$1,690,000	$3,280,000	$153,000	$297,000
Subtotal	*$3,910,000*	*$7,550,000*	*$353,000*	*$682,000*
Total	**$4,130,000**	**$8,950,000**	**$373,000**	**$809,000**

Post-Designation Incremental Welfare Impacts

210. All post-designation incremental impacts are forecast to be incurred by the USFS. The impacts stem from the administrative costs of addressing adverse modification of critical habitat during baseline section 7 consultation for the frog (i.e., consultations that occur because of the species' listing, not the designation of critical habitat). Exhibit 8-13 presents post-designation incremental impacts by unit.[161]

[161] No National Forests intersect the Central Coast region units, thus no post-designation incremental impacts are forecast in these units.

EXHIBIT 8-13 POST-DESIGNATION INCREMENTAL IMPACTS ON TIMBER HARVEST ACTIVITIES BY UNIT (2009-2028, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
SIERRA NEVADA REGION		
BUT-1	$2,800	$253
ELD-1	$1,500	$136
NEV-1	$3,280	$296
PLA-1	$1,470	$133
YUB-1	$2,160	$195
Subtotal	*$11,200*	*$1,010*
CENTRAL COAST REGION		
MEN-1	$0	$0
SNM-2	$0	$0
SCZ-1	$0	$0
Subtotal	*$0*	*$0*
Total	**$11,200**	**$1,010**

Regional Economic Impacts

211. In addition to the post-designation baseline impacts quantified above, this analysis provides information on the potential regional economic impacts associated with reduced timber production in the Central Coast region. Exhibit 8-14 describes the baseline income and employment effects of reduced timber production in the region. These employment effects are similar to those provided by private timberland owners in the Central Coast region who estimated that timber harvest delays would result in combined annual wage losses of $577,000 to timber fallers, loggers, truckers, and sawmill workers.[162] The regional economic impacts reported in Exhibit 8-14 are greater than the wage loss estimates provided by landowners because they consider the broader implications of reduced timber production beyond the forest products industry. These estimates represent snapshots of the regional impacts resulting from the protective measures for the frog. These impacts will occur once and persist for some period of time until the economy adjusts to the change.[163]

[162] Written and personal communication with Matt Dias of the Big Creek Lumber Company on May 5, 2009 and May 18, 2009.

[163] IMPLAN does not account for long-term adjustments made by the regional economy in response to the initial change in output by timber companies.

EXHIBIT 8-14 REGIONAL ECONOMIC IMPACTS OF REDUCED TIMBER PRODUCTION: CENTRAL COAST REGION (2009 DOLLARS)

IMPACT	SCENARIO	DIRECT	INDIRECT	INDUCED	TOTAL
Output	Low	$2,510,000	$736,000	$541,000	$3,780,000
	High	$3,280,000	$963,000	$707,000	$4,950,000
Employment	Low	15	4	4	23
	High	20	5	6	30
Labor Income	Low	$821,000	$231,000	$188,000	$1,240,000
	High	$1,070,000	$302,000	$246,000	$1,620,000

Note(s):
(1) Assumes annual direct impacts to the "cut stock, resawing lumber, and planning industry" (NAICC code 321912, IMPLAN code #118) of $2.5 to $3.2 million ($2009).
(2) The affected region is assumed to include Santa Cruz, San Mateo, and Santa Clara Counties, California.
(3) Labor Income includes proprietors' income and employee compensation.

212. A regional economic analysis was not conducted for the Sierra Nevada region because the impacts to timber harvest activities in the region (i.e., conducting surveys for the frog, incorporating frog-specific conservation measures into THPs, and modifying timber harvests to minimize impacts to the frog) are not expected to reduce overall timber production in the region. To the extent that overall timber production in the Sierra Nevada region is reduced due to frog conservation, regional economic impacts are expected to be similar in form to those estimated for the Central Coast region.

8.5 ASSUMPTIONS & CAVEATS

213. The major assumptions and caveats applied in the analysis of impacts to timber harvest activities are summarized in Exhibit 8-15.

EXHIBIT 8-15 SUMMARY OF ASSUMPTIONS AND CAVEATS USED IN TIMBER HARVEST ACTIVITIES ANALYSIS

ASSUMPTION/CAVEAT	POTENTIAL EFFECT ON RESULTS
Analysis only estimates impacts on timber harvest activities within the eight units where timber harvest activities are identified as a threat to the frog (i.e., BUT-1, ELD-1, NEV-1, PLA-1, YUB-1, MEN-1, SCZ-1, and SNM-2).	-
Based on discussions with CAL FIRE, this analysis assumes additional frog conservation measures for timber harvests will not be required due to critical habitat.	-
Analysis assumes that any timber harvest area located within proposed critical habitat for the frog will include suitable habitat for the frog.	+
Analysis assumes that the number of future timber harvests in the Sierra Nevada and Central Coast regions will be similar to the frequency of timber harvests from the time the frog was listed (1996) through the present.	+/-
Analysis reduces per harvest impacts by the percentage of a timber harvest occurring within proposed critical habitat to estimate impacts to private timberland owners.	-
Analysis assumes that all frog take avoidance measures implemented by CAL FIRE on State lands occurred or will occur within the study area.	+
+: This assumption may result in an overestimate of real costs. - : This assumption may result in an underestimate of real costs. +/-: This assumption has an unknown effect on estimates.	

CHAPTER 9 | TRANSPORTATION

214. This chapter describes how conservation efforts to protect the frog and its habitat may affect transportation activities in the study area. These activities represent a potential threat to the species and its habitat by reducing available aquatic habitat through siltation or direct removal of upland habitat. Transportation activities may also pose risks of habitat fragmentation because roads and thruways can produce a physical barrier between habitat areas.[164]

215. The California Department of Transportation (Caltrans) maintains and builds highways as well as railroads and mass transit lines for the State of California. Most road projects planned and carried out by Caltrans involve a Federal nexus through funding from the Federal Highway Administration (FHWA) or from permits required under Section 404 of the Clean Water Act (CWA).

216. Exhibit 9-1 provides total impacts to transportation activities as described in the remainder of the chapter. Conservation measures required for transportation-related activities to protect the frog are primarily designed to preserve water quality and minimize surface disturbance. For larger transportation projects, Caltrans may also purchase land from conservation banks to offset direct habitat loss. Additionally, where suitable frog habitat is present, Caltrans will survey and monitor for the frog. Aside from these offset purchases and monitoring/survey efforts, these conservation measures are expected to occur even in the absence of the frog and its habitat as a result of existing best management practices. Based on the level of existing measures to protect frog habitat, the incremental impacts of critical habitat designation are forecast to be relatively minor and administrative in nature.

217. The chapter begins by discussing past and likely future transportation-related impacts within the study area, Caltrans' frog site assessment procedures, and past frog conservation measures for transportation-related activities. This is followed by a presentation of pre- and post-designation impacts and a final section highlighting major assumptions and caveats of the analysis.

[164] 73 FR 53511.

EXHIBIT 9-1 SUMMARY OF IMPACTS TO TRANSPORTATION ACTIVITIES (2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

VALUES	LOW	HIGH
Pre-Designation Impacts (1996 – 2008)		
Present Value of Impacts	$2,550,000	$7,810,000
Post-Designation Baseline Impacts (2009 – 2030)		
Present Value of Impacts	$676,000	$2,220,000
Annualized Impact Value	$61,100	$201,000
Incremental Impacts (2009 – 2030)		
Present Value of Impacts	$27,200	$27,200
Annualized Impact Value	$2,460	$2,460

9.1 BACKGROUND

9.1.1 TRANSPORTATION ACTIVITIES IN THE STUDY AREA

218. According to the National Highway Planning Network, approximately 297 miles of the national highway system falls within the study area.[165] Portions of State Highway 1 in units SLO-1 and SLO-2 account for roughly one-third of this mileage.

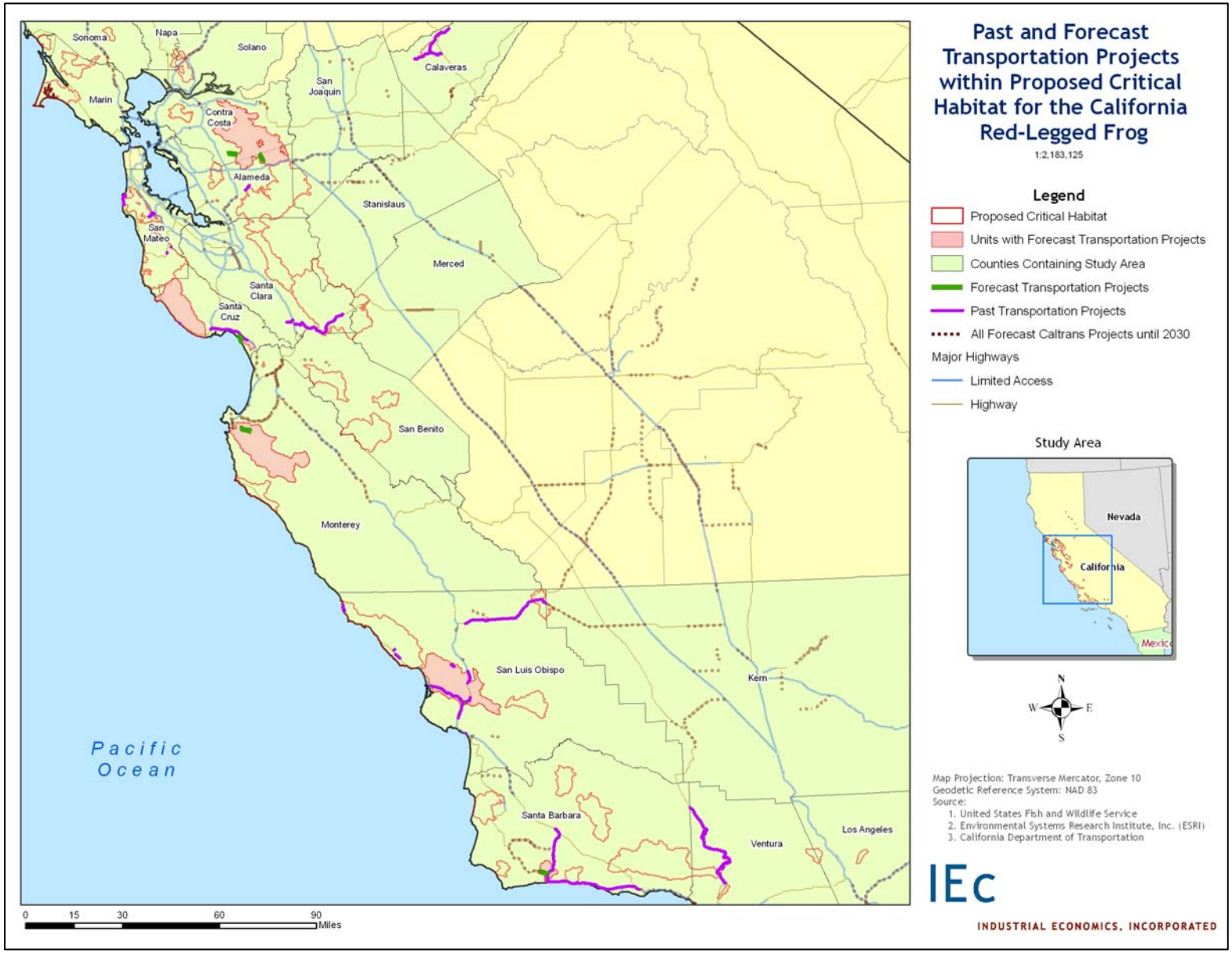
219. Caltrans maintains a database of current and predicted transportation projects called the California Transportation Investment System (CTIS). CTIS is a GIS-based application created by Caltrans that displays the current location of planned projects, as well as "programmed" (i.e., projects with secured funding) transportation projects until 2030. Exhibit 9-2 presents the major past and forecast transportation projects as determined by an overlay of CTIS projects and the study area.

220. Since 1998, Caltrans has undertaken 35 projects within the study area. Over the next 22 years, 9 projects are planned or programmed within the study area. Both past and forecast projects range in scope but primarily involve bridge replacements, construction of additional lanes, and other improvements to roadways and roadsides. Projects slated to be built beyond 2012 (the time horizon for the current State Transportation Improvement Program) will ultimately depend on funding availability.[166] Projects in CTIS represent Caltrans current priorities with respect to prevailing road conditions and funding forecasts.

[165] The Federal Highway Administration, National Highway Planning Network (computer file). 2005. District of Columbia. Accessed at: http://www.fhwa.dot.gov/planning/nhpn/ on January 2, 2009.

[166] The State Transportation Improvement Program (STIP) is a multi-year capital improvement program of transportation projects on and off the State Highway System, funded with revenues from the State Highway Account and other funding sources. STIP programming generally occurs every two years. For more information, see http://www.dot.ca.gov/hq/LocalPrograms/STIP.htm

EXHIBIT 9-2 PAST AND FORECAST TRANSPORTATION PROJECTS IN THE STUDY AREA



9.1.2 CALTRANS SITE ASSESSMENT PROCEDURES

221. Caltrans considers the presence of endangered species on all projects. If Caltrans biologists detect suitable habitat for the frog and the species is known to exist in the project area, they will survey for the species. If suitable habitat is present but the species' presence cannot be confirmed by known occurrences, Caltrans will follow the Service's guidance on site field surveys. Whether through an initial Caltrans survey or Service survey protocol, if frog presence is established or suitable habitat is identified, Caltrans will undertake protective measures for the species.[167]

9.1.3 FROG CONSERVATION MEASURES

222. Since the species listing in 1996, there have been 73 section 7 consultations associated with transportation-related activities. Conservation measures required for transportation-related activities are primarily designed to preserve water quality and minimize surface disturbance. Accordingly, the majority of conservation measures required to protect the frog or its habitat are expected to occur even in the absence of the frog and its habitat as part of existing regional Flood Control District permits or as Caltrans Best Management Practices (BMPs).[168] According to discussions with Caltrans staff, frog-specific conservation measures are limited to:

- Pre-construction survey, capture and removal of any frogs by qualified biologists;
- Construction confined to the dry season;[169]
- In areas temporarily disturbed, vegetation will be removed by hand, where feasible, instead of by heavy equipment;[170]
- No water will be used from streams or ponds that support the frog;
- Construction of temporary silt dams to minimize sedimentation; and
- Hydroseed project areas to stabilize soils prior to the onset of winter rains upon project completion.

223. In addition to the above construction-based conservation measures, Caltrans has purchased habitat, conservation easements, or established in-lieu fee mitigation programs to offset impacts from the agency's larger transportation projects. In 2007, Caltrans spent

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[167] Personal communication with Tom Edell, Associate Biologist at Caltrans (District 5) on December 10, 2008.

[168] Ibid.; Caltrans Storm Water Quality Handbooks: Project Planning and Design Guide. Construction Site Best Management Practices Manual. March 1, 2003. Accessed at http://www.dot.ca.gov/hq/construc/stormwater/CSBMPM_303_Final.pdf on December 29, 2008.

[169] Estimating impacts on past modifications such as confining construction to the dry season or removing vegetation by hand is difficult. Caltrans schedules a majority of their large projects in the dry season and impacts associated with seasonal restrictions can typically be mitigated with advanced planning, resulting in negligible impacts. Also, quantifying the additional burden of removing vegetation by hand or minimizing ground disturbance varies by project and does not represent a significant additional cost.

[170] Supra note 222.

a total of $1.49 million on conservation bank acquisitions. Caltrans staff estimates roughly one-third of this cost was directly related to frog-specific acquisitions, while other transactions included the frog among other species. [171]

224. Caltrans provided cost data for frog conservation measures from 10 projects in 2007. Exhibit 9-3 summarizes these estimated frog conservation costs associated with transportation-related activities.

EXHIBIT 9-3 EXAMPLE FROG CONSERVATION COSTS FOR TRANSPORTATION ACTIVITIES (2007)

ESTIMATED BANK CREDITS, IN-LIEU, CONSERVATION EASEMENTS, AND COOP AGREEMENTS FOR THE FROG		AVOIDANCE & MINIMIZATION		CREATION & RESTORATION		MONITORING		TOTAL PROJECT COST	
LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
$53,000	$159,000	$0	$9,750	$25,000	$80,000	$5,000	$50,000	**$83,000**	**$299,000**

Note: Cost data taken from Caltrans Endangered Species Act Annual Impact and Mitigation Report. The listed figures represent ranges in per-project costs, where such ranges existed. The data are only representative of the sample of 2007 projects.

9.2 PRE-DESIGNATION BASELINE IMPACTS

225. The pre-designation period for this analysis extends from the listing of the species in 1996 to 2008. Exhibit 9-4 presents total undiscounted and present value costs of pre-designation frog management activities on transportation-related activities. All 24 past projects required a Biological Opinion and fell within the study area between 2003 and 2008. To estimate pre-designation impacts, this analysis applies the range of costs listed in Exhibit 9-3 to the year in which the project occurred (as well as administrative costs of formal consultations highlighted in Exhibit 2-2).

[171] California Department of Transportation. Endangered Species Act Annual Impact and Mitigation Report Submittal. Forwarded by Amy Pettler, Senior Endangered Species Coordinator and Wildlife Biologist, Division of Environmental Analysis on January 5, 2009. Only about one-third of the conservation bank acquisitions were attributable solely to the frog. Most purchases included mitigation lands for multiple species, which included the frog.

EXHIBIT 9-4 TRANSPORTATION PRE-DESIGNATION ECONOMIC IMPACTS (1996- 2008, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	TOTAL NUMBER OF PROJECTS	YEARS	PRESENT VALUE COST	
			LOW	HIGH
MNT-2	1	2005	$109,000	$392,000
MNT-3	1	2006	$102,000	$366,000
SCZ-1	1	2008	$88,800	$320,000
SCZ-2	1	2003	$125,000	$449,000
SLO-1	2	2005	$218,000	$784,000
SLO-2	7	2004, 2006, 2007	$721,000	$1,570,000
SLO-3	2	2005, 2006	$210,000	$758,000
SNB-1	2	2003, 2006	$226,000	$815,000
SNB-3	1	2004	$116,000	$419,000
STB-4	1	2004	$116,000	$419,000
STB-5	3	2005, 2007	$313,000	$784,000
VEN-1	2	2004, 2008	$205,000	$739,000
Total	**24**		**$2,550,000**	**$7,810,000**

9.3 POST-DESIGNATION IMPACTS

226. The post-designation period for this analysis is 2009 to 2030. Based on Caltrans data, nine transportation projects are expected to occur during this period. Of these, three projects are expected to begin in 2009, three in 2010, one in 2011, and two in 2030. As previously discussed, based on discussions with Caltrans staff, conservation measures are implemented for all projects where frog presence is established or suitable habitat is identified. Because this analysis assumes the entire study area contains suitable habitat, frog-specific conservation measures required for transportation activities are expected to occur even in the absence of the frog. Therefore, this analysis assumes that the only incremental impacts are administrative in nature. Post-designation impacts are categorized as either occurring in the baseline or as incremental to the proposed critical habitat designation. Exhibit 9-5 summarizes the post-designation baseline impacts and Exhibit 9-6 presents post-designation incremental impacts.

EXHIBIT 9-5 TRANSPORTATION POST-DESIGNATION BASELINE ECONOMIC IMPACTS (2009 – 2030, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	UNDISCOUNTED COST		PRESENT VALUE COST		ANNUALIZED COST	
	LOW	HIGH	LOW	HIGH	LOW	HIGH
CCS-2	$189,000	$621,000	$183,000	$600,000	$16,500	$54,300
MNT-2	$283,000	$931,000	$271,000	$890,000	$24,500	$80,500
SCZ-1	$94,400	$310,000	$22,800	$74,900	$2,060	$6,780
SCZ-2	$94,400	$310,000	$22,800	$74,900	$2,060	$6,780
SLO-3	$94,400	$310,000	$94,400	$310,000	$8,530	$28,100
STB-5	$94,400	$310,000	$82,500	$271,000	$7,450	$24,500
Total	**$850,000**	**$2,790,000**	**$676,000**	**$2,220,000**	**$61,100**	**$201,000**
Note: Totals may not sum due to rounding.						

EXHIBIT 9-6 TRANSPORTATION POST-DESIGNATION INCREMENTAL ECONOMIC IMPACTS (2009 – 2030, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
CCS-2	$7,600	$7,350	$665
MNT-2	$11,400	$10,900	$986
SCZ-1	$3,800	$918	$83
SCZ-2	$3,800	$918	$83
SLO-3	$3,800	$3,800	$344
STB-5	$3,800	$3,320	$300
Total	**$34,200**	**$27,200**	**$2,460**
Note: Totals may not sum due to rounding.			

9.4 SOURCES OF UNCERTAINTY

227. It is important to recognize the uncertainty inherent in the assumptions underlying this analysis. Exhibit 9-7 summarizes these uncertainties and their potential effect on estimated economic impacts.

EXHIBIT 9-7 SUMMARY OF SOURCES OF UNCERTAINTY TO TRANSPORTATION ANALYSIS

ASSUMPTION	POTENTIAL EFFECT ON RESULTS
Cost data taken from Caltrans Endangered Species Act Annual Impact and Mitigation Report Submittal. The costs listed represent the ranges in cost information, where such ranges existed. The data is only representative of 10 2007 projects.	+/-
The CTIS database includes all planned and programmed transportation projects until 2030. The location of projects beyond those that have already secured funding are subject to change based on funding priorities and road conditions.	+/-
Impacts from conservation measures are incurred throughout the lifetime of the project. Larger transportation projects take many years to complete. For the two projects anticipated to begin in 2030, this analysis applies the full costs of implementing protective measures for the frog in that year.	+
Caltrans Districts interviewed for this analysis do not reference critical habitat boundaries when determining suitable habitat or species presence. This analysis assumes that all forecast projects will include a species survey and range of protective measures outlined in Exhibit 9-3.	+

+: This assumption may result in an overestimate of real costs.
- : This assumption may result in an underestimate of real costs.
+/-: This assumption has an unknown effect on estimates.

CHAPTER 10 | UTILITY AND OIL AND GAS PIPELINE CONSTRUCTION AND MAINTENANCE AND MINING ACTIVITIES

228. This chapter evaluates the effect of frog conservation efforts on utility and pipeline construction and maintenance activities in the study area. Similar to transportation activities, these activities represent a potential threat to the species or its habitat by causing siltation and reducing available aquatic habitat or direct removal of upland habitat.[172] Such activities also pose risks of habitat fragmentation.

229. Major utility and pipeline construction and maintenance projects involve a Federal nexus from permits required under Section 404 of the CWA, issued by the U.S. Army Corps of Engineers (USACE). According to the California Energy Commission (CEC), natural gas pipelines intersect 22 of the 50 critical habitat units and petroleum pipelines intersect seven critical habitat units.[173] In addition, three energy facilities fall within the study area.

230. Exhibit 10-1 summarizes the economic impacts to utility and oil and gas pipeline activities. Similar to transportation activities, conservation measures required to protect the frog and its habitat during construction and maintenance activities associated with utility and oil and gas pipelines are primarily designed to preserve water quality and minimize surface disturbance.

231. This chapter also discusses potential economic impacts to mining projects identified during the public comment period. Mining is not identified as a potential threat by the Service in the proposed rule as areas with current mining operations do not support the PCEs on which the species depends. However, during the public comment period, one mining company reported plans to expand their existing activities into proposed critical habitat acres in SOL-1. Future frog-related costs associated with this project expansion are anticipated, but information to quantify these costs is not available. A discussion of this mining project and potential conservation measures to protect the frog from the proposed project is included in Section 10.2.[174]

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[172] 73 FR 53511.

[173] Maps of the overlay of natural gas and petroleum pipelines with proposed critical habitat were produced by the California Energy Commission. Polyline layers delineating the location of pipelines are generalized and accordingly, the overlay with proposed critical habitat is based on a visual approximation.

[174] Section 10.2 also discusses a second mine, operated by the same company, in SOL-3. This mine is currently in the process of being reclaimed, and measures are in place to protect the frog during reclamation.

EXHIBIT 10-1 SUMMARY OF IMPACTS TO UTILITY AND PIPELINE ACTIVITIES (2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

VALUES	LOW	HIGH
Pre-Designation Impacts (1996 – 2008)		
Present Value of Impacts	$234,000	$1,090,000
Post-Designation Baseline Impacts (2009 – 2030)		
Present Value of Impacts	$668,000	$2,440,000
Annualized Impact Value	$60,400	$221,000
Incremental Impacts (2009 – 2030)		
Present Value of Impacts	$61,300	$61,300
Annualized Impact Value	$5,540	$5,540

10.1 IMPACTS TO UTILITY AND OIL AND GAS PIPELINE ACTIVITIES

232. To provide context for the analysis, the following sections presents the extent of utility and oil and gas pipelines within the study area. The second section describes the data and methods from which the impact estimates are derived. The third section summarizes the projected economic impacts to utility and oil and gas pipeline activities and highlights major assumptions and caveats that may affect the results of the analysis.

10.1.1 UTILITY AND OIL AND GAS PIPELINES IN CALIFORNIA

233. The extent to which pipelines overlap the study area is difficult to determine because information about the location of existing pipelines is limited due to national security concerns. Exhibits 10-2 and 10-3 provide select extents from maps provided by the CEC for this analysis. Each map provides a general delineation of the location of natural gas and petroleum pipelines within California, and their spatial relation to the study area.

234. As shown in Exhibit 10-4, currently three power plants are located within the study area:

1) **Stenner Canyon Hydroelectric Plant**. The Stenner Canyon facility is currently inactive and the City of San Luis Obispo has no plans to reactivate the plant in the foreseeable future.[175]

2) **City of Santa Cruz Resource Recovery Facility.** This facility is a landfill gas collection system and electric generation facility. The County of Santa Cruz has no plans to expand or renovate the landfill gas collection system facility over the next 22 years.[176]

3) **Waste Management – Linde Group Altamont Landfill Gas Plant.** Waste Management and Linde North America are planning the largest landfill gas plant in the world at the current Altamont Landfill near Livermore, California. The

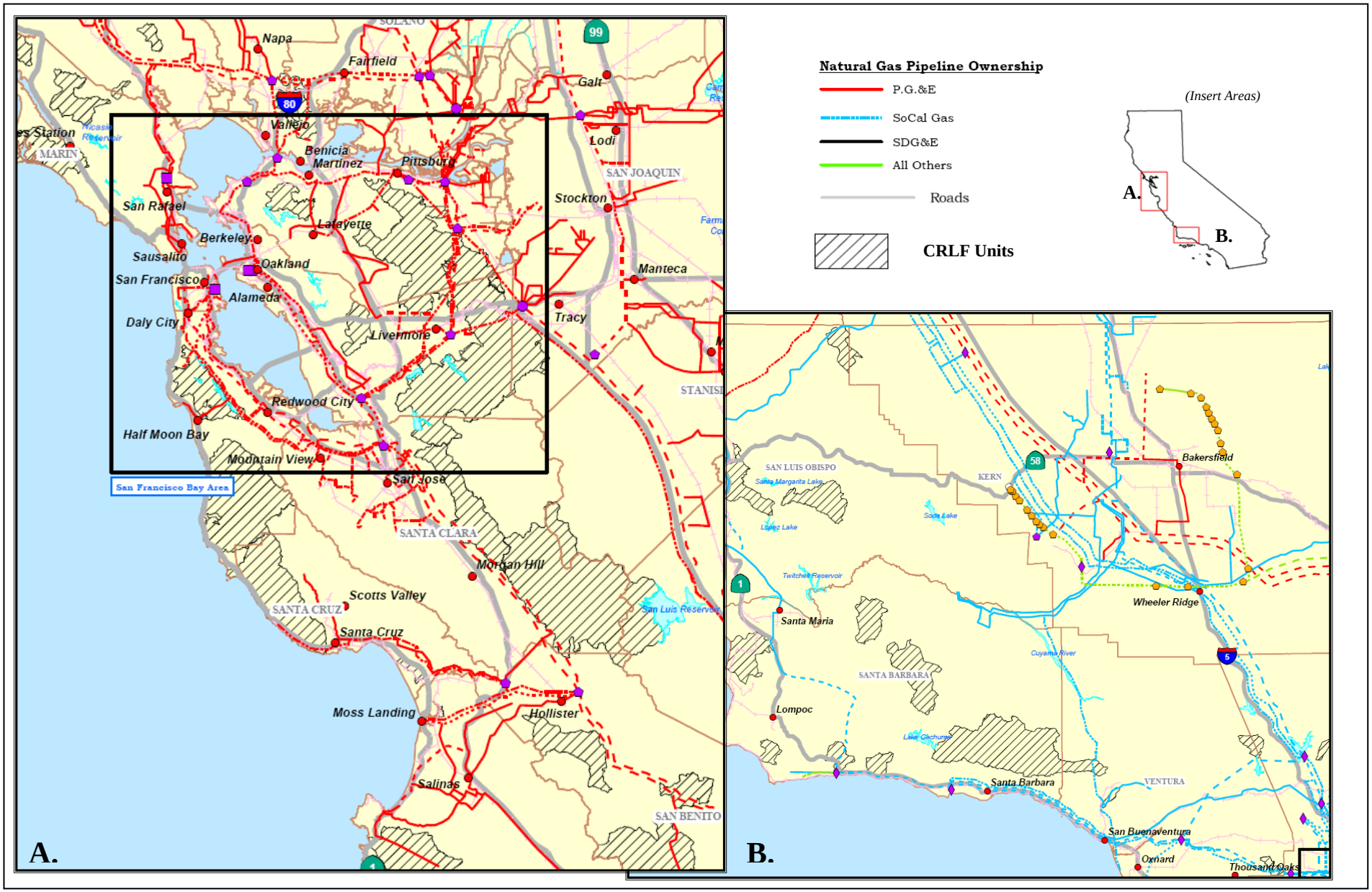
[175] Personal communication with Gary Henderson, Manager of Water Division in the Department of Public Utilities for the City of San Luis Obispo on January 12, 2009.

[176] Personal communication with Mary Arman, Public Works Operations Manager-Resource Recovery & Administrative Services, City of Santa Cruz on January 12, 2009.

$15.5 million facility is expected to produce up to 13,000 gallons a day of liquefied natural gas when operations begin in 2009.[177] As highlighted in Exhibit 10-4, the plant is located in Unit ALA-2.

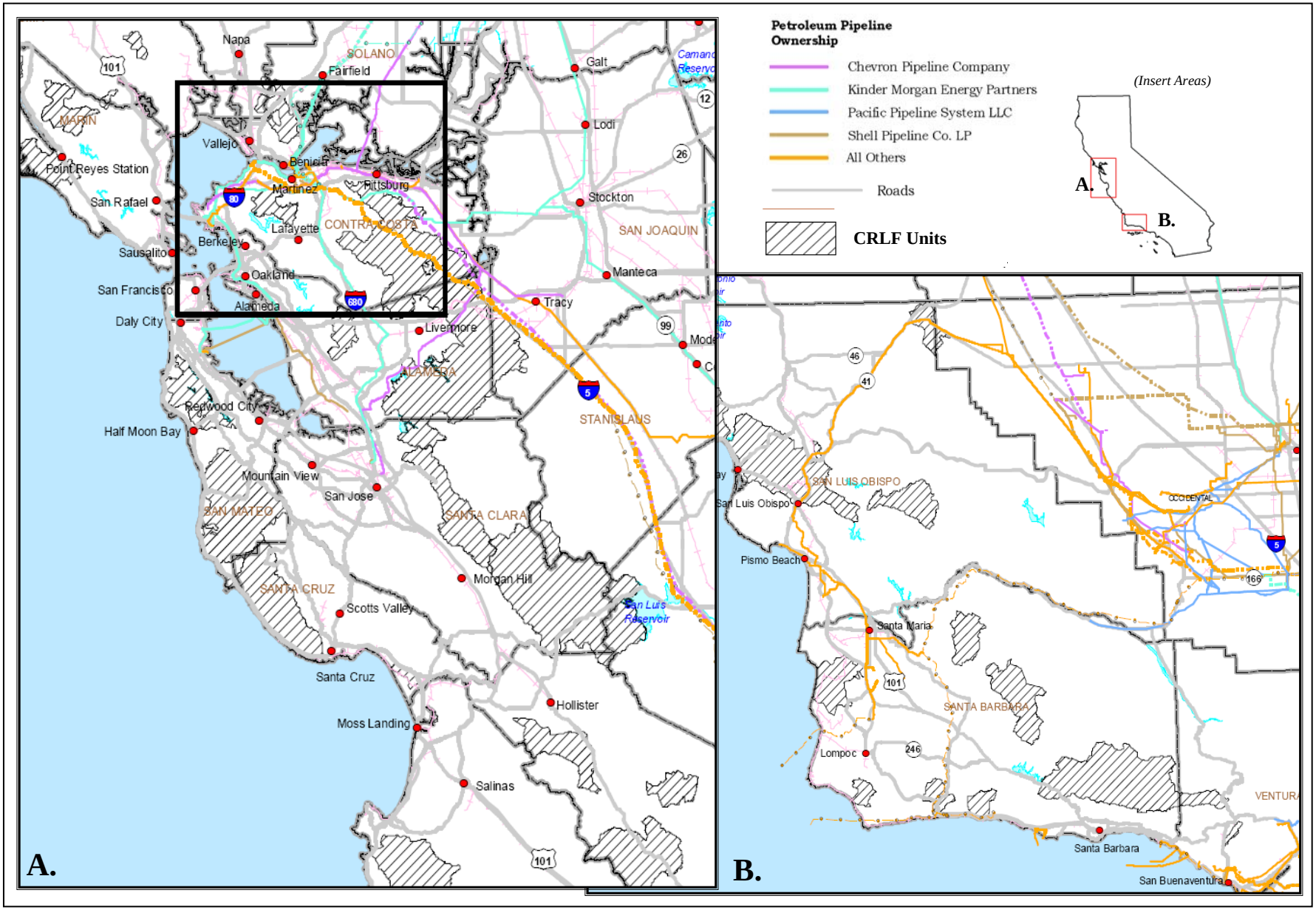
[177] Waste Management Press Release- April 29, 2008. Waste Management And Linde To Develop The World's Largest Landfill Gas To LNG Facility. Available at: http://www.wm.com/wm/environews.asp, accessed on January 13, 2009.

EXHIBIT 10-2 SELECT EXTENTS OF NATURAL GAS PIPELINE LOCATIONS IN THE STUDY AREA



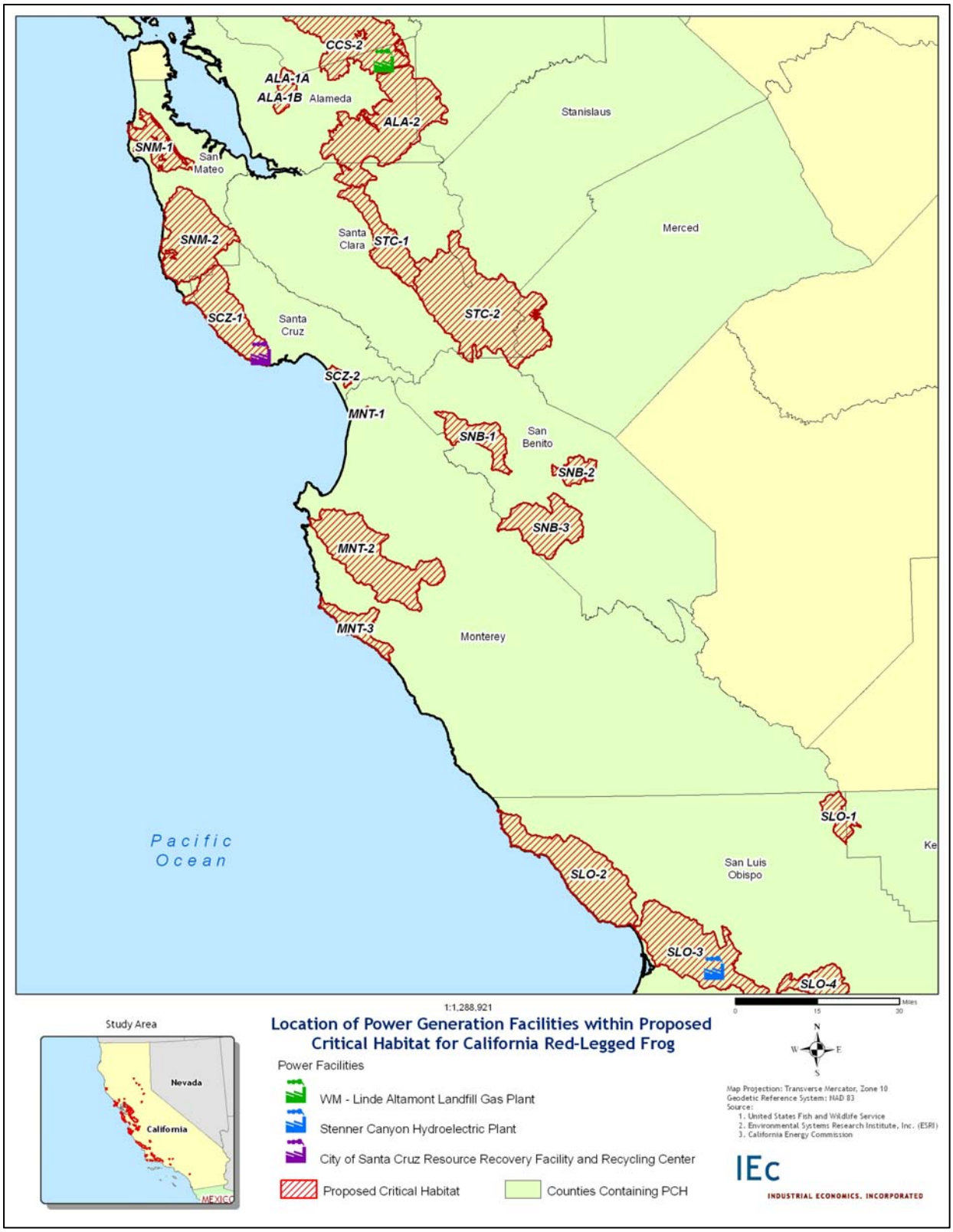
Source: California Energy Commission

EXHIBIT 10-3 SELECT EXTENTS OF PETROLEUM PIPELINE LOCATIONS IN THE STUDY AREA



Source: California Energy Commission

EXHIBIT 10-4 POWER PLANTS WITHIN THE STUDY AREA



10.1.2 PRE-DESIGNATION BASELINE IMPACTS

235. Since the species listing in 1996, there have been six section 7 consultations associated with construction and maintenance activities on utility and oil and gas pipelines. Similar to conservation measures required for water management and transportation-related activities, conservation measures required for these pipeline-related activities are primarily designed to preserve water quality and minimize surface disturbance. Based on a review of the consultation history, examples of frog-specific conservation measures include:

- Pre-construction frog surveys and removal of identified frogs;
- Biologist on-site during all activities;
- Worker education and training session;
- Revegetate and re-contour all disturbed areas with native vegetation;
- Construction work limited to the dry season (May 1 through Oct 31) and/or low stream flow periods (June 1 through Nov 1);
- Construction equipment, staging areas, fueling and maintenance vehicles will be located outside of riparian and wetland areas; and
- Establishment of buffer zones around off-site parking areas.

Cost data requested from oil and gas stakeholders have not been forthcoming. However, given the similarity in conservation measures required for pipeline projects and transportation projects, this analysis applies relevant cost information obtained from Caltrans for transportation projects (Exhibit 10-5) to estimate past projects impacts (Exhibit 10-6).

EXHIBIT 10-5 FROG CONSERVATION COSTS FOR PIPELINE AND UTILITY ACTIVITIES (2007)

AVOIDANCE & MINIMIZATION		HABITAT CREATION & RESTORATION		MONITORING		TOTAL PROJECT COST	
LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
$0	$9,750	$25,000	$80,000	$5,000	$50,000	**$30,000**	**$140,000**

Source: California Department of Transportation. 2007. Endangered Species Act Annual Impact and Mitigation Report Submittal. Division of Environmental Analysis.
Note: Totals may not sum due to rounding.

EXHIBIT 10-6 PRE-DESIGNATION IMPACTS (1996 - 2008, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	NUMBER OF PROJECTS	PROJECT YEARS	PRESENT VALUE COST	
			LOW	HIGH
STB-4	1	2007	$45,000	$210,000
STB-5	2	2004, 2005	$81,400	$379,000
SLO-3	1	2007	$39,300	$183,000
STB-7	1	2003	$34,300	$160,000
ALA-2	1	2005	$34,300	$160,000
Total	**6**		**$234,000**	**$1,090,000**
Note: Totals may not sum due to rounding.				

10.1.3 POST-DESIGNATION IMPACTS

236. As previously discussed, a detailed overlay of existing pipeline within the study area is unavailable due to national security concerns. This analysis uses customized maps produced by the CEC to estimate the location of natural gas and petroleum pipelines. Based on a visual inspection of pipelines in the study area, 22 natural gas and seven petroleum pipelines course though the study area. Based on a review of the consultation history, this analysis conservatively assumes that each pipeline will be subject to maintenance or repairs over the next 22 years. Additionally, of the three existing power plants in the study area, one facility is currently undertaking a major expansion.

237. Based on this information, this analysis estimates a total of 29 construction and maintenance projects to occur within the study area over the next 22 years. Absent specific information on when the project will occur, this analysis assumes there is an equal probability of a project happening between 2009 and 2030. Therefore, this analysis spreads the potential impacts incurred from a project equally across the time horizon for the analysis. Average project modification costs (as shown in Exhibit 10-5) are applied to the number of forecast projects. The total post-designation baseline and incremental costs are presented in Exhibits 10-7 and 10-8, respectively. This analysis assumes that incremental impacts are administrative in nature.

EXHIBIT 10-7 PIPELINE AND UTILITY POST-DESIGNATION BASELINE ECONOMIC IMPACTS (2009 – 2030, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	UNDISCOUNTED COST		PRESENT VALUE COST		ANNUALIZED COST	
	LOW	HIGH	LOW	HIGH	LOW	HIGH
ALA-2	$82,800	$302,000	$44,500	$163,000	$4,030	$14,700
CCS-1	$41,400	$151,000	$22,300	$81,300	$2,010	$7,350
CCS-2	$124,000	$453,000	$66,800	$244,000	$6,040	$22,100
MNT-2	$41,400	$151,000	$22,300	$81,300	$2,010	$7,350
SCZ-1	$41,400	$151,000	$22,300	$81,300	$2,010	$7,350
SLO-1	$82,800	$302,000	$44,500	$163,000	$4,030	$14,700
SLO-2	$41,400	$151,000	$22,300	$81,300	$2,010	$7,350
SLO-3	$82,800	$302,000	$44,500	$163,000	$4,030	$14,700
SNB-2	$41,400	$151,000	$22,300	$81,300	$2,010	$7,350
SNB-3	$41,400	$151,000	$22,300	$81,300	$2,010	$7,350
SNM-1	$41,400	$151,000	$22,300	$81,300	$2,010	$7,350
SOL-1	$41,400	$151,000	$22,300	$81,300	$2,010	$7,350
SOL-2	$41,400	$151,000	$22,300	$81,300	$2,010	$7,350
SOL-3	$41,400	$151,000	$22,300	$81,300	$2,010	$7,350
STB-2	$41,400	$151,000	$22,300	$81,300	$2,010	$7,350
STB-5	$82,800	$302,000	$44,500	$163,000	$4,030	$14,700
STB-6	$82,800	$302,000	$44,500	$163,000	$4,030	$14,700
STB-7	$41,400	$151,000	$22,300	$81,300	$2,010	$7,350
STC-1	$41,400	$151,000	$22,300	$81,300	$2,010	$7,350
STC-2	$41,400	$151,000	$22,300	$81,300	$2,010	$7,350
VEN-1	$41,400	$151,000	$22,300	$81,300	$2,010	$7,350
VEN-3	$82,800	$302,000	$44,500	$163,000	$4,030	$14,700
Total			**$668,000**	**$2,440,000**	**$60,400**	**$221,000**

Note: Totals may not sum due to rounding.

EXHIBIT 10-8 PIPELINE AND UTILITY POST-DESIGNATION INCREMENTAL ECONOMIC IMPACTS (2009 – 2030, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	UNDISCOUNTED COST		PRESENT VALUE COST		ANNUALIZED COST	
	LOW	HIGH	LOW	HIGH	LOW	HIGH
ALA-2	$7,600	$7,600	$4,090	$4,090	$370	$370
CCS-1	$3,800	$3,800	$2,040	$2,040	$185	$185
CCS-2	$11,400	$11,400	$6,130	$6,130	$554	$554
MNT-2	$3,800	$3,800	$2,040	$2,040	$185	$185
SCZ-1	$3,800	$3,800	$2,040	$2,040	$185	$185
SLO-1	$7,600	$7,600	$4,090	$4,090	$370	$370
SLO-2	$3,800	$3,800	$2,040	$2,040	$185	$185
SLO-3	$7,600	$7,600	$4,090	$4,090	$370	$370
SNB-2	$3,800	$3,800	$2,040	$2,040	$185	$185
SNB-3	$3,800	$3,800	$2,040	$2,040	$185	$185
SNM-1	$3,800	$3,800	$2,040	$2,040	$185	$185
SOL-1	$3,800	$3,800	$2,040	$2,040	$185	$185
SOL-2	$3,800	$3,800	$2,040	$2,040	$185	$185
SOL-3	$3,800	$3,800	$2,040	$2,040	$185	$185
STB-2	$3,800	$3,800	$2,040	$2,040	$185	$185
STB-5	$7,600	$7,600	$4,090	$4,090	$370	$370
STB-6	$7,600	$7,600	$4,090	$4,090	$370	$370
STB-7	$3,800	$3,800	$2,040	$2,040	$185	$185
STC-1	$3,800	$3,800	$2,040	$2,040	$185	$185
STC-2	$3,800	$3,800	$2,040	$2,040	$185	$185
VEN-1	$3,800	$3,800	$2,040	$2,040	$185	$185
VEN-3	$7,600	$7,600	$4,090	$4,090	$370	$370
Total			**$61,300**	**$61,300**	**$5,540**	**$5,540**

Note: Totals may not sum due to rounding.

10.1.4 SOURCES OF UNCERTAINTY

238. The sources of uncertainty in the estimates provided in this section primarily concern currently available data and the difficulty of forecasting future projects in the study area. In several cases, data have been requested from stakeholders but has not been forthcoming. To the extent that future projects were not identified, total impact estimates may increase as information becomes available.

EXHIBIT 10-9 SUMMARY OF CAVEATS TO UTILITY AND OIL AND GAS PIPELINE ANALYSIS

ASSUMPTION	POTENTIAL EFFECT ON RESULTS
Due to national security concerns, the exact locations of natural gas and petroleum pipelines are unknown. Based on a visual approximation of custom maps produced by the California Energy Commission, this analysis identified 22 natural gas and 9 petroleum pipelines located in the study area. This analysis conservatively assumes that each pipeline will be subject to repair or maintenance over the next 22 years.	+
Incremental impacts may be incurred in areas where new power plants are constructed within the study area. However projecting these impacts given the uncertainty of future energy activities in California is beyond the scope of this analysis.	-
+: This assumption may result in an overestimate of real costs. - : This assumption may result in an underestimate of real costs. +/-: This assumption has an unknown effect on estimates.	

10.2 IMPACTS TO MINING ACTIVITIES

239. The proposed rule did not include mining activities as a threat to proposed critical habitat because areas with existing mining operations do not support the PCEs on which the species depends. However, during the public comment period, one mining company reported plans to expand its existing mining operations into the study area. According to the public comment, the mining company has applied to the County of Solano to expand the quarry area of its mining activities by approximately 53 acres, of which 35 acres fall within proposed critical habitat in SOL-1.[178]

240. While the expansion project has not yet entered into a formal consultation with the Service, according to discussions with the mining company, its representatives initiated informal discussions with the Service in 2007 as a result of positive frog surveys in the expansion project footprint. According to the mining company, two mitigation projects are currently under consideration, including a conservation easement on property owned by the mining company in the same watershed as the quarry expansion area and restoration of a former quarry site to native habitat. However, the company is unable to provide a cost estimate for these potential mitigation projects at this time, as the extent of required mitigation has not yet been discussed with the Service. These details are expected to be finalized once the company enters a formal consultation with the Service.[179] Accordingly, the economic impacts associated with this proposed expansion of mining activities are not quantified in this analysis.

241. The same company identified a second quarry that overlaps the southern portion of proposed critical habitat in SOL-3. The company is in the process of reclaiming the

[178] Syar Industries, Inc. Public Comment Submitted on Revised Critical Habitat for the California Red-Legged Frog. FWS-R8-ES-2008-0089-0114. November 3, 2009.

[179] Personal communication with John F. Perry, VP Engineering, Syar Industries, Inc. November 20, 2009.

quarry pursuant to the California Surface Mining and Reclamation Act to the alternative use of grazing land. As part of its application to Napa County for its revised reclamation plan, the company performed a biological assessment, which did not identify the frog at the site and determined that the area provides low-quality dispersal habitat.[180] The company is working with the county and the Service to develop mitigation measures to minimize the impact of its reclamation operations on the frog, including perimeter fencing to prevent frog migration into the area, surveys, timing the work to avoid frog dispersal times, and training employees on avoidance measures. The company expresses concern that the designation of critical habitat may delay the reclamation of the site.

242. Although the frog has not been positively identified at the site, the comment letter provides evidence that minimization efforts are underway in the absence of critical habitat. Associated costs are therefore attributable to the baseline scenario. Information to quantify these costs is not readily available at this time. The site does not currently include the primary constituent elements (PCEs) for the frog, therefore it is unlikely to meet the definition of critical habitat. Given this fact and that conversations with Napa County and the Service are already underway, additional delays resulting from the designation are not anticipated.

[180] Syar Industries, Inc. Public Comment Submitted on Revised Critical Habitat for the California Red-Legged Frog. FWS-R8-ES-2008-0089-0121. November 3, 2009.

CHAPTER 11 | FIRE MANAGEMENT ACTIVITIES

243. This section describes potential impacts on forest fuels reduction and wildland fire suppression activities (collectively referred to as "fire management" activities) due to conservation measures for the frog. The proposed rule identifies the dewatering of aquatic habitat used by the frog due to water drafting as the most significant threat to the frog and its habitat associated with fire management activities.[181]

244. The proposed rule identifies fire management activities as a threat to the frog in five proposed critical habitat units: BUT-1, YUB-1, NEV-1, PLA-1, and ELD-1.[182] In general, the primary agencies engaging in fire management activities in California are the USFS, the BLM, and CAL FIRE. To a lesser extent, private timberland owners also engage in fire management activities with funding from CAL FIRE.[183] Although, the USFS, BLM, and CAL FIRE all implement conservation measures for the frog as part of fire management activities, these measures are part of broader aquatic and riparian habitat management guidelines. That is, the same conservation measures would be implemented in the absence of the frog and its habitat. Thus, the impacts on fire management activities associated with frog conservation are limited to the administrative cost of section 7 consultation summarized in Exhibit 11-1. Costs associated with frog survey and monitoring are estimated in Chapter 12.

245. The remainder of this chapter describes the extent of fire management activities in the study area and discusses existing aquatic and riparian guidelines followed during fire management activities by the primary agencies responsible for fire management activities in the study area.

[181] 73 FR 53492

[182] 73 FR 53492

[183] California Department of Forestry and Fire Protection. 2006. Procedural Guide for Community Assistance Grant Fuel Reduction Projects Funded by Proposition 40, Sierra Nevada Forest Land and Fuels Management. State of California – The Resources Agency, California Department of Forestry and Fire Protection.

EXHIBIT 11-1 SUMMARY OF IMPACTS TO FIRE MANAGEMENT ACTIVITIES (2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	UNDISCOUNTED COSTS	PRESENT VALUE COSTS
Pre-Designation Impacts (1996 - 2008)		
BUT-1	$14,100	$23,300
LOS-1	$10,800	$16,200
NEV-1	$841	$1,390
VEN-2	$1,530	$2,300
Total	**$27,200**	**$43,100**
Post-Designation Baseline Impacts (2009 - 2030)		
BUT-1	$23,800	$12,800
LOS-1	$18,200	$9,800
NEV-1	$1,420	$766
VEN-2	$2,600	$1,400
Total	**$46,000**	**$24,800**
Post-Designation Incremental Impacts (2009 - 2030)		
LOS-1	$6,070	$3,270
NEV-1	$49,800	$26,800
PLA-1	$22,300	$12,000
VEN-2	$866	$466
Total	**$79,100**	**$42,600**
Note: Totals may not sum due to rounding.		

11.1 FIRE MANAGEMENT ACTIVITIES IN THE STUDY AREA

246. Fire management activities within the study area include two types of activities: fuel treatment activities and fire suppression activities. Exhibit 11-2 provides estimates of the areas within affected critical habitat units where the potential for fire management activities are expected to be highest. The following sections describe each type of fire management activity in more detail.

- **Fuel Treatment Activities** include mechanical thinning, mastication, construction of fuel breaks, and controlled understory burns. Fuel treatment activities are expected to occur most frequently within areas where the risk of wildfires is great due to the build-up of forest fuels. Exhibit 11-3 presents areas within each of the five units where the forest fuel loading potential is high or very high.
- **Fire Suppression Activities** focus on minimizing the spread of existing wildland fires and include measures, such as, fireline construction and the aerial application

of water.[184] Fire suppression activities are expected to occur most frequently in areas where the risk of wildfire and potential damages caused by wildfire are high. Wildland-Urban Interface (WUI) areas define areas where man-made structures meet or intermingle with wildland vegetation.[185] The potential for damage to humans (i.e., loss of lives or property) caused by wildland fires is greatest within WUI areas. Exhibit 11-4 presents WUI areas within the five units where the risk of wildfire is high, very high, or extremely high.

EXHIBIT 11-2 AREAS WHERE FUEL REDUCTION AND FIRE SUPPRESSION ACTIVITIES ARE LIKELY TO OCCUR BY AFFECTED UNIT

UNIT	TOTAL ACRES	EXTENT OF AREAS WHERE FUEL REDUCTION ACTIVITIES ARE LIKELY TO OCCUR (ACRES)	EXTENT OF AREAS WHERE FIRE SUPPRESSION ACTIVITIES ARE LIKELY TO OCCUR (ACRES)
BUT-1	5,290	4,960	0
ELD-1	5,530	4,710	5,130
NEV-1	8,290	7,780	7,720
PLA-1	1,240	968	949
YUB-1	6,320	6,080	5,040

Sources:
(1) California Department of Forestry and Fire Protection. 2005. Fuel Rank. Accessed January 12, 2009. http://frap.cdf.ca.gov/data/frapgismaps/select.asp?theme=5 .
(2) California Department of Forestry and Fire Protection. 2003. Wildland Urban Interface (WUI) Fire Threat. Accessed on January 12, 2009. http://frap.cdf.ca.gov/data/frapgismaps/select.asp?theme=5

[184] Personal communication with Dawn Lipton, Wildlife Biologist, Eldorado National Forest, on January 6, 2009; Tina Mark, Wildlife Biologist, Tahoe National Forest, on January 7, 2009; and, Amy Fesnock, Threatened and Endangered Species Specialist, California Bureau of Land Management, on January 5, 2009.

[185] University of Wisconsin - SILVIS Lab. The Wildland Urban Interface. Accessed January 10, 2009. http://silvis.forest.wisc.edu/projects/WUI_Main.asp

EXHIBIT 11-3 AREAS OF HIGH OR VERY HIGH FUEL LOADING POTENTIAL WITHIN THE FIVE CHD UNITS THREATENED BY FIRE MANAGEMENT ACTIVITIES

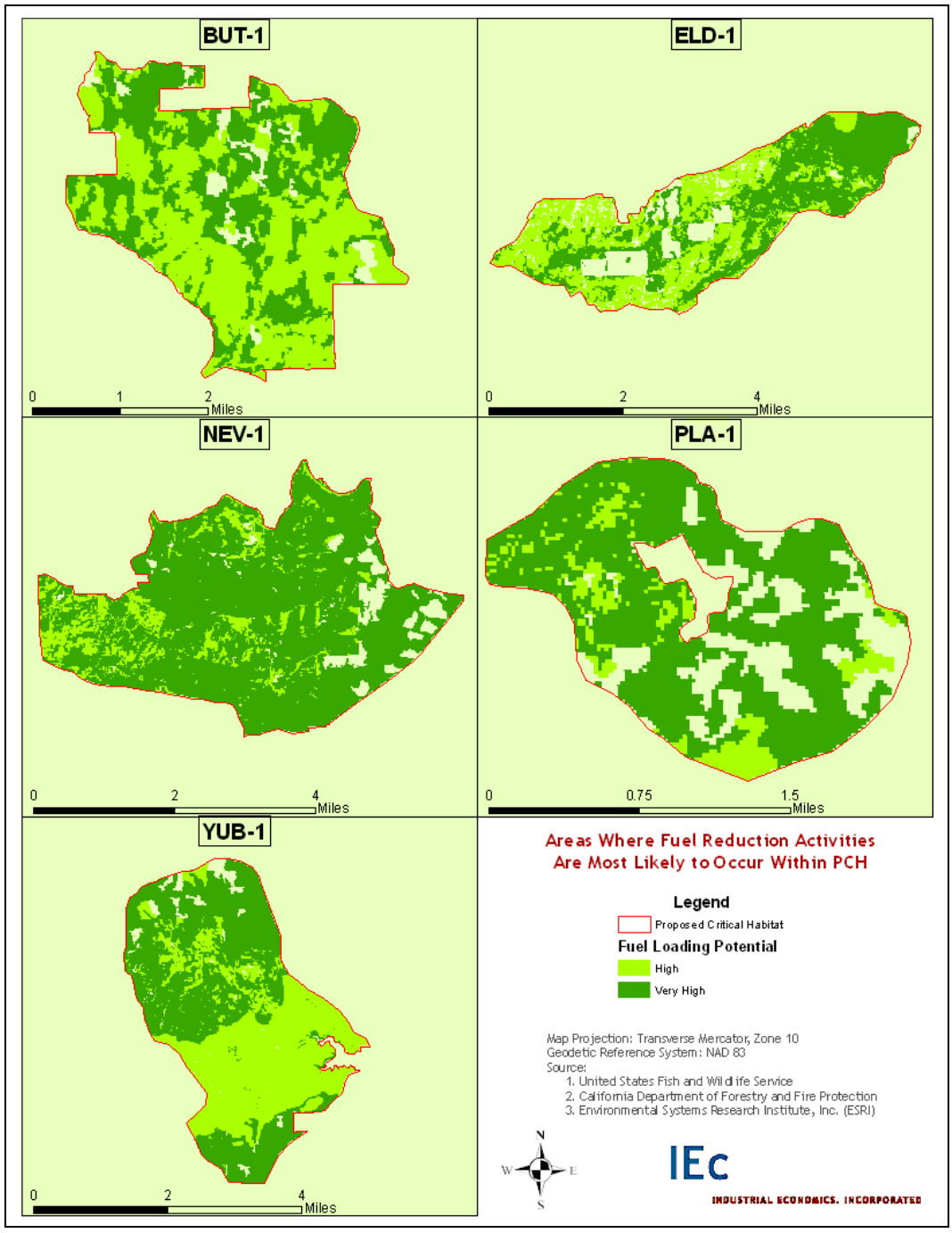
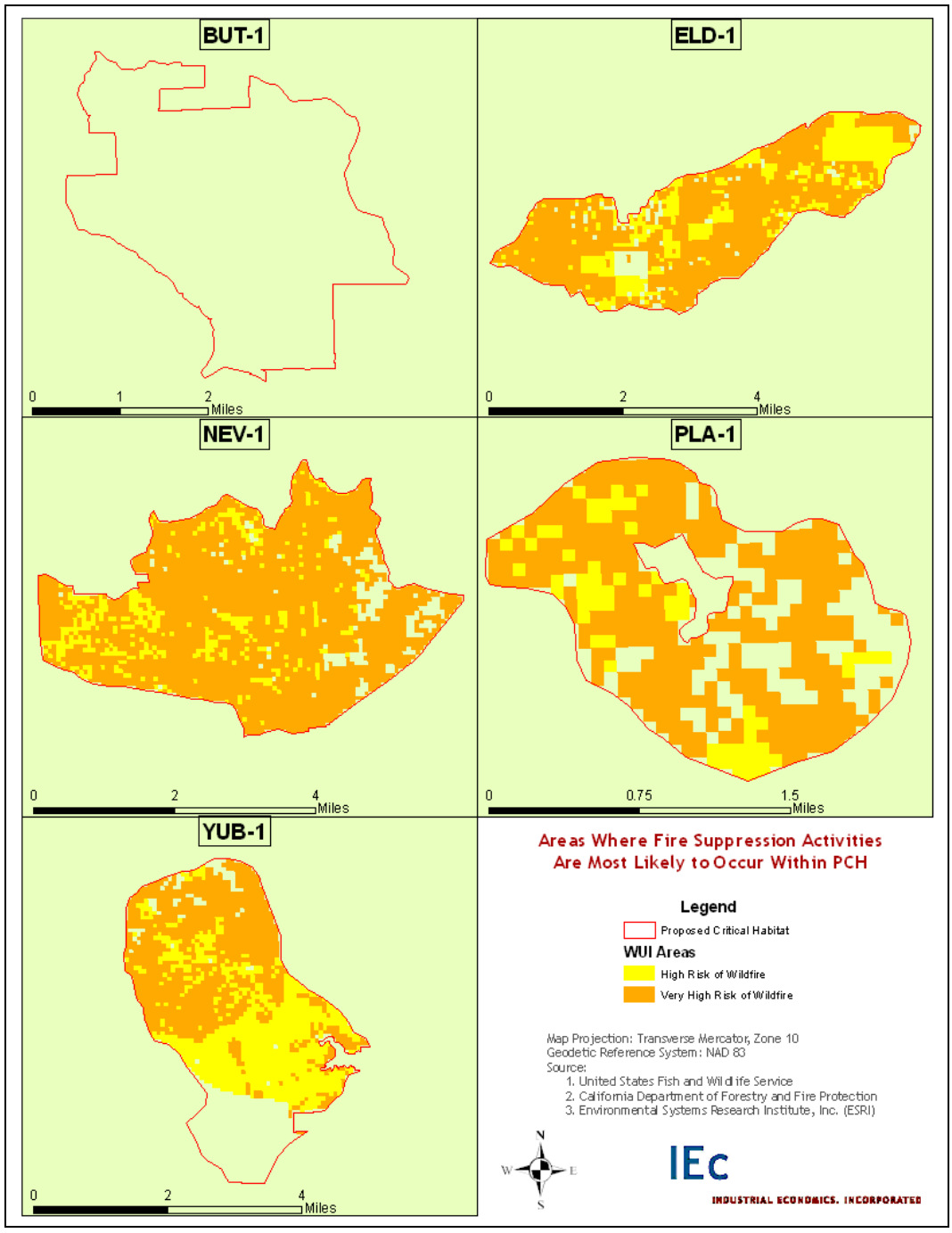


EXHIBIT 11-4 WUI AREAS WHERE THE RISK OF FIRE IS HIGH OR VERY HIGH WITHIN THE FIVE CHD UNITS THREATENED BY FIRE MANAGEMENT ACTIVITIES



11.2 FROG CONSERVATION AND EXISTING FIRE MANAGEMENT GUIDELINES AND STANDARDS

247. The final listing rule for the frog describes the threat of wildland fires on the frog and its habitat as follows:

> "Periodic wildfires may adversely affect California red-legged frogs by causing direct mortality, destroying streamside vegetation, or eliminating vegetation that protect the watershed."[186]

Given the severity of threats to the frog associated with wildland fires, fire management activities, which limit the potential and severity of wildfires, may contribute to frog conservation efforts. However, fire management activities may also result in adverse impact to the frog and its habitat.

248. Since the listing of the species in 1996, only one consultation for the frog on fire management activities has taken place (Angeles National Forest, 2003). Frog conservation measures implemented for fire management activities are designed to preserve water quality and protect riparian and aquatic areas. Examples of conservation measures required to protect the frog and/or its habitat include:

- Design and manage fuel treatments to minimize the risk that treated areas will be used by unauthorized motorized and mechanized vehicles;
- Avoid establishing staging bases, heli-bases, base camps, firelines or other areas of human concentration and equipment use within frog suitable and occupied habitat and riparian areas to the maximum extent possible;
- Maintain and enhance soil productivity in riparian and upland areas by retention of standing and down coarse woody debris; and
- Avoid or minimize soil erosion by retention of ground cover in riparian and upland areas.

A review of existing guidelines to protect riparian and aquatic areas adjacent to fire management activities indicate that these types of conservation measures are expected to occur even in the absence of the frog and its habitat as a result of existing best management practices. For example, the California State Board of Forestry and Fire Protection note that any project that alters vegetation has the potential to: "impact soil erosion, land stability, fisheries, water quality, water storage and conveyance facilities, and domestic water supplies."[187] According, the primary agencies responsible for fire management activities (USFS, BLM, CAL FIRE) follow specific guidelines to minimize the impact of fire management activities on natural resources. The following sections describe existing guidelines and standards on Federal and non-Federal lands, respectively.

---

[186] U.S. Fish and Wildlife Service, Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Red-Legged Frog (*Rana aurora draytonii*); Final Rule, published in the *Federal Register* on May 23, 1996, Vol. 61, No. 101; U.S. Fish and Wildlife Service, Endangered and Threatened Wildlife and Plants.

[187] California State Board of Forestry and Fire Protection. 2006. Vegetation Treatment Program Environmental Impact Report Notice of Preparation. Sacramento, California.

Fire Management on Federal Lands

249. All USFS land (portions of Plumas, Eldorado, and Tahoe National Forests) within affected critical habitat units is covered by the SNFPA. As previously discussed in Chapter 8, the SNFPA contains detailed standards and guidelines protecting aquatic and riparian habitats. These standards and guidelines apply to all projects implemented within the National Forests covered by the SNFPA, including fire management activities. In addition to the standards and guidelines described in Chapter 8, the SNFPA includes specific standards and guidelines for fire management activities:[188]

- Design prescribed fire treatments to minimize disturbance of ground cover and riparian vegetation in RCAs. In burn plans for project areas that include, or are adjacent to RCAs, identify mitigation measures to minimize the spread of fire into riparian vegetation.
- Within CARS, in occupied or essential habitat for threatened, endangered, or sensitive species, evaluate the appropriate role, timing, and extent of prescribed fire. Avoid direct lighting within riparian vegetation.
- Use screening devices for water drafting pumps (fire suppression activities are exempt during initial attack). Use pumps with low entry velocity to minimize removal of aquatic species, including juvenile fish, amphibian egg masses and tadpoles, from aquatic habitats.
- Allow mechanical ground disturbing fuels treatments, hazard tree removal, salvage harvest, or commercial fuelwood cutting within RCAs or CARs, only when the activity is consistent with riparian conservation objectives.

Similar to the USFS, during fire management activities the BLM follows watershed management protection measures and requires the development of watershed-specific measures.[189] Further, the BLM follows all relevant best management practices when engaging in projects in or adjacent to aquatic or riparian habitats.[190] Based on discussions with BLM staff, fire management activities that may affect the frog and its habitat are most likely to occur on BLM lands managed by the Folsom Field Office of the BLM (including areas in ELD-1, NEV-1, PLA-1 and YUB-1).[191] The Regional Management Plan for the Folsom Field Office includes only one protection measure for the frog related

[188] U.S. Forest Service. 2004. Record of Decision: Sierra Nevada Forest Plan Amendment – Final Supplemental Environmental Impact Statement. United States Department of Agriculture, Forest Service, Pacific Southwest Region.

[189] United States Department of the Interior, Bureau of Land Management. 2008. Sierra Resource Management Plan and Record of Decision for the Folsom Field Office California.

[190] Personal Communication with Amy Fesnock, Threatened and Endangered Species Specialist, California Bureau of Land Management, on January 5, 2009.

[191] Based on review of Folsom Field Office Boundary Map. Accessed January 12, 2008. http://www.blm.gov/ca/st/en/fo/folsom/mapfolsom2.html

to fire management: apply existing BLM guidelines of no fire retardant within 300 feet of wetlands and, if possible, avoid retardant drops within 500 feet of wetlands.[192]

Fire Management on State and Private Lands

250. Fire management activities on State and private lands are implemented as part of four main programs administered by CAL FIRE:

(1) Vegetation Management Program;

(2) Prefire Management Program;

(3) California Forest Improvement Program; and

(4) Proposition 40 Fuels Reduction Program.[193]

Proposed projects under each of these programs are subject to review by CAL FIRE. Although specific guidelines for the protection of aquatic and riparian habitat do not exist for these programs, proposed projects are expected to address aquatic and riparian habitat conservation, if relevant to the project.[194] Any conservation measures implemented to limit impacts on aquatic and riparian habitats are considered to be beneficial to the frog and its habitat. The specific measures implemented vary depending on the project, but are expected to be at least equivalent to the timber harvest guidelines for State and private lands described in Chapter 8.

11.3 POST-DESIGNATION IMPACTS

251. The post-designation period for this analysis is 2009 to 2030. Based on the occurrence of one formal consultation for fire management activities in the Angeles National Forest between 1996 and 2008, approximately two consultations are expected to occur between 2009 and 2030 in Angeles National Forest.[195] Average consultation costs (as shown in Exhibit 2-2 in Chapter 2) are applied to the number of predicted formal consultations. The number of consultations are spread evenly across years and over time.

252. The Tahoe National Forest expects to undergo an additional formal consultation on fire management activities every five years due to the designation of critical habitat for the frog.[196] Since this consultation would not occur absent critical habitat, all the

[192] United States Department of the Interior, Bureau of Land Management. 2008. Sierra Resource Management Plan and Record of Decision for the Folsom Field Office California.

[193] California State Board of Forestry and Fire Protection. 2006. Vegetation Treatment Program Environmental Impact Report Notice of Preparation. Sacramento, California.

[194] Based on review of: (1) California Department of Forestry and Fire Protection. 2006. Procedural Guide for Community Assistance Grant Fuel Reduction Projects Funded by Proposition 40, Sierra Nevada Forest Land and Fuels Management. State of California – The Resources Agency, California Department of Forestry and Fire Protection; (2) California Department of Forestry and Fire Protection. 2004. Vegetation Management Program Fact Sheet. Accessed online at: http://www.fire.ca.gov/resource_mgt/resource_mgt_vegetation.php on January 12, 2009; and (3) California Department of Forestry and Fire Protection. 2007. California Forest Improvement Program: User's Guide 2007 Edition, Volume 1.

[195] Based on review of formal consultation history from 1996 through 2008.

[196] Personal communication with Tina Mark, Wildlife Biologist, Tahoe National Forest, on January 7, 2009.

administrative costs of the consultation are included as incremental impacts. Average consultation costs (as shown in Exhibit 2-2 in Chapter 2) are applied to the number of predicted formal consultations. The number of consultations are spread evenly across years and over time.

11.4 SOURCES OF UNCERTAINTY

253. Under the 50 CFR 402.04 Counter Regulations National Forests are able to forgo section 7 consultation with the Service on forest fuels management projects if a biological assessment leads to a no adverse effects finding. The administrative costs associated with developing biological assessments for such projects are relevant to this analysis. Currently, the annual number of biological assessments the USFS conducts for the frog within the study area that do not require section 7 consultation is unknown. Therefore, the administrative costs of such biological assessments are not quantified in this analysis. To the extent that additional biological assessments, unrelated to section 7 consultations, occur on USFS land within the study area, this analysis underestimates baseline administrative impacts.

254. Other sources of uncertainty in the estimates provided in this Chapter primarily concern the extent of fire management activities reviewed. This analysis is limited to the consideration of impacts on fire management activities within the five critical habitat units where fire management activities are identified as a threat to the frog (BUT-1, ELD-1, NEV-1, PLA-1, and YUB-1). To the extent that special management considerations for fire management activities are required in additional critical habitat units, total impact estimates may increase.

CHAPTER 12 | HABITAT AND VEGETATION MANAGEMENT ACTIVITIES

255. This chapter describes past and ongoing research, survey and monitoring, and habitat and vegetation management activities implemented for the frog. Unlike the other activities described in this analysis, the activities described in this section do not pose a threat to the frog or its habitat. Rather, the activities described in this chapter are implemented specifically to benefit the frog and its habitat.

256. In general, baseline impacts are related to ongoing survey and monitoring efforts for the frog on Federal and State land. Based on discussions with affected Federal and State agencies, surveying and monitoring efforts, as well as habitat management activities are not expected to change due to the designation of critical habitat. Accordingly, the only incremental impacts quantified in this analysis are related to the administrative costs of section 7 consultations addressing adverse modification of critical habitat. Impacts on habitat and vegetation management activities are summarized in Exhibit 12-1 and further described in the following sections.

EXHIBIT 12-1 SUMMARY OF COSTS OF ACTIVE FROG MANAGEMENT ACTIVITIES (2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

VALUES	COSTS
Pre-Designation Impacts (1996 – 2008)	
Present Value of Impacts	$725,000
Post-Designation Baseline Impacts (2009 – 2030)	
Present Value of Impacts	$489,000
Annualized Impact Value	$44,200
Incremental Impacts (2009 – 2030)	
Present Value of Impacts	$74,300
Annualized Impact Value	$6,720

12.1 PRE-DESIGNATION IMPACTS

257. The USFS and BLM conduct periodic surveys for the frog to identify frog populations on the land they manage within the study area.[197] Additionally, the USFS and BLM conduct site assessments for the frog prior to the implementation of proposed projects in areas containing suitable frog habitat. Further, the BLM conducts habitat and population monitoring for the frog in the Spivey Pond management area.[198] Survey and monitoring activities for the frog have occurred since the species was listed in 1996 and are expected to continue for the foreseeable future on Federal lands in the study area.

258. The BLM actively manages the Spivey Pond management area for the frog. Frog habitat in this area consists primarily of abandoned ponds originally used for grazing. Specific management activities include removing non-native vegetation and non-native predators from the ponds inhabited by the frog. Additionally, no management activities, such as, grazing and ranching and timber harvest activities, take place in the Spivey Pond Management area in order to preserve frog habitat. The BLM has also considered constructing suitable ponds for the frog, similar to those located within the Spivey Pond management area, on BLM land near San Bernardino, California where an additional frog population has been identified. To date, the BLM has not installed any ponds for the frog nor do they have any definite plans to install ponds in the future. Therefore, impacts associated with constructing additional ponds for the frog on BLM land within the study area are not quantified in this analysis.[199]

259. Currently, there is not enough information to quantify impacts on the BLM associated with the Spivey Pond management area. Additional data and/or information are invited on the Spivey Pond management area and the potential economic impacts due to frog conservation on BLM lands. It is anticipated that any new information received during the public comment period will be included in the final version of this report.

260. To date, the USFS has not engaged in active habitat or vegetation management for the frog.[200] However, the USFS has discussed constructing ponds for the frog in areas of the Tahoe National Forest located adjacent to a known frog population on private lands.[201] However, the USFS has no specific plans to construct ponds for the frog at this time. Further, Eldorado National Forest has considered purchasing additional private lands for

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[197] Personal communication with Valerie Hubbartt, Wildlife Biologist, Los Padres National Forest, on December 1, 2008; Amy Fesnock, Threatened and Endangered Species Specialist, California Bureau of Land Management, on January 5, 2009; Dawn Lipton, Wildlife Biologist, Eldorado National Forest, on January 6, 2009; and, Tina Mark, Wildlife Biologist, Tahoe National Forest, on January 7, 2009.

[198] Personal communication with Amy Fesnock, Threatened and Endangered Species Specialist, California Bureau of Land Management, on January 5, 2009.

[199] Personal communication with Amy Fesnock, Threatened and Endangered Species Specialist, California Bureau of Land Management, on January 5, 2009.

[200] Personal communication with Valerie Hubbartt, Wildlife Biologist, Los Padres National Forest, on December 1, 2008; Dawn Lipton, Wildlife Biologist, Eldorado National Forest, on January 6, 2009; and, Tina Mark, Wildlife Biologist, Tahoe National Forest, on January 7, 2009.

[201] Personal Communication with Tina Mark, Wildlife Biologist, Tahoe National Forest, on January 7, 2009.

the frog.[202] The location of such purchases would be determined by the designation of critical habitat. Given that Eldorado National Forest has no specific plan to purchase additional lands for the frog in the near future, the costs of such purchases are not quantified in this analysis. However, if Eldorado National Forest were to purchase land for the frog in the future, the costs of such purchases would represent incremental impacts of the designation of critical habitat.

261. The pre-designation impacts quantified in this analysis are due to past surveying and monitoring efforts for the frog on the Tahoe, Eldorado, and Plumas National Forests (approximately $480,000 since 1996, undiscounted).[203,204] Additionally, administrative costs of section 7 consultation on habitat and vegetation management projects throughout the study area are included as part of the pre-designation impacts (approximately $245,000 since 1996, undiscounted). Exhibit 12-2 presents pre-designation impacts related to surveying, monitoring, and habitat and vegetation management for the frog by unit.

EXHIBIT 12-2 PRE-DESIGNATION IMPACTS RELATED TO SURVEYING, MONITORING, AND HABITAT & VEGETATION MANAGEMENT FOR THE FROG BY UNIT (2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE IMPACTS
ALA-1A	$28
ALA-1B	$75
ALA-2	$2,100
BUT-1	$166,000
CCS-1	$133
CCS-2	$1,270
ELD-1	$294,000
LOS-1	$8,830
MNT-1	$75
MNT-2	$17,700
MNT-3	$4,170
MRN-1	$3,320
MRN-2	$9,610
MRN-3	$14,400

[202] Personal Communication with Dawn Lipton, Wildlife Biologist, Eldorado National Forest, on January 6, 2009.

[203] Personal Communication with Tina Mark, Wildlife Biologist, Tahoe National Forest, on January 7, 2009.

[204] Surveying and monitoring cost estimates for the Plumas and Eldorado National Forests are based on cost estimates received from the Tahoe National Forest. That is, this analysis assumes, for lack of better information, that the surveying and monitoring efforts on the Plumas and Eldorado National Forests are the same as the efforts on the Tahoe National Forest.

UNIT	PRESENT VALUE IMPACTS
NEV-1	$203,000
PLA-1	$90,900
SCZ-1	$95,000
SCZ-2	$5,550
SLO-1	$29,500
SLO-2	$14,400
SLO-3	$15,500
SLO-4	$4,680
SNB-1	$1,550
SNB-2	$741
SNB-3	$2,740
SNM-1	$308
SNM-2	$2,000
SON-3	$329
STB-1	$5,870
STB-2	$7,800
STB-3	$11,100
STB-4	$1,880
STB-5	$2,820
STB-6	$2,630
STB-7	$40,200
STC-1	$281
STC-2	$3,300
VEN-1	$2,090
VEN-2	$11,300
VEN-3	$3,580
YUB-1	$128,000
Total	**$1,210,000**

12.2 POST-DESIGNATION IMPACTS

262. Post-designation impacts stem from continued surveying and monitoring efforts for the frog in the Tahoe, Eldorado, and Plumas National Forests (approximately $22,500 annually). Surveying and monitoring efforts for the frog in these National Forests are not expected to increase as a result of critical habitat designation.[205] Thus, all impacts related to surveying and monitoring for the frog on USFS land are included as part of the economic baseline. Additional post-designation baseline impacts stem from the

[205] Personal communication with Dawn Lipton, Wildlife Biologist, Eldorado National Forest, on January 6, 2009; and Tina Mark, Wildlife Biologist, Tahoe National Forest, on January 7, 2009.

administrative costs of section 7 consultation (approximately $18,800 annually). All post-designation incremental impacts stem from the administrative cost of addressing adverse modification during baseline consultations for the frog (approximately $6,280 annually). No new consultations are expected to occur as a result of critical habitat designation. Exhibits 12-3 and 12-4 present post-designation baseline and incremental impacts by unit.

EXHIBIT 12-3 POST-DESIGNATION BASELINE IMPACTS RELATED TO SURVEYING, MONITORING, AND HABITAT & VEGETATION MANAGEMENT FOR THE FROG BY UNIT (2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
ALA-1A	$22	$2
ALA-1B	$60	$5
ALA-2	$1,670	$151
BUT-1	$50,100	$4,530
CCS-1	$106	$10
CCS-2	$1,010	$91
ELD-1	$88,800	$8,030
LOS-1	$6,500	$587
MNT-1	$54	$5
MNT-2	$12,800	$1,160
MNT-3	$3,010	$272
MRN-1	$1,340	$121
MRN-2	$3,880	$351
MRN-3	$5,840	$528
NEV-1	$61,300	$5,540
PLA-1	$27,500	$2,480
SCZ-1	$70,500	$6,370
SCZ-2	$4,120	$372
SLO-1	$12,500	$1,130
SLO-2	$10,100	$910
SLO-3	$10,900	$983
SLO-4	$3,280	$296
SNB-1	$1,060	$96
SNB-2	$506	$46
SNB-3	$1,870	$169
SNM-1	$245	$22
SNM-2	$1,530	$138
SON-3	$133	$12

UNIT	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
STB-1	$4,510	$408
STB-2	$6,050	$547
STB-3	$8,540	$772
STB-4	$1,460	$132
STB-5	$2,190	$198
STB-6	$2,040	$184
STB-7	$30,200	$2,730
STC-1	$223	$20
STC-2	$2,610	$236
VEN-1	$1,450	$131
VEN-2	$8,180	$739
VEN-3	$2,490	$225
YUB-1	$38,700	$3,500
Total	**$489,000**	**$44,200**

EXHIBIT 12-4 POST-DESIGNATION INCREMENTAL IMPACTS RELATED TO SURVEYING, MONITORING, AND HABITAT & VEGETATION MANAGEMENT FOR THE FROG BY UNIT (2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
ALA-1A	$7	$1
ALA-1B	$20	$2
ALA-2	$555	$50
CCS-1	$35	$3
CCS-2	$335	$30
LOS-1	$2,170	$196
MNT-1	$18	$2
MNT-2	$4,270	$386
MNT-3	$1,000	$91
MRN-1	$448	$41
MRN-2	$1,290	$117
MRN-3	$1,950	$176
SCZ-1	$23,500	$2,120
SCZ-2	$1,370	$124
SLO-1	$4,160	$376
SLO-2	$3,350	$303
SLO-3	$3,630	$328

UNIT	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
SLO-4	$1,090	$99
SNB-1	$352	$32
SNB-2	$169	$15
SNB-3	$623	$56
SNM-1	$82	$7
SNM-2	$510	$46
SON-3	$44	$4
STB-1	$1,500	$136
STB-2	$2,020	$182
STB-3	$2,850	$257
STB-4	$487	$44
STB-5	$729	$66
STB-6	$680	$61
STB-7	$10,100	$911
STC-1	$74	$7
STC-2	$870	$79
VEN-1	$483	$44
VEN-2	$2,730	$246
VEN-3	$829	$75
Total	**$74,300**	**$6,720**

12.3 SOURCES OF UNCERTAINTY

263. The sources of uncertainty in the estimates provided in this chapter primarily concern currently available data. In several cases, data have been requested from stakeholders but has not been forthcoming. Total impact estimates may increase as information becomes available.[206] For example, should BLM or USFS construct additional ponds or purchase lands for the frog, the costs of habitat management may be understated.

[206] Analysis assumes that surveying and monitoring efforts for the frog in the Plumas and Eldorado National Forests are equal to efforts in the Tahoe National Forest.

CHAPTER 13 | ECONOMIC BENEFITS

264. Characterization of the potential economic benefits of critical habitat designation for the frog provides context to the cost analyses presented in the preceding chapters. This chapter first describes the categories of economic benefit that may derive from the conservation of species and habitats, and discusses the research methods that economists employ to quantify these benefits. Next, this chapter summarizes the frog conservation efforts described in Chapters 4 through 12 of this report and links them with potential categories of economic benefit that may derive from their implementation. This chapter does not, however, quantify the potential baseline and incremental benefits described.

13.1 CATEGORIES OF BENEFIT RELATING TO SPECIES AND HABITAT CONSERVATION

265. The primary goal of listing a species is to preserve the species from extinction. Various economic benefits, measured in terms of social welfare or regional economic performance, may also result from species and habitat conservation. The benefits of species and habitat conservation can be placed into two broad categories: (1) those associated with the primary goal of species conservation, and (2) those that derive from the habitat conservation efforts to achieve this primary goal.

266. Because a purpose of the Act is to provide for the conservation of endangered and threatened species, the benefits of actions taken under the Act are often measured in terms of the value placed by the public on species preservation (e.g., avoidance of extinction, and/or increase in a species' population). Such social welfare values for a species may reflect both use and non-use values for the species. Use values derive from a direct use for a species, such as commercial harvesting or recreational wildlife-viewing opportunities. Non-use values are not derived from direct use of the species, but instead reflect the utility the public derives from knowledge that a species continues to exist (e.g., existence or bequest values).

267. As a result of actions taken to preserve endangered and threatened species, such as habitat management, various other benefits may accrue to the public. Conservation efforts for species and habitat may result in improved environmental quality, which in turn may have collateral human health or recreational use benefits. In addition, conservation efforts undertaken for the benefit of a threatened or endangered species may enhance shared habitat for other wildlife. Such benefits may be a direct result of modifications to projects, or may be collateral to such actions. For example, a section 7 consultation may result in the conservation of buffer strips along streams, in order to reduce sedimentation due to construction activities. A reduction in sediment load may directly benefit water quality, while the presence of buffer strips may also provide the

collateral benefits of preserving habitat for terrestrial species and enhancing nearby residential property values (e.g., preservation of open space).

268. Economists apply a variety of methodological approaches in estimating both use and non-use values for species and for habitat improvements, including stated preference and revealed preference methods. Stated preference techniques include the contingent valuation method and conjoint analysis or contingent ranking methods. In simplest terms, these methods employ survey techniques, asking respondents to state what they would be willing to pay for a resource or for programs designed to protect that resource. A substantial literature has developed that describes the application of this technique to the valuation of natural resource assets.

269. More specific to use values for species or habitats, revealed preference techniques examine individuals' behavior in markets in response to changes in environmental or other amenities, i.e., people "reveal" their value by their behavior. For example, travel cost models are frequently applied to value access to recreational opportunities, as well as to value changes in the quality and characteristics of these opportunities. Basic travel cost models are rooted in the idea that the value of a recreation resource can be estimated by analyzing the travel and time costs incurred by individuals visiting the site. Another revealed preference technique is hedonic analysis, which is often employed to determine the effect of specific site characteristics on property values.

13.2 POTENTIAL BENEFITS OF CALIFORNIA RED-LEGGED FROG CONSERVATION

270. This section describes the categories of benefits resulting from frog conservation efforts within the study area. Exhibit 13-1 summarizes potential benefits associated with the specific frog conservation efforts described in Chapters 4 through 12 of this report. The first column summarizes frog conservation efforts by land use activity. The second column identifies potential categories of benefits that may derive from implementation of these conservation efforts. A description of these categories of benefit is provided below. The final columns of the exhibit identify the units in which baseline or incremental benefits may occur. Whether the benefits deriving from the conservation efforts are baseline or incremental depends on the reason for implementing the effort. The baseline or incremental status of the conservation effort summarized in the exhibit is as described for each activity and unit in Chapters 4 through 12 of this report.

271. The categories of economic benefit that may derive from the frog conservation efforts described in this report include:

- **Property value benefits:** Open space resulting from the conservation of frog habitat in mitigation banks may increase nearby property values.[207]

[207] Significant uncertainty exists about the location and characteristics of future mitigation banks that could be used by developers to conserve frog habitat. Furthermore, to the extent that developers switch to alternative sites, rather than building in critical habitat, it is possible that no net change in open space will result. Therefore, although an extensive literature exists providing information regarding the potential for increased values for properties proximate to open space, such benefits are not quantified at this time.

- **Improved water quality:** Managing economic activities that occur adjacent to riparian and aquatic habitats (e.g., agriculture, construction, and timber harvests) may improve water quality. Water quality improvements may in turn have human health and human use (e.g., recreation) benefits.
- **Aesthetic benefits:** Social welfare gains may be associated with enhanced aesthetic quality of habitat (e.g., as a result of habitat restoration activities). Preferences for aesthetic improvements may be measured through increased willingness-to-pay to visit a habitat region for recreation or increased visitation.
- **Flood control:** Maintaining or enhancing the flood control services provided by an ecosystem may increase property values within the watershed, and avoid costs of flood-related damage or replacement flood control programs.
- **Improved soil productivity:** Productive soils stabilize wetland habitat and relate to water quality and recreational use values.
- **Regional economic benefits:** To the extent that aesthetic benefits or improved water quality lead to an increase in visitation to the region (e.g., for recreation such as hiking or wildlife-viewing), the economy and employment may benefit from increased regional spending.

In most cases, quantification and/or monetization of such benefits requires significant data and models that may not be readily available at this time. For example, estimation of the benefits of improved water quality in terms of reduced downstream treatment costs and/or improvements to human health requires data on current water quality in all affected streams and waterways. In addition, complex fate and transport models of contaminants and sediments are necessary to calculate the change in water quality likely to result from the implementation of conservation activities (e.g., pesticide use restrictions, habitat restoration). Engineering cost models of alternative treatment technologies are necessary to estimate the incremental cost savings associated with changes in water quality. Finally, dose-response models are needed to estimate the change in adverse human health effects, as well as studies of willingness to pay for such health improvements. Thus, although some of the listed ancillary benefits may result in a shift in market resources, all of the data required to estimate such shifts is not readily available at this time.

272. In addition to these categories of potential benefit, all of the conservation efforts described in Exhibit 13-1 are related to the broader conservation and recovery of the species. For example, monitoring and surveying for the species is undertaken to better understand the effects of projects on species, and therefore inform the avoidance or minimization of those effects. All conservation efforts therefore relate to the maintenance or enhancement of the use (e.g., wildlife-viewing) and non-use value (e.g., existence value) that the public may hold specifically for the frog. Further, many of the conservation efforts undertaken for the frog may also result in improvements to ecosystem health that are shared by other, coexisting species. The maintenance or enhancement of use and non-use values for these other species, or for biodiversity in general, may also result from these frog conservation efforts.

EXHIBIT 13-1 FROG CONSERVATION EFFORTS AND POTENTIAL ASSOCIATED BENEFITS (NOT INCLUDING CONSERVATION AND RECOVERY OF THE SPECIES)

CONSERVATION EFFORT	POTENTIAL ASSOCIATED BENEFITS	UNITS APPLIED	
		BASELINE BENEFIT	INCREMENTAL BENEFIT
RESIDENTIAL AND COMMERCIAL DEVELOPMENT			
Project site restoration or revegetation.	• Property value benefits • Improved water quality • Regional economic benefits	42 Units: ALA-1A, ALA-1B, ALA-2, CAL-1, CCS-1, CCS-2, ELD-1, MEN-1, MNT-1, MNT-2, MNT-3, MRN-1, MRN-2, MRN-3, NAP-1, NEV-1, PLA-1, RIV-1, SCZ-1, SCZ-2, SLO-1, SLO-2, SLO-3, SNB-1, SNB-2, SNB-3, SNM-1, SNM-2, SOL-1, SOL-2, SOL-3, SON-1, SON-2, SON-3, STB-2, STB-5, STB-6, STB-7, STC-1, STC-2, VEN-1, YUB-2	43 Units: ALA-1A, ALA-1B, ALA-2, CAL-1, CCS-1, CCS-2, ELD-1, MEN-1, MNT-2, MNT-3, MRN-1, MRN-2, MRN-3, NAP-1, NEV-1, RIV-1, SCZ-1, SCZ-2, SLO-1, SLO-2, SLO-3, SLO-4, SNB-1, SNB-2, SNB-3, SNM-1, SNM-2, SOL-1, SOL-2, SOL-3, SON-2, SON-3, STB-1, STB-2, STB-3, STB-5, STB-6, STB-7, STC-1, STC-2, VEN-1, VEN-3, YUB-2
Purchase conservation habitat to offset development.			
Seasonal work restrictions.	• Improved water quality • Flood control • Enhanced soil productivity • Regional economic benefits		
Hiring a Service-approved biologist to survey the site, oversee project activities, relocate frogs from the project site, and train workers.	*Not Applicable*		
Exotic species removal.	• Improved water quality • Aesthetic benefits • Regional economic benefits		
WATER MANAGEMENT			
Hiring a Service-approved biologist to survey the site, oversee project activities, relocate frogs from the project site, and train workers.	*Not Applicable*	All	Incremental impacts limited to administrative costs.
Conducting work outside of the breeding season between April and October.	*Not Applicable*		
Clearing food trash from the work site daily.	• Improved water quality • Aesthetic benefits • Regional economic benefits		
Conducting vehicle maintenance and fueling at least 66 feet from aquatic habitat.	• Improved water quality • Regional economic benefits		

CONSERVATION EFFORT	POTENTIAL ASSOCIATED BENEFITS	UNITS APPLIED	
		BASELINE BENEFIT	INCREMENTAL BENEFIT
Minimizing the spread of invasive species, pathogens, and disease in aquatic habitat.	• Improved water quality • Improved soil productivity • Regional economic benefits		
Screening dewatering pump intakes.	*Not Applicable*		
AGRICULTURE			
Avoid pesticide use in frog habitat and in buffer zones around frog habitat for 66 pesticide active ingredients.	• Improved water quality • Regional economic benefits	38 Units: ALA-2, CCS-1, CCS-2, ELD-1, MNT-2, MNT-3, MRN-1, MRN-2, MRN-3, NAP-1, NEV-1, RIV-1, SCZ-1, SCZ-2, SLO-1, SLO-2, SLO-3, SLO-4, SNB-1, SNB-2, SNB-3, SNM-1, SNM-2, SOL-1, SOL-2, SOL-3, SON-1, SON-2, SON-3, STB-2, STB-3, STB-5, STB-6, STB-7, STC-1, STC-2, VEN-1, VEN-3	38 Units: ALA-2, CCS-1, CCS-2, ELD-1, MNT-2, MNT-3, MRN-1, MRN-2, MRN-3, NAP-1, NEV-1, RIV-1, SCZ-1, SCZ-2, SLO-1, SLO-2, SLO-3, SLO-4, SNB-1, SNB-2, SNB-3, SNM-1, SNM-2, SOL-1, SOL-2, SOL-3, SON-1, SON-2, SON-3, STB-2, STB-3, STB-5, STB-6, STB-7, STC-1, STC-2, VEN-1, VEN-3
RANCHING/GRAZING			
Implement best management practices (BMPs) for protection of aquatic and riparian habitat.	• Improved water quality • Flood control • Regional economic benefits	None	Incremental impacts limited to administrative costs.
TIMBER HARVEST			
Implement best management practices (BMPs) for protection of aquatic and riparian habitat.	• Improved water quality • Flood control • Regional economic benefits	8 Units: BUT-1, ELD-1, MEN-1, NEV-1, PLA-1, SCZ-1, SNM-2, YUB-1	Incremental impacts limited to administrative costs.
TRANSPORTATION			
Pre-construction survey, capture and removal of any frogs by qualified biologists.	*Not Applicable*	6 Units: CCS-2, MNT-2, SCZ-1, SCZ-2, SLO-3, STB-5	Incremental impacts limited to administrative costs.
Construction confined to the dry season.	• Improved water quality • Regional economic benefits		

CONSERVATION EFFORT	POTENTIAL ASSOCIATED BENEFITS	UNITS APPLIED	
		BASELINE BENEFIT	INCREMENTAL BENEFIT
In areas temporarily disturbed, vegetation will be removed by hand, where feasible, instead of by heavy equipment.	*Not Applicable*		
No water will be used from streams or ponds that support the frog.	• Improved water quality • Flood control • Regional economic benefits		
Ground disturbance and vegetation clearing along river banks will be minimized.	• Improved water quality • Flood control • Regional economic benefits • Improved soil productivity		
Construction of temporary silt dams to minimize sedimentation.	• Improved water quality • Flood control • Regional economic benefits		
Upon project completion, hydroseed project areas to stabilize soils prior to the onset of winter rains.	• Improved water quality • Flood control • Improved soil productivity • Regional economic benefits		
FIRE SUPPRESSION			
Design and manage fuel treatments to minimize the risk that treated areas will be used by unauthorized motorized and mechanized vehicles.	• Improved water quality • Flood control • Enhanced soil productivity • Regional economic benefits	2 Units: BUT-1, NEV-1	Incremental impacts limited to administrative costs.
Avoid establishing staging bases, heli-bases, base camps, firelines or other areas of human concentration and equipment use within frog suitable and occupied habitat and riparian areas to the maximum extent possible.	• Improved water quality • Flood control • Enhanced soil productivity • Regional economic benefits		
Maintain and enhance soil productivity in riparian and upland areas by retention of standing and down coarse woody debris.	• Improved water quality • Flood control • Enhanced soil productivity • Regional economic benefits		
Avoid or minimize soil erosion by retention of ground cover in riparian and upland areas.	• Improved water quality • Flood control • Enhanced soil productivity • Regional economic benefits		
HABITAT MANAGEMENT			
Pre-construction frog surveys and removal of identified frogs.	*Not Applicable*	5 Units: BUT-1, ELD-1, NEV-1, PLA-1, YUB-1	Incremental impacts limited to administrative costs.
Biologist on-site during all activities.	*Not Applicable*		
Worker education and training session.	*Not Applicable*		

CONSERVATION EFFORT	POTENTIAL ASSOCIATED BENEFITS	UNITS APPLIED	
		BASELINE BENEFIT	INCREMENTAL BENEFIT
Revegetate and re-contour all disturbed areas with native vegetation.	• Improved water quality • Flood control • Enhanced soil productivity • Regional economic benefits		
Construction work limited to the dry season (May 1 – Oct 31) and/or low stream flow periods (June 1 – Nov 1).	• Improved water quality • Flood control • Enhanced soil productivity • Regional economic benefits		
Construction equipment, staging areas, fueling and maintenance vehicles will be located outside of riparian and wetland areas.	• Improved water quality • Flood control • Enhanced soil productivity • Regional economic benefits		
Establishment of buffer zones around off-site parking areas.	• Improved water quality • Flood control • Enhanced soil productivity • Regional economic benefits		
UTILITY AND PIPELINE CONSTRUCTION			
Pre-construction frog surveys and removal of identified frogs.	*Not Applicable*	22 Units: ALA-2, CCS-1, CCS-2, MNT-2, SCZ-1, SLO-1, SLO-2, SLO-3, SNB-2, SNB-3, SNM-1, SOL-1, SOL-2, SOL-3, STB-2, STB-5, STB-6, STB-7, STC-1, STC-2, VEN-1, VEN-3	Incremental impacts limited to administrative costs.
Biologist on-site during all activities.	*Not Applicable*		
Worker education and training session.	*Not Applicable*		
Revegetate and re-contour all disturbed areas with native vegetation.	• Improved water quality • Flood control • Enhanced soil productivity • Regional economic benefits		
Construction work limited to the dry season (May 1 – Oct 31) and/or low stream flow periods (June 1 – Nov 1).	• Improved water quality • Flood control • Enhanced soil productivity • Regional economic benefits		
Construction equipment, staging areas, fueling and maintenance vehicles will be located outside of riparian and wetland areas.	• Improved water quality • Flood control • Enhanced soil productivity • Regional economic benefits		
Establishment of buffer zones around off-site parking areas.	• Improved water quality • Flood control • Enhanced soil productivity • Regional economic benefits		

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APPENDIX A | INITIAL REGULATORY FLEXIBILITY ANALYSIS AND ENERGY IMPACT ANALYSIS

273. This appendix considers the extent to which the incremental impacts of critical habitat designation may be borne by small entities and the energy industry. The analysis presented in Section A.1 is conducted pursuant to the RFA as amended by SBREFA of 1996. Information for this analysis was gathered from the U.S. Small Business Administration (SBA), the Service, and from interviews with stakeholders contacted during the development of the economic analysis. The energy analysis in Section A.2 is conducted pursuant to Executive Order No. 13211.

274. The analyses of impacts to small entities and the energy industry rely on the estimated *incremental* impacts resulting from the proposed critical habitat designation. The incremental impacts of the rulemaking are most relevant for the small business and energy impacts analyses, because they reflect costs that may be avoided or reduced based on decisions regarding the composition of the final rule. The post-designation baseline impacts associated with the listing of the frog and other State and local regulations and policies, as quantified in Chapters 4 through 12 of this report, are expected to occur regardless of the outcome of this rulemaking.

A.1 IMPACTS TO SMALL ENTITIES

275. When a Federal agency proposes regulations, the RFA requires the agency to prepare and make available for public comment an analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions).[207]

276. If a proposed rule is not expected to have a significant impact on a substantial number of small entities, the RFA allows an agency to so certify the rule, in lieu of preparing an Initial Regulatory Flexibility Analysis (IRFA).[208] In the case of the proposed critical habitat for the frog, uncertainty exists regarding both the numbers of entities that will be affected by the proposed rule and the degree of impact on individual entities. The problem is complicated by differences among entities – even within the same sector – as to the nature and size of their operations. Therefore, to ensure a broad consideration of impact on small entities, the Service has prepared this IRFA without first making the

[207] 5 U.S.C. § 601 et seq.

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

threshold determination of whether the proposed critical habitat designation could be certified as not having a significant economic impact on a substantial number of small entities.

277. This IRFA is intended to improve the Service's understanding of the effects of the proposed rule on small entities and to identify opportunities to minimize these impacts in the final rulemaking. Exhibit A-1 describes the components of an IRFA. The remainder of this section addresses each of these IRFA requirements.

EXHIBIT A-1 ELEMENTS OF AN IRFA

ELEMENTS OF AN INITIAL REGULATORY FLEXIBILITY ANALYSIS
1. A description of the reasons why the action by the agency is being considered.
2. A succinct statement of the objectives of, and legal basis for, the proposed.
3. A description- and, where feasible, an estimate of the number- of small entities to which the rule will apply.
4. A description of the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the types of professional skills necessary for the preparation of the report or record.
5. An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap, or conflict with the proposed rule.
6. A description of alternatives to the proposed rule which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities.
Source: Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act. pg. 32.

A.1.1 REASONS FOR CONSIDERING THE PROPOSED ACTION

278. Section 4(a)(3) of the Endangered Species Act (Act) requires the Service to designate critical habitat for threatened and endangered species to the maximum extent prudent and determinable.[209] Given that the frog is federally-listed as threatened under the Act, the Service finds that the designation of critical habitat is required. Critical habitat was originally designated for the species on March 13, 2001, followed by a revised designation on April 13, 2006.[210] Then on December 12, 2007 the Center for Biological Diversity filed a complaint against the Service challenging the 2006 revision. In April 2008, the court entered a consent decree requiring a revised critical habitat rule by August 2009. On September 16, 2008, the Service published a Proposed Rule revising the designation of critical habitat for the frog.[211]

279. The benefits of critical habitat designation derive from section 7 of the Act, which requires that Federal agencies, in consultation with the Service, ensure that actions they carry out, permit or fund are not likely to destroy or adversely modify critical habitat. As

[209] 16 U.S.C. Sections 1531-1544.

[210] 66 FR 14626; 71 FR 19244

[211] 73 FR 53492.

noted above, the Act requires the Service to designate critical habitat for threatened and endangered species to the maximum extent prudent and determinable.

A.1.2 OBJECTIVES AND LEGAL BASIS OF THE PROPOSED RULE

280. The purpose of the proposed rule is to designate critical habitat for the frog pursuant to the Endangered Species Act (Act). Section 4(b)(2) of the Act requires that the Service designate critical habitat "on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impacts, of specifying any particular area as critical habitat." This section grants the Secretary [of Interior] discretion to exclude any area from critical habitat if (s)he determines "the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat". The Secretary's discretion is limited, as (s)he may not exclude areas if it "will result in the extinction of the species."

A.1.3 DESCRIPTION AND TYPES AND NUMBER OF SMALL ENTITIES TO WHICH THE RULE WILL APPLY

281. Three types of small entities are defined in the RFA:

- **Small Business -** Section 601(3) of the RFA defines a small business as having the same meaning as small business concern under section 3 of the Small Business Act. This includes any firm that is independently owned and operated and is not dominant in its field of operation. The SBA has developed size standards to carry out the purposes of the Small Business Act, and those size standards can be found in 13 CFR 121.201. The size standards are matched to North American Industry Classification System (NAICS) industries. The SBA definition of a small business applies to a firm's parent company and all affiliates as a single entity.
- **Small Governmental Jurisdiction -** Section 601(5) defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000. Special districts may include those servicing irrigation, ports, parks and recreation, sanitation, drainage, soil and water conservation, road assessment, etc. When counties have populations greater than 50,000, those municipalities of fewer than 50,000 can be identified using population reports. Other types of small government entities are not as easily identified under this standard, as they are not typically classified by population.
- **Small Organization -** Section 601(4) defines a small organization as any not-for-profit enterprise that is independently owned and operated and not dominant in its field. Small organizations may include private hospitals, educational institutions, irrigation districts, public utilities, agricultural co-ops, etc.

282. The courts have held that the RFA/SBREFA requires Federal agencies to perform a regulatory flexibility analysis of forecast impacts to small entities that are directly regulated. In the case of *Mid-Tex Electric Cooperative, Inc., v. Federal Energy*

Regulatory Commission (FERC), FERC proposed regulations affecting the manner in which generating utilities incorporated construction work in progress in their rates. The generating utilities that expected to be regulated were large businesses; however, their customers – transmitting utilities such as electric cooperatives – included numerous small entities. In this case, the court agreed that FERC simply authorized large electric generators to pass these costs through to their transmitting and retail utility customers, and FERC could therefore certify that small entities were not directly affected within the definition of the RFA.[212]

283. Similarly, *American Trucking Associations, Inc. v. Environmental Protection Agency* (EPA) addressed a rulemaking in which EPA established a primary national ambient air quality standard for ozone and particulate matter.[213] The basis of EPA's RFA/SBREFA certification was that this standard did not directly regulate small entities; instead, small entities were indirectly regulated through the implementation of state plans that incorporated the standards. The court found that, while EPA imposed regulation on states, it did not have authority under this rule to impose regulations directly on small entities and therefore small entities were not directly affected within the definition of the RFA.

284. The SBA, in its guidance on how to comply with the RFA, recognizes that consideration of indirectly affected small entities is not required by the RFA, but encourages agencies to perform a regulatory flexibility analysis even when the impacts of its regulation are indirect.[214] "If an agency can accomplish its statutory mission in a more cost-effective manner, the Office of Advocacy [of the SBA] believes that it is good public policy to do so. The only way an agency can determine this is if it does not certify regulations that it knows will have a significant impact on small entities even if the small entities are regulated by a delegation of authority from the federal agency to some other governing body."[215]

285. The regulatory mechanism through which critical habitat protections are enforced is section 7 of the Act, which directly regulates only those activities carried out, funded, or permitted by a Federal agency. By definition, Federal agencies are not considered small entities, although the activities they may fund or permit may be proposed or carried out by small entities. Given the SBA guidance described above, this analysis considers the extent to which this designation could potentially affect small entities, regardless of whether these entities would be directly regulated by the Service through the proposed rule or by a delegation of impact from the directly regulated entity.

286. This IRFA focuses on small entities that may bear the estimated incremental impacts associated with the proposed rulemaking as described in Chapters 4 through 12 of this

[212] 773 F. 2d 327 (D.C. Cir. 1985).

[213] 175 F. 3d 1027, 1044 (D.C. Cir. 1999).

[214] Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act. pg. 20.

[215] *Ibid.*, pg. 21.

report. Specifically, this economic analysis quantifies incremental economic impact of frog conservation associated with urban development, agriculture, ranching, water management, timber harvest activities, transportation, utility and oil and gas pipeline construction and maintenance, fire management and public lands management. However, as described below, only incremental impacts to development and agriculture potentially affect small entities.

287. Impacts are not expected to small entities in other economic sectors potentially affected by this rule for the following reasons:

- **Water Management (Chapter 5)** – No incremental impacts are anticipated for water management activities.
- **Grazing and Ranching (Chapter 7) -** Routine grazing activities on private lands are exempt from the prohibition against take of the frog under a Special Rule issued by the Service under section 4(d) of the Act. Incremental impacts are anticipated to take the form of administrative costs of section 7 consultations between the Service and the NRCS, both Federal agencies. Therefore, no measurable incremental impacts to small entities are anticipated.[216]
- **Timber Harvest Activities (Chapter 8) –** Incremental impacts take the form of additional administrative costs incurred by the USFS to consult with the Service on the frog. No incremental impacts to small entities are anticipated.
- **Transportation (Chapter 9) –** Incremental impacts include administrative costs incurred by the FHWA and Caltrans, a State agency. Thus small entities are not anticipated to incur incremental costs.
- **Oil, Gas, and Mining (Chapter 10)** – Oil and gas operators in the region may include small entities, but the incremental impacts to the oil and gas sector are anticipated to be administrative in nature. Therefore, any potential impacts to small entities are expected to be minimal. One mining company may be affected by the presence of the frog, however these impacts are attributed to the baseline scenario.
- **Fire Management Activities (Chapter 11)** – Incremental impacts include administrative consultation costs incurred by Tahoe National Forest, which is not a small entity.
- **Habitat and Vegetation Management Activities (Chapter 12) –** Incremental impacts are limited to administrative consultation costs incurred by USFS.

288. Incremental impacts to development and agriculture, however, may affect small entities. A description of the types and number of small entities potentially affected follows.

[216] Ranchers may be subject to the pesticide/herbicide use restrictions discussed in Chapter 6. Interviews with representatives of the county agricultural commissions suggest that ranchers use the named herbicides for spot treatment of grazing lands, and the commissions are working with ranchers to identify alternatives. Thus, economic impacts are likely to be minimal.

Urban Development (Chapter 4)

289. This analysis expects frog conservation efforts to affect developers and/or existing landowners, depending on whether developers are able to pass all or a portion of their costs of frog protection measures back to landowners in the form of lower prices paid for undeveloped land. Exhibit A-2 shows the total number of entities and the number of small entities engaged in development activities in the 28 counties of the study area. Based on Dun and Bradstreet data, nearly all developers are considered small. Out of the total number of entities engaged in single-family construction, multi-family construction, and land subdivision, 99 percent are small entities.

EXHIBIT A-2 TOTAL ENTITIES AND SMALL ENTITIES IN THE DEVELOPMENT INDUSTRY

NAICS CODE	DESCRIPTION	TOTAL NUMBER OF ENTITIES	NUMBER OF SMALL ENTITIES
236115	Single-Family Construction	32,996	32,860
236116	Multi-Family Construction	5,993	5,957
237210	Land Subdivision	7,655	7,423
TOTAL		**46,644**	**46,240**

Notes:
Size standard based on SBA's Table of Small Business Size Standards for NAICS 2002 (http://www.sba.gov/size/sizetable2002.pdf). Numbers of businesses are based on Dun and Bradstreet Business Information, "Dun's Market Identifiers," downloaded January 2009.

290. Whether individual developers are affected depends on the specific characteristics of a particular land parcel as well as the availability of land within the affected region. If land is not scarce in the affected region, the price of a specific parcel will likely incorporate any regulatory restrictions on that parcel. Therefore, any costs associated with conservation efforts for the frog will likely be reflected in the price paid for the parcel. In this case, the costs of frog conservation efforts are ultimately borne by the current landowner in the form of reduce land values. Many of these landowners may be individuals or families that are not legally considered to be businesses. No NAICS code exists for landowners, and the SBA does not provide a definition of a small landowner.

291. If, however, land in the affected region is scarce, or the characteristics of the specific parcel are unique, the price of a parcel may not incorporate regulatory restrictions associated with that parcel. In this case, the project developer may be required to incur the additional costs associated with frog conservation efforts. To understand the potential impacts on small entities, this analysis conservatively assumes that all of the private owners of developable lands affected by future frog conservation efforts will be developers. This assumption is likely to overstate the actual impacts to small development firms.

292. To estimate the number of developers potentially affected by the rule, this analysis first estimates the number of development projects potentially constructed within the timeframe of this analysis. Second, the analysis estimates the number of developers required to undertake these projects and determines how many of those developers may be small.

- **Estimate number of development projects potentially affected by critical habitat designation.** This analysis assumes full build out of all acres identified as likely to be developed (as defined in Chapter 4) within the next 22 years. Specifically, over the next 22 years this analysis forecasts development in 1,901 acres in the study area where the frog would likely not be detected (Exhibit 4-5). Thus, incremental impacts are anticipated in these areas. Assuming a 100-acre[217] average development size yields approximately 19 development projects over the next 22 years, or fewer than one project annually.
- **Estimate number of small developers responsible for these projects.** This analysis assumes that one developer is required per development project. Furthermore, this analysis assumes that all developers are considered small. This assumption may overstate the impacts to small entities if some developers are not considered small.

293. In summary, approximately one small developer annually may be affected by the proposed rule. To the extent that projects undertaken by small developers are smaller on average than 100 acres, this estimate may be understated. However, if developers are able to pass their compliance costs back to landowners in the form of lower prices paid for the raw land, this estimate is overstated. Furthermore, if some of these projects are undertaken by large developers, and/or typical project sizes are larger, the number of affected small entities is also overstated.

Agriculture (Chapter 6)

294. This analysis expects frog conservation efforts to affect small farmers. Small businesses in crop production (NAICS subsectors 1111, 1112, and 1113) are defined by SBA as having annual revenues less than $750,000 (hereinafter referred to as "small farms"). Ideally this analysis would rely on geographic data to identify the size of farms within the study area and the percentage of a farm's total harvested acres potentially removed from agricultural production as a result of the pesticide use restriction. However such geographic data are unavailable.

295. In the absence of this information, this analysis uses publically-available Census data and a simplified approach to generate an estimate of the number of small farms affected. First, it estimates the probability that affected acres are located on small farms rather than large farms. Then, the analysis relies upon median farm size to translate the estimated

[217] Industrial Economics, Incorporated, "Draft Economic Analysis of Proposed Critical Habitat Designation for the Quino Checkerspot Butterfly," prepared for the U.S. Fish and Wildlife Service, June 2001.

number of *acres* affected on small farms to an estimate of the number of small farm *entities* affected, by county. As such, this approach makes a simplifying assumption that all acres on a given small farm are affected by the pesticide use restriction. For example, if 104 affected acres are likely to be found on small farms, dividing this number by a median farm size of 13 acres yields an estimate of eight small farm entities affected. This approach likely understates the number of affected small farms, because most farms are unlikely to be completely encompassed by areas subject to the use restrictions. Rather, it is likely that more farms are affected to a smaller degree (e.g., small farms overlap only a portion of the restricted areas). Information enabling further refinement of this methodology is not readily available.

296. Specifically, this analysis employs the following five steps to estimate the number of small farm entities affected, by county:

Step 1 - Identify the acreage and value of cropland subject to incremental impacts. As discussed in Chapter 6.1, at the upper bound, this analysis estimates 7,286 acres affected incrementally as a result of the critical habitat designation, assuming a pesticide buffer area of 200 feet. The methodology to arrive at this acreage is indentified in section 6.2.

Step 2 – Estimate the probability that incrementally affected acres are located on small farms. This step requires an estimate of the percentage of cropped acres in each county farmed by small entities. This percentage is then multiplied by 7,286 acres to estimate the probable number of affected acres found on small farms. To obtain the percentage of cropped acres in each county belonging to small farms, the analysis undertakes three steps.

Step 2a - Estimate the average revenues per acre, by county. According to the Census, the average market value (2007) of agricultural products sold per farm in the study area ranges from a low of $15,732 in El Dorado County to a high of $1,816,906 in Monterey County. To generate a per acre estimate, this analysis divides the average market value of agricultural products sold per farm by the average farm size in each county.[218]

Step 2b - Estimate the maximum number of acres harvested per "small farm," by county. To estimate the maximum number of acres harvested by "small farms," this analysis divides $750,000 by the per acre estimate generated in Step 2a for each county. The result represents the size of the largest small farm in the county as defined by SBA; most farms meeting SBA's criteria are likely to be even smaller in size. Based on this criterion, the largest small farms range from 80 acres in Santa Cruz to 4,005 acres in El Dorado (Exhibit A-3).

[218] Note that information about revenues is only available for all farms in California, including farms primarily devoted to grazing, ranching, and/or dairy production. Thus, the average per acre revenue estimate may over- or understate typical revenues for farms primarily harvesting crops. Furthermore, information regarding median revenues, rather than average, was not readily-available at the writing of this report.

EXHIBIT A-3 ACRES HARVESTED BY FARM WITH SALES OF $750,000 OR LESS, BY COUNTY

COUNTY	AVERAGE SALES PER FARM	AVERAGE FARM SIZE (ACRES)	AVERAGE SALES PER ACRE	ACRES TO ACHIEVE SALES OF $750,000
Contra Costa	$111,687	232	$481	1,558
El Dorado	$15,732	84	$187	4,005
Marin	$226,944	523	$434	1,728
Monterey	$1,816,906	1,108	$1,640	457
Napa	$230,078	136	$1,692	443
San Benito	$356,577	928	$384	1,952
San Joaquin	$431,665	204	$2,116	354
San Luis Obispo	$201,368	492	$409	1,832
San Mateo	$412,008	174	$2,368	317
Santa Barbara	$595,696	455	$1,309	573
Santa Clara	$220,906	281	$786	954
Santa Cruz	$656,037	70	$9,372	80
Solano	$274,489	403	$681	1,101
Ventura	$540,137	106	$5,096	147
California	**$418,164**	**313**	**$1,336**	**561**

Sources: Department of Commerce, Bureau of Economic Analysis, 2008; USDA, National Agricultural Statistics Service. 2007 Census of Agriculture. Volume 1, Chapter 2: County Level Data, Table 1. County Summary Highlights: 2007 and Table 2. Market Value of Agricultural Products Sold Including Direct Sales: 2007 and 2002.
* Estimates subject to rounding.

Step 2c - Identify the percent of cropland harvested by "small farms." The Census includes a breakdown of the number of farms and acres harvested by geographic size and by county. Specifically, the Census breaks down acres harvested across 11 farm size categories with the smallest farm size of 1 to 9 acres to the largest farms classified as having 2,000 acres or more. These data are combined with the information from Step 2b to estimate the percent of acres harvested by "small farms" in each county (Exhibit A-4). For example, to generate revenues of $750,000 in Contra Costa County, a farm must harvest on average 1,558 acres, which falls in the tenth farm size category: 1,000 acres to 1,999 acres. Based on this criterion, all acres harvested by farms with less than 2,000 acres would be classified as "small farms," defined as generating revenues less than $750,000 annually.

EXHIBIT A-4 ESTIMATED PERCENT OF CROPLAND HARVESTED BY FARMS WITH REVENUES $750,000 OR LESS, BY COUNTY

Key: Gray shading indicates those acres harvested by farms with estimated revenues of $750,000 or more.

	HARVESTED CROPLAND (ACRES) BY SIZE OF FARM													
FARM SIZE	CONTRA COSTA	EL DORADO	MARIN	MONTEREY	NAPA	SAN BENITO	SAN JOAQUIN	SAN LUIS OBISPO	SAN MATEO	SANTA BARBARA	SANTA CLARA	SANTA CRUZ	SOLANO	VENTURA
1 to 9 acres	346	454	69	498	1,680	494	2,369	890	94	1,086	772	551	256	2,643
10 to 49 acres	1,605	2,238	174	2,087	7,699	1,319	22,401	7,919	583	5,679	2,434	2,416	2,714	13,311
50 to 69 acres	865	644	-	1,773	2,338	641	7,857	2,626	70	1,504	679	922	1,064	3,963
70 to 99 acres	276	658	21	1,915	2,314	401	12,493	4,425	202	1,829	573	1,229	2,031	4,112
100 to 139 acres	310	540	103	1,805	1,514	1,086	14,589	3,975	1,278	3,082	1,279	547	1,621	4,641
140 to 179 acres	-	464	-	3,346	3,888	470	14,652	3,353	205	1,922	(D)	988	1,602	4,992
180 to 219 acres	-	-	-	2,012	1,411	890	11,065	2,719	431	3,356	793	1,209	1,588	2,540
220 to 259 acres	1,200	263	-	3,494	1,490	1,096	9,389	2,688	186	2,407	(D)	906	1,107	3,816
260 to 499 acres	966	(D)	602	13,264	9,245	2,260	47,961	11,162	1,190	7,229	2,429	3,098	8,468	13,306
500 to 900 acres	3,649	-	561	28,873	4,159	2,075	80,826	12,866	350	11,457	3,132	2,080	11,261	16,571
1000 to 1999 acres	6,745	-	1,947	42,748	7,526	12,716	87,779	19,108	(D)	21,276	7,692	(D)	19,240	14,804
2000 acres or more	7,579	(D)	-	126,019	8,596	9,123	133,289	33,761	(D)	32,453	3,083	(D)	69,458	12,190
Total harvested cropland	**23,541**	**5,261**	**3,477**	**227,834**	**51,860**	**32,571**	**444,670**	**105,492**	**4,589**	**93,280**	**22,866**	**13,946**	**120,410**	**96,889**
Small Farm Definition	**<2,000**	**All**	**<2,000**	**<500**	**<500**	**<2,000**	**<500**	**<2,000**	**<500**	**<1,000**	**<1,000**	**<100**	**<1,000**	**<180**
Percent "Large" Farms	**32%**	**--**	**--**	**87%**	**39%**	**28%**	**68%**	**32%**	**8%**	**58%**	**47%**	**63%**	**58%**	**65%**
Percent "Small" Farms	**68%**	**100%**	**100%**	**13%**	**61%**	**72%**	**32%**	**68%**	**92%**	**42%**	**53%**	**37%**	**42%**	**35%**

Source: Department of Commerce, Bureau of Economic Analysis, 2008; USDA, National Agricultural Statistics Service. 2007 Census of Agriculture. Volume 1, Chapter 2: County Level Data, Table 9. Harvested Cropland by Size of Farm and Acres Harvested: 2007 and 2002.

The percent of acres harvested by farms with less than 2,000 acres in Contra Costa County is approximately 68 percent; alternatively, 32 percent of the acres harvested in Contra Costa County are harvested by farms with 2,000 acres or more. Of the 7,286 acres identified as incrementally affected by the pesticide use restrictions as a result of critical habitat designation, this analysis estimates a total of 4,946 acres (or 68 percent) are likely to be harvested by "small farms" (see Exhibit A-5).

Step 3 - Estimate the number of affected small farms, by county. The preceding steps provide the information necessary to estimate the number of small farms affected by county. Specifically, this analysis divides the estimated number of acres harvested by small farms by the median farm size in each county. This approach yields a lower-bound estimate of the total number of small farms affected in the study area, or 198 (Exhibit A-5). As previously discussed, this estimate likely understates the number of affected small farms because the percentage of acres affected per farm will vary and is likely less than 100 percent. Data limitations prevent a more precise estimate of the number of small farms affected.[219]

EXHIBIT A-5 ACRES HARVESTED BY FARM WITH SALES OF $750,000 OR LESS, BY COUNTY

COUNTY	AFFECTED ACRES	% SMALL FARMS	AFFECTED SMALL FARM ACRES	MEDIAN FARM SIZE	NUMBER OF SMALL FARMS AFFECTED	TOTAL NUMBER OF SMALL FARMS
Contra Costa	154	68%	104	13	8	281
El Dorado	30	100%	30	13	2	627
Marin	539	100%	539	90	6	83
Monterey	101	13%	13	75	0.18	542
Napa	40	61%	24	16	2	1,450
San Benito	1,626	72%	1,170	25	47	310
San Joaquin	43	32%	14	25	1	2,564
San Luis Obispo	2,381	68%	1,619	40	40	1,521
San Mateo	782	92%	722	20	36	150
Santa Barbara	688	42%	292	20	15	1,069
Santa Clara	536	53%	284	10	28	626
Santa Cruz	319	37%	117	10	12	470
Solano	4	42%	2	30	0.06	461
Ventura	42	35%	14	14	1	1,906
Total	**7,286**		**4,946**		**198**	**12,060**

Sources: Department of Commerce, Bureau of Economic Analysis, 2008; USDA, National Agricultural Statistics Service. 2007 Census of Agriculture. Volume 1, Chapter 2: County Level Data, Table 1. County Summary Highlights: 2007 and Table 2. Market Value of Agricultural Products Sold Including Direct Sales: 2007 and 2002.

[219] Assuming that at the upper-bound, all small farms the counties are affected is unrealistic. For example, in Monterey County, 542 farms harvesting crops are estimated to be small, however only 13 small farm acres are likely to be affected.

A.1.4 DESCRIPTION OF THE PROJECTED REPORTING, RECORDKEEPING, AND OTHER COMPLIANCE REQUIREMENTS OF THE RULE

297. Potential impacts to small entities are described in detail below.

Urban Development

298. Over the next 22 years the annualized incremental impact due to critical habitat designation is estimated to range from $9.9 million to $40.7 million. As described in Chapter 4, the majority of these estimates represent the opportunity cost to developers of delaying completion of projects while participating in section 7 consultations and assembling required offsets. These costs also include the administrative effort associated with section 7 consultations and CEQA and costs to purchase habitat offsets or undertake habitat restoration projects.[220]

299. Administrative efforts likely require the expertise of private consultants with Bachelors or Master's Degree level training in biology or ecology, and potentially legal counsel. As discussed earlier, where substitute land is readily available to developers, costs will be borne by affected landowners in the form of decreased land values. Under such circumstances, no reporting or recordkeeping activities are anticipated.

Agriculture

300. This analysis assumes that incremental impacts incurred by modifying agricultural activities will affect small farmers across the study area. As described in Chapter 6, this analysis assumes that the Service will recommend pesticide use restrictions in designated critical habitat. The analysis assumes that the affected lands will be taken out of production. To estimate the potential incremental impact per small farmer, the annualized value of incrementally affected cropland is multiplied by the percentage of small farm acreage estimated in each county (Exhibit A-4). The result, which represents the total annualized loss to small farmers, is then divided by the number of affected small farmers estimated in each county (Exhibit A-5). According to this analysis, annualized incremental impacts are anticipated to range between $500 and $168,000 per farm. Exhibit A-6 presents impacts by county, per small farmer.

301. As discussed in Section A.1.3., information is not available on the percentage of a farm's total harvested acres potentially removed from agricultural production as a result of the pesticide use restriction. Accordingly, this analysis uses county-specific information on the median farm size to estimate the number of small farms affected in the study area. This simplified approach effectively assumes that 100 percent of a farm is affected by the pesticide use restriction. This approach likely understates the number of affected small farms because the actual percentage of acres affected per farm will vary and is likely less than 100 percent. It is important to note that if the number of small farms affected increases, the economic impact per farm estimated in this section will decrease. The

[220] Note that costs to developers are overstated slightly because the total includes section 7 administrative costs incurred by Federal agencies.

imposition of the pesticide application restrictions does not impose recordkeeping or reporting requirements.

EXHIBIT A-6 AGRICULTURAL IMPACTS TO SMALL BUSINESSES IN CROP PRODUCTION: 200 FOOT BUFFER

COUNTY	ANNUALIZED IMPACTS	% ACRES IN SMALL FARMS	SMALL FARM ANNUALIZED IMPACTS	# OF SMALL BUSINESS AFFECTED	ANNUAL IMPACTS PER FARM
Contra Costa	$24,400	68%	$16,500	8	$2,100
El Dorado	$1,100	100%	$1,100	2	$500
Marin	$37,500	100%	$37,500	6	$6,300
Monterey	$226,400	13%	$30,000	0.18	$168,000
Napa	$27,700	61%	$16,900	2	$11,000
San Benito	$1,051,700	72%	$757,200	47	$16,200
San Joaquin	$7,000	32%	$2,300	1	$4,100
San Luis Obispo	$1,375,600	68%	$935,300	40	$23,100
San Mateo	$143,000	92%	$132,100	36	$3,700
Santa Barbara	$213,400	42%	$90,500	15	$6,200
Santa Clara	$40,100	53%	$21,200	28	$700
Santa Cruz	$876,300	37%	$321,600	12	$27,400
Solano	$1,400	42%	$600	0.06	$10,500
Ventura	$48,600	35%	$16,900	1	$16,400
Total	**$4,074,400**		**$2,379,700**	**198**	

Note: Totals may not add due to rounding.

A.1.5 IDENTIFICATION OF ALL RELEVANT FEDERAL RULES THAT MAY DUPLICATE, OVERLAP, OR CONFLICT WITH THE PROPOSED RULE

302. An IRFA must identify any duplicative, overlapping, and conflicting Federal rules. Rules are duplicative or overlapping if they are based on the same or similar reasons for the regulation, the same or similar regulatory goals, and if they regulate the same classes of industry. Rules are conflicting when they impose two conflicting regulatory requirements on the same classes of industry.

303. The protection of listed species and habitat may overlap other sections of the Act. The protections afforded to threatened and endangered species and their habitat are described in sections 7, 9, and 10 of the Act. While the proposed critical habitat regulates activities that are federally-funded, authorized by a Federal agency, or carried out by a Federal agency, section 7 also 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. The baseline conservation efforts quantified in this report overlaps with the jeopardy standard invoked by the listing of the species. The incremental impacts forecast in this report and contemplated in this IRFA

are expected to result from the critical habitat designation, however, and not other Federal rules.

A.1.6 A DESCRIPTION OF ALTERNATIVES TO THE PROPOSED RULE WHICH ACCOMPLISH THE OBJECTIVES AND WHICH MINIMIZE IMPACT ON SMALL ENTITIES

304. In the proposed rule the service identifies 50 units as potential critical habitat for the frog. Section 4(b)(2) of the Act allows the Service to exclude areas proposed for designation based on economic impact and other relevant impacts. As a result, designation of a sub-set of the critical habitat, as it is defined in the proposed rule, is available to the Service as an alternative.

A.2 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY

305. Pursuant to E.O. No. 13211, "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use," issued May 18, 2001, Federal agencies must prepare and submit a "Statement of Energy Effects" for all "significant energy actions." The purpose of this requirement is to ensure that all Federal agencies "appropriately weigh and consider the effects of the Federal Government's regulations on the supply, distribution, and use of energy."[221]

306. OMB guidance for implementing this E.O., outlining nine outcomes that may constitute "a significant adverse effect" when compared with the regulatory action under consideration:

- 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 kilowatts-hours per year or in excess of 500 megawatts of installed capacity;
- Increases in energy use required by the regulatory action that exceed the thresholds above;
- Increases in the cost of energy production in excess of one percent;
- Increases in the cost of energy distribution in excess of one percent; or
- Other similarly adverse outcomes.[222]

307. As highlighted in Chapter 10 (Exhibits 10-2 and 10-3), a number of oil and gas companies own and operate pipelines that pass through the study area and Waste

[221] Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing E.O. 13211, M-01-27, Office of Management and Budget, July 13, 2001, http://www.whitehouse.gov/omb/memoranda/m01-27.html.

[222] Ibid.

Management and the Linde Group plan to build the world's largest landfill gas plant in ALA-2. The incremental impact to these entities over the next 22 years is solely attributable to the costs of section 7 consultation. No measurable impacts to the quantity or cost of energy production and distribution are likely to result from the proposed rule.

APPENDIX B | IMPACTS BY SUBUNIT

Appendix B provides detailed impacts by subunit. A subunit is defined by a unique combination of a proposed critical habitat unit and a census tract.

EXHIBIT B-1 POST-DESIGNATION BASELINE IMPACTS BY PROPOSED CRITICAL HABITAT SUBUNIT (2009 DOLLARS)

SUBUNIT	PRESENT VALUE IMPACTS				ANNUALIZED IMPACTS			
	3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE		3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
ALA-1A-6001430100	$1,330,000	$5,180,000	$1,320,000	$5,180,000	$83,200	$325,000	$119,000	$468,000
ALA-1A-6001450500	$13,300,000	$53,900,000	$13,300,000	$53,900,000	$835,000	$3,380,000	$1,200,000	$4,880,000
ALA-1A-6013345110	$207	$207	$149	$149	$13	$13	$14	$14
ALA-1B-6001435101	$4,130,000	$16,400,000	$4,120,000	$16,400,000	$259,000	$1,030,000	$372,000	$1,480,000
ALA-1B-6001438000	$318	$318	$229	$229	$20	$20	$21	$21
ALA-1B-6001440100	$9,400	$19,300	$7,770	$17,700	$590	$1,210	$702	$1,600
ALA-1B-6001450601	$5,180,000	$21,300,000	$5,170,000	$21,200,000	$325,000	$1,330,000	$467,000	$1,920,000
ALA-2-6001450701	$139,000	$361,000	$117,000	$331,000	$8,700	$22,600	$10,600	$29,900
ALA-2-6001451101	$26,700,000	$106,000,000	$26,700,000	$106,000,000	$1,680,000	$6,640,000	$2,410,000	$9,570,000
ALA-2-6077005203	$353,000	$1,100,000	$353,000	$1,100,000	$22,100	$69,100	$31,900	$99,500
ALA-2-6077005500	$1,170,000	$3,340,000	$1,160,000	$3,320,000	$73,700	$210,000	$105,000	$300,000
ALA-2-6085504308	$52	$130	$37	$94	$3	$8	$3	$8
ALA-2-6085504417	$68,900	$274,000	$68,900	$274,000	$4,320	$17,200	$6,220	$24,800
ALA-2-6085512700	$764,000	$3,050,000	$761,000	$3,040,000	$48,000	$191,000	$68,800	$275,000
BUT-1-6007002400	$173,000	$263,000	$125,000	$190,000	$10,900	$16,500	$11,300	$17,100
CAL-1-6009000210	$2,680,000	$7,690,000	$2,670,000	$7,680,000	$168,000	$483,000	$241,000	$694,000
CAL-1-6009000300	$3	$3	$2	$2	$0	$0	$0	$0
CCS-1-6013347000	$13,100	$14,800	$9,590	$10,800	$822	$930	$867	$979
CCS-1-6013356002	$462,000	$744,000	$370,000	$628,000	$29,000	$46,700	$33,500	$56,800
CCS-1-6013359202	$4,760	$4,760	$3,510	$3,510	$299	$299	$317	$317
CCS-1-6013360100	$480	$480	$346	$346	$30	$30	$31	$31
CCS-2-6001450100	$67	$68	$48	$49	$4	$4	$4	$4
CCS-2-6001450721	$11,900,000	$46,400,000	$11,900,000	$46,400,000	$745,000	$2,910,000	$1,070,000	$4,190,000
CCS-2-6001451101	$37,900,000	$151,000,000	$37,900,000	$151,000,000	$2,380,000	$9,450,000	$3,430,000	$13,600,000
CCS-2-6001451202	$2,200,000	$8,480,000	$2,190,000	$8,480,000	$138,000	$532,000	$198,000	$766,000
CCS-2-6013303200	$34,400	$77,400	$25,200	$56,600	$2,160	$4,860	$2,280	$5,120
CCS-2-6013304000	$246,000	$350,000	$192,000	$272,000	$15,500	$22,000	$17,400	$24,600
CCS-2-6013313103	$6,020	$11,500	$4,530	$8,510	$378	$724	$409	$769
CCS-2-6013313202	$7,700	$16,400	$5,830	$12,100	$483	$1,030	$527	$1,090

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SUBUNIT	PRESENT VALUE IMPACTS				ANNUALIZED IMPACTS			
	3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE		3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
CCS-2-6013346101	$1,470,000	$5,950,000	$1,460,000	$5,950,000	$92,000	$373,000	$132,000	$538,000
CCS-2-6013346102	$134,000	$535,000	$133,000	$534,000	$8,420	$33,600	$12,000	$48,200
CCS-2-6013346201	$1,960	$1,970	$1,480	$1,490	$123	$124	$134	$135
CCS-2-6013355104	$13,200,000	$48,300,000	$13,000,000	$48,100,000	$827,000	$3,030,000	$1,170,000	$4,350,000
CCS-2-6013355106	$416,000	$455,000	$306,000	$334,000	$26,100	$28,600	$27,700	$30,200
CCS-2-6013355200	$32,900	$35,300	$24,600	$26,300	$2,060	$2,220	$2,220	$2,380
CCS-2-6013355303	$19,900	$25,700	$15,000	$19,200	$1,250	$1,610	$1,360	$1,740
CCS-2-6013355304	$612	$1,420	$441	$1,030	$38	$89	$40	$93
ELD-1-6017031302	$0	$0	$0	$0	$0	$0	$0	$0
ELD-1-6017031405	$1,990,000	$6,540,000	$1,930,000	$6,400,000	$125,000	$410,000	$174,000	$578,000
ELD-1-6017031406	$489,000	$1,660,000	$487,000	$1,660,000	$30,700	$104,000	$44,000	$150,000
LOS-1-6037920014	$25,200	$25,200	$18,200	$18,200	$1,580	$1,580	$1,640	$1,640
LOS-1-6037920103	$37,700	$37,700	$27,200	$27,200	$2,360	$2,360	$2,460	$2,460
MEN-1-6045011100	$95,900	$137,000	$73,400	$114,000	$6,020	$8,580	$6,630	$10,300
MNT-1-6053010202	$5,080	$5,080	$3,660	$3,660	$319	$319	$331	$331
MNT-1-6053010304	$41,000	$53,700	$31,000	$43,800	$2,570	$3,370	$2,800	$3,960
MNT-2-6053010702	$49	$80	$35	$58	$3	$5	$3	$5
MNT-2-6053010801	$137	$225	$99	$162	$9	$14	$9	$15
MNT-2-6053011000	$13,500,000	$19,000,000	$10,200,000	$15,700,000	$848,000	$1,190,000	$926,000	$1,420,000
MNT-2-6053011101	$522,000	$1,680,000	$507,000	$1,660,000	$32,800	$106,000	$45,800	$150,000
MNT-2-6053011500	$272	$299	$196	$216	$17	$19	$18	$20
MNT-2-6053011600	$15,800,000	$29,900,000	$12,700,000	$26,800,000	$993,000	$1,880,000	$1,150,000	$2,420,000
MNT-2-6053011700	$159,000	$375,000	$141,000	$357,000	$9,980	$23,500	$12,800	$32,300
MNT-2-6053013200	$293,000	$1,150,000	$292,000	$1,150,000	$18,400	$72,100	$26,400	$104,000
MNT-3-6053011000	$284	$284	$205	$205	$18	$18	$19	$19
MNT-3-6053011500	$8,740,000	$8,770,000	$6,330,000	$6,360,000	$549,000	$551,000	$572,000	$575,000
MRN-1-6041133000	$410,000	$1,520,000	$403,000	$1,510,000	$25,700	$95,300	$36,500	$137,000
MRN-1-6097154302	$4,350	$14,900	$4,330	$14,800	$273	$932	$392	$1,340
MRN-2-6041133000	$91,500	$202,000	$78,500	$189,000	$5,740	$12,700	$7,100	$17,100
MRN-3-6041132200	$588,000	$1,560,000	$528,000	$1,500,000	$36,900	$97,700	$47,800	$135,000

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SUBUNIT	PRESENT VALUE IMPACTS				ANNUALIZED IMPACTS			
	3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE		3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
MRN-3-6041133000	$1,350	$1,350	$979	$979	$85	$85	$89	$89
NAP-1-6055201400	$91,200	$321,000	$87,700	$317,000	$5,720	$20,100	$7,920	$28,700
NAP-1-6055201800	$34,200	$103,000	$31,100	$97,900	$2,150	$6,440	$2,810	$8,850
NEV-1-6057000801	$1,300,000	$4,330,000	$1,230,000	$4,130,000	$81,800	$272,000	$111,000	$374,000
NEV-1-6057000900	$250	$250	$180	$180	$16	$16	$16	$16
PLA-1-6061020200	$291,000	$680,000	$259,000	$647,000	$18,300	$42,700	$23,400	$58,500
RIV-1-6065043224	$63,000	$96,700	$45,800	$70,200	$3,950	$6,070	$4,140	$6,350
SCZ-1-6081613800	$5,280,000	$9,090,000	$4,190,000	$7,950,000	$331,000	$570,000	$379,000	$719,000
SCZ-1-6087100400	$79,800	$197,000	$43,700	$96,400	$5,010	$12,300	$3,950	$8,720
SCZ-1-6087100500	$13,400,000	$50,200,000	$13,400,000	$50,200,000	$842,000	$3,150,000	$1,210,000	$4,540,000
SCZ-1-6087101200	$20,500,000	$39,200,000	$16,700,000	$35,400,000	$1,280,000	$2,460,000	$1,510,000	$3,200,000
SCZ-1-6087120200	$75,900,000	$96,700,000	$56,600,000	$76,800,000	$4,760,000	$6,070,000	$5,120,000	$6,940,000
SCZ-1-6087120301	$2,580	$2,680	$1,860	$1,930	$162	$168	$168	$175
SCZ-1-6087120400	$1,760	$1,840	$1,270	$1,330	$110	$115	$115	$120
SCZ-1-6087120500	$590	$608	$426	$439	$37	$38	$39	$40
SCZ-1-6087120700	$19,400	$19,600	$14,000	$14,100	$1,220	$1,230	$1,270	$1,280
SCZ-2-6087110400	$47	$47	$34	$34	$3	$3	$3	$3
SCZ-2-6087122300	$92,000,000	$151,000,000	$72,000,000	$130,000,000	$5,770,000	$9,480,000	$6,510,000	$11,800,000
SLO-1-6029004500	$35,600	$65,800	$26,500	$49,200	$2,240	$4,130	$2,400	$4,450
SLO-1-6053011400	$28	$77	$20	$56	$2	$5	$2	$5
SLO-1-6079010300	$2,770,000	$9,520,000	$2,740,000	$9,450,000	$174,000	$597,000	$248,000	$854,000
SLO-2-6079010000	$3,180	$3,490	$2,290	$2,520	$200	$219	$207	$227
SLO-2-6079010400	$14,000,000	$55,500,000	$14,000,000	$55,500,000	$879,000	$3,490,000	$1,270,000	$5,020,000
SLO-2-6079010500	$607,000	$2,440,000	$607,000	$2,440,000	$38,100	$153,000	$54,900	$221,000
SLO-2-6079010800	$15,400,000	$15,500,000	$11,200,000	$11,300,000	$965,000	$970,000	$1,020,000	$1,020,000
SLO-3-6079010500	$1,920,000	$7,670,000	$1,920,000	$7,660,000	$120,000	$481,000	$173,000	$693,000
SLO-3-6079010600	$7,360,000	$19,200,000	$6,430,000	$18,300,000	$462,000	$1,210,000	$581,000	$1,650,000
SLO-3-6079010800	$5,510,000	$5,610,000	$4,030,000	$4,100,000	$346,000	$352,000	$364,000	$371,000
SLO-3-6079010901	$1,030,000	$4,060,000	$1,030,000	$4,060,000	$64,800	$255,000	$93,100	$367,000
SLO-3-6079010902	$110,000	$425,000	$110,000	$425,000	$6,920	$26,700	$9,960	$38,400

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SUBUNIT	PRESENT VALUE IMPACTS				ANNUALIZED IMPACTS			
	3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE		3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
SLO-3-6079011000	$2,210,000	$8,700,000	$2,210,000	$8,700,000	$139,000	$546,000	$200,000	$786,000
SLO-3-6079011101	$458	$1,040	$330	$753	$29	$66	$30	$68
SLO-3-6079011102	$10	$23	$7	$16	$1	$1	$1	$1
SLO-3-6079011200	$4,420,000	$17,500,000	$4,420,000	$17,500,000	$278,000	$1,100,000	$400,000	$1,580,000
SLO-3-6079011400	$7,490	$26,400	$7,180	$26,000	$470	$1,650	$649	$2,350
SLO-3-6079011502	$5,050,000	$12,000,000	$4,330,000	$11,300,000	$317,000	$756,000	$391,000	$1,020,000
SLO-3-6079012702	$12,300,000	$30,500,000	$10,600,000	$28,700,000	$773,000	$1,910,000	$958,000	$2,590,000
SLO-3-6079012704	$1,410,000	$5,600,000	$1,410,000	$5,600,000	$88,800	$352,000	$128,000	$506,000
SLO-4-6079011502	$58	$58	$42	$42	$4	$4	$4	$4
SLO-4-6079012302	$2,000	$2,000	$1,440	$1,440	$126	$126	$131	$131
SLO-4-6079012702	$239,000	$686,000	$217,000	$664,000	$15,000	$43,100	$19,600	$60,100
SNB-1-6053010606	$16	$16	$12	$12	$1	$1	$1	$1
SNB-1-6069000200	$11,500	$11,500	$8,320	$8,320	$724	$724	$752	$752
SNB-1-6069000800	$33,300,000	$36,000,000	$24,200,000	$26,300,000	$2,090,000	$2,260,000	$2,180,000	$2,380,000
SNB-2-6069000800	$117,000	$201,000	$89,200	$150,000	$7,370	$12,600	$8,070	$13,600
SNB-3-6053011102	$477	$499	$344	$360	$30	$31	$31	$33
SNB-3-6053011201	$213	$214	$153	$155	$13	$14	$14	$14
SNB-3-6069000800	$171,000	$305,000	$135,000	$246,000	$10,700	$19,100	$12,200	$22,200
SNM-1-6081603000	$2	$5	$2	$4	$0	$0	$0	$0
SNM-1-6081603100	$228,000	$663,000	$205,000	$639,000	$14,300	$41,600	$18,500	$57,800
SNM-1-6081603200	$494,000	$2,010,000	$494,000	$2,010,000	$31,000	$126,000	$44,600	$182,000
SNM-1-6081603300	$212,000	$836,000	$211,000	$835,000	$13,300	$52,500	$19,000	$75,500
SNM-1-6081603400	$31,600	$75,500	$26,500	$69,500	$1,980	$4,730	$2,400	$6,290
SNM-1-6081603500	$274	$481	$198	$347	$17	$30	$18	$31
SNM-1-6081603600	$228,000	$913,000	$228,000	$913,000	$14,300	$57,300	$20,600	$82,600
SNM-1-6081613501	$1,170,000	$1,230,000	$855,000	$903,000	$73,300	$77,200	$77,300	$81,600
SNM-1-6081613502	$2,510,000	$8,970,000	$2,400,000	$8,830,000	$158,000	$563,000	$217,000	$798,000
SNM-1-6081613600	$614,000	$2,340,000	$602,000	$2,320,000	$38,500	$147,000	$54,400	$210,000
SNM-1-6081613700	$1,770,000	$6,310,000	$1,670,000	$6,180,000	$111,000	$396,000	$151,000	$558,000
SNM-2-6081613200	$836	$836	$603	$603	$53	$53	$55	$55

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SUBUNIT	PRESENT VALUE IMPACTS				ANNUALIZED IMPACTS			
	3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE		3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
SNM-2-6081613400	$38,700	$38,700	$27,900	$27,900	$2,430	$2,430	$2,520	$2,520
SNM-2-6081613700	$32,300	$76,900	$27,000	$70,900	$2,030	$4,830	$2,440	$6,410
SNM-2-6081613800	$20,500,000	$59,200,000	$18,200,000	$55,900,000	$1,290,000	$3,710,000	$1,650,000	$5,060,000
SNM-2-6085511703	$444	$444	$320	$320	$28	$28	$29	$29
SNM-2-6087120200	$27,200	$30,600	$19,900	$23,000	$1,710	$1,920	$1,800	$2,080
SNM-2-6087120500	$1,710	$1,710	$1,230	$1,230	$107	$107	$111	$111
SOL-1-6055201002	$16,100	$52,200	$16,100	$52,100	$1,010	$3,280	$1,450	$4,710
SOL-1-6095250102	$967,000	$3,060,000	$964,000	$3,060,000	$60,700	$192,000	$87,100	$276,000
SOL-1-6095252102	$73,000	$243,000	$69,600	$234,000	$4,580	$15,300	$6,290	$21,200
SOL-1-6095252104	$6	$17	$5	$12	$0	$1	$0	$1
SOL-1-6095252202	$836,000	$2,490,000	$810,000	$2,450,000	$52,500	$156,000	$73,200	$222,000
SOL-2-6055201002	$21,800	$56,800	$15,700	$41,000	$1,370	$3,570	$1,420	$3,710
SOL-2-6095252201	$366,000	$1,120,000	$355,000	$1,090,000	$23,000	$70,100	$32,100	$98,400
SOL-3-6055201002	$665,000	$2,110,000	$652,000	$2,080,000	$41,700	$133,000	$58,900	$188,000
SOL-3-6095252201	$1,370,000	$4,200,000	$1,360,000	$4,180,000	$85,800	$264,000	$123,000	$378,000
SON-1-6097151503	$55,800	$140,000	$49,900	$134,000	$3,500	$8,800	$4,510	$12,100
SON-1-6097151600	$19,600	$19,600	$14,200	$14,200	$1,230	$1,230	$1,290	$1,290
SON-2-6097150303	$983	$983	$708	$708	$62	$62	$64	$64
SON-2-6097150500	$1,880	$5,810	$1,830	$5,760	$118	$364	$165	$521
SON-2-6097150606	$15,400	$22,400	$11,900	$19,000	$965	$1,410	$1,080	$1,720
SON-2-6097151309	$64,800	$195,000	$60,700	$188,000	$4,060	$12,300	$5,490	$17,000
SON-3-6041133000	$245,000	$555,000	$214,000	$523,000	$15,300	$34,800	$19,300	$47,300
SON-3-6097150800	$558,000	$1,750,000	$549,000	$1,740,000	$35,000	$110,000	$49,600	$158,000
SON-3-6097151100	$7,770	$22,800	$7,280	$22,400	$487	$1,430	$658	$2,020
STB-1-6083001800	$57,900	$58,600	$41,800	$42,500	$3,630	$3,670	$3,780	$3,840
STB-2-6083002006	$3,600,000	$9,020,000	$3,080,000	$8,340,000	$226,000	$566,000	$278,000	$754,000
STB-2-6083002500	$1,050,000	$1,910,000	$866,000	$1,710,000	$66,000	$120,000	$78,300	$155,000
STB-2-6083002603	$44,100	$44,900	$33,700	$34,300	$2,770	$2,820	$3,050	$3,100
STB-3-6083001800	$66,600	$66,700	$50,100	$50,200	$4,180	$4,180	$4,530	$4,540
STB-3-6083001901	$6,940	$8,380	$5,140	$6,590	$435	$526	$465	$596

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SUBUNIT	PRESENT VALUE IMPACTS				ANNUALIZED IMPACTS			
	3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE		3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
STB-3-6083001905	$35,500	$35,500	$27,200	$27,200	$2,230	$2,230	$2,460	$2,460
STB-4-6083002603	$20,200	$20,200	$14,500	$14,500	$1,270	$1,270	$1,320	$1,320
STB-4-6083002805	$25,900	$25,900	$18,700	$18,700	$1,630	$1,630	$1,690	$1,690
STB-5-6083001906	$34,200	$79,500	$27,400	$67,700	$2,140	$4,990	$2,470	$6,120
STB-5-6083002805	$409,000	$755,000	$322,000	$613,000	$25,600	$47,400	$29,100	$55,400
STB-5-6083002910	$34,400	$86,300	$29,300	$79,500	$2,160	$5,420	$2,650	$7,180
STB-6-6083001906	$2,890	$6,830	$2,080	$4,930	$181	$429	$188	$445
STB-6-6083002910	$26,000,000	$31,600,000	$19,400,000	$24,800,000	$1,630,000	$1,980,000	$1,750,000	$2,240,000
STB-7-6083000103	$115	$223	$83	$161	$7	$14	$8	$15
STB-7-6083000501	$9	$9	$7	$7	$1	$1	$1	$1
STB-7-6083000700	$18	$34	$13	$25	$1	$2	$1	$2
STB-7-6083001500	$57	$57	$41	$41	$4	$4	$4	$4
STB-7-6083001701	$6,090	$6,620	$4,390	$4,770	$382	$416	$397	$432
STB-7-6083001800	$681,000	$838,000	$525,000	$661,000	$42,700	$52,600	$47,400	$59,700
STB-7-6083001906	$41,300	$95,900	$33,800	$84,400	$2,590	$6,020	$3,060	$7,630
STB-7-6083002907	$11	$11	$8	$8	$1	$1	$1	$1
STB-7-6083002910	$9	$9	$6	$6	$1	$1	$1	$1
STB-7-6111000100	$42,400	$51,000	$30,600	$36,800	$2,660	$3,200	$2,760	$3,320
STC-1-6085503312	$145,000	$145,000	$105,000	$105,000	$9,100	$9,120	$9,510	$9,540
STC-1-6085503319	$365	$470	$263	$339	$23	$30	$24	$31
STC-1-6085504201	$44	$105	$32	$76	$3	$7	$3	$7
STC-1-6085504202	$118,000	$470,000	$118,000	$469,000	$7,420	$29,500	$10,700	$42,400
STC-1-6085504308	$7,310	$26,200	$6,920	$25,300	$459	$1,640	$626	$2,280
STC-1-6085512100	$60	$143	$44	$103	$4	$9	$4	$9
STC-1-6085512402	$10	$23	$7	$17	$1	$1	$1	$2
STC-1-6085512700	$2,680,000	$7,840,000	$2,450,000	$7,590,000	$168,000	$492,000	$221,000	$686,000
STC-2-6047002100	$118,000	$280,000	$111,000	$270,000	$7,390	$17,600	$10,100	$24,400
STC-2-6069000100	$652,000	$1,930,000	$533,000	$1,630,000	$40,900	$121,000	$48,200	$147,000
STC-2-6085512402	$8,990	$13,500	$6,880	$11,300	$564	$845	$622	$1,030
STC-2-6085512602	$6,940	$20,900	$6,320	$19,600	$435	$1,310	$571	$1,770

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SUBUNIT	PRESENT VALUE IMPACTS				ANNUALIZED IMPACTS			
	3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE		3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
STC-2-6085512700	$8,160,000	$30,300,000	$7,960,000	$30,100,000	$512,000	$1,900,000	$720,000	$2,720,000
STC-2-6099003400	$7,450	$14,100	$5,980	$12,400	$467	$885	$540	$1,120
VEN-1-6111000902	$13,700,000	$14,400,000	$9,950,000	$10,600,000	$860,000	$904,000	$900,000	$955,000
VEN-1-6111001001	$33,900	$57,300	$26,200	$44,500	$2,130	$3,600	$2,360	$4,020
VEN-1-6111001101	$308	$996	$272	$909	$19	$63	$25	$82
VEN-1-6111001102	$761	$2,170	$621	$1,830	$48	$136	$56	$166
VEN-1-6111001204	$771	$1,840	$556	$1,320	$48	$115	$50	$120
VEN-2-6037920104	$20,300	$20,300	$14,600	$14,600	$1,270	$1,270	$1,320	$1,320
VEN-2-6111000100	$44,500	$44,500	$32,100	$32,100	$2,790	$2,790	$2,900	$2,900
VEN-3-6037800201	$6	$17	$4	$12	$0	$1	$0	$1
VEN-3-6037800302	$1	$1	$1	$1	$0	$0	$0	$0
VEN-3-6111007404	$135,000	$274,000	$97,400	$198,000	$8,450	$17,200	$8,810	$17,900
VEN-3-6111007503	$22,800	$46,400	$16,400	$33,400	$1,430	$2,910	$1,490	$3,020
VEN-3-6111007506	$243	$692	$175	$499	$15	$43	$16	$45
YUB-1-6115041100	$464,000	$1,950,000	$403,000	$1,660,000	$29,100	$123,000	$36,400	$150,000
Total	**$575,000,000**	**$1,340,000,000**	**$488,000,000**	**$1,250,000,000**	**$36,100,000**	**$84,000,000**	**$44,100,000**	**$113,000,000**

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EXHIBIT B-2 POST-DESIGNATION INCREMENTAL IMPACTS BY PROPOSED CRITICAL HABITAT SUBUNIT (2009 DOLLARS)

SUBUNIT	PRESENT VALUE IMPACTS				ANNUALIZED IMPACTS			
	3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE		3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
ALA-1A-6001430100	$870,000	$3,580,000	$868,000	$3,580,000	$54,600	$225,000	$78,500	$324,000
ALA-1A-6001450500	$248,000	$1,020,000	$246,000	$1,010,000	$15,500	$63,700	$22,200	$91,600
ALA-1A-6013345110	$88	$88	$63	$63	$6	$6	$6	$6
ALA-1B-6001435101	$9,630,000	$40,100,000	$9,620,000	$40,100,000	$604,000	$2,520,000	$870,000	$3,630,000
ALA-1B-6001438000	$90	$90	$65	$65	$6	$6	$6	$6
ALA-1B-6001440100	$1,830	$1,830	$1,320	$1,320	$115	$115	$120	$120
ALA-1B-6001450601	$1,140,000	$4,800,000	$1,140,000	$4,790,000	$71,500	$301,000	$103,000	$433,000
ALA-2-6001450701	$238,000	$671,000	$209,000	$642,000	$14,900	$42,100	$18,900	$58,100
ALA-2-6001451101	$17,700,000	$72,700,000	$17,600,000	$72,600,000	$1,110,000	$4,560,000	$1,590,000	$6,560,000
ALA-2-6077005203	$444	$444	$331	$331	$28	$28	$30	$30
ALA-2-6077005500	$477,000	$1,220,000	$433,000	$1,170,000	$30,000	$76,800	$39,200	$106,000
ALA-2-6085504308	$53,100	$217,000	$53,100	$217,000	$3,330	$13,600	$4,800	$19,600
ALA-2-6085504417	$137	$137	$99	$99	$9	$9	$9	$9
ALA-2-6085512700	$977,000	$3,970,000	$967,000	$3,960,000	$61,300	$249,000	$87,400	$358,000
BUT-1-6007002400	$3,880	$3,880	$2,800	$2,800	$243	$243	$253	$253
CAL-1-6009000210	$2,150,000	$7,030,000	$2,150,000	$7,020,000	$135,000	$441,000	$194,000	$635,000
CAL-1-6009000300	$2,180	$7,080	$2,180	$7,080	$137	$444	$197	$640
CCS-1-6013347000	$497,000	$2,020,000	$492,000	$2,020,000	$31,200	$127,000	$44,500	$183,000
CCS-1-6013356002	$315,000	$1,100,000	$298,000	$1,080,000	$19,800	$68,700	$27,000	$97,400
CCS-1-6013359202	$502	$502	$386	$386	$32	$32	$35	$35
CCS-1-6013360100	$25	$25	$18	$18	$2	$2	$2	$2
CCS-2-6001450100	$2	$2	$2	$2	$0	$0	$0	$0
CCS-2-6001450721	$6,520	$6,520	$4,950	$4,950	$409	$409	$447	$447
CCS-2-6001451101	$2,710,000	$11,200,000	$2,700,000	$11,200,000	$170,000	$702,000	$244,000	$1,010,000
CCS-2-6001451202	$89,900	$349,000	$89,300	$349,000	$5,640	$21,900	$8,070	$31,500
CCS-2-6013303200	$721	$721	$563	$563	$45	$45	$51	$51
CCS-2-6013304000	$3,940	$3,940	$3,090	$3,090	$247	$247	$280	$280
CCS-2-6013313103	$1,030	$1,030	$807	$807	$65	$65	$73	$73
CCS-2-6013313202	$1,540	$1,540	$1,200	$1,200	$97	$97	$109	$109

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SUBUNIT	PRESENT VALUE IMPACTS				ANNUALIZED IMPACTS			
	3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE		3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
CCS-2-6013346101	$533	$533	$393	$393	$34	$34	$36	$36
CCS-2-6013346102	$642	$642	$464	$464	$40	$40	$42	$42
CCS-2-6013346201	$317	$317	$252	$252	$20	$20	$23	$23
CCS-2-6013355104	$6,170,000	$24,000,000	$6,060,000	$23,900,000	$387,000	$1,510,000	$548,000	$2,160,000
CCS-2-6013355106	$8,560	$8,560	$6,700	$6,700	$537	$537	$606	$606
CCS-2-6013355200	$338	$338	$244	$244	$21	$21	$22	$22
CCS-2-6013355303	$3,310	$3,310	$2,620	$2,620	$208	$208	$237	$237
CCS-2-6013355304	$108	$108	$78	$78	$7	$7	$7	$7
ELD-1-6017031302	$0	$0	$0	$0	$0	$0	$0	$0
ELD-1-6017031405	$2,110,000	$7,930,000	$2,100,000	$7,920,000	$132,000	$497,000	$190,000	$716,000
ELD-1-6017031406	$422,000	$1,600,000	$421,000	$1,600,000	$26,500	$100,000	$38,100	$145,000
LOS-1-6037920014	$3,270	$3,270	$2,350	$2,350	$205	$205	$213	$213
LOS-1-6037920103	$4,270	$4,270	$3,080	$3,080	$268	$268	$278	$278
MEN-1-6045011100	$2,140,000	$8,480,000	$2,130,000	$8,480,000	$134,000	$532,000	$193,000	$767,000
MNT-1-6053010202	$24	$24	$17	$17	$2	$2	$2	$2
MNT-1-6053010304	$124	$124	$90	$90	$8	$8	$8	$8
MNT-2-6053010702	$758	$3,120	$755	$3,110	$48	$196	$68	$281
MNT-2-6053010801	$1,480	$4,640	$1,460	$4,630	$93	$291	$132	$419
MNT-2-6053011000	$3,540,000	$4,730,000	$2,670,000	$3,910,000	$222,000	$297,000	$241,000	$354,000
MNT-2-6053011101	$897,000	$2,290,000	$785,000	$2,180,000	$56,300	$144,000	$71,000	$197,000
MNT-2-6053011500	$149	$450	$135	$436	$9	$28	$12	$39
MNT-2-6053011600	$3,020,000	$11,300,000	$2,910,000	$11,200,000	$190,000	$710,000	$263,000	$1,010,000
MNT-2-6053011700	$3,960	$3,960	$3,930	$3,930	$249	$249	$355	$355
MNT-2-6053013200	$38,600	$159,000	$38,500	$159,000	$2,420	$9,980	$3,480	$14,400
MNT-3-6053011000	$31	$31	$22	$22	$2	$2	$2	$2
MNT-3-6053011500	$21,400	$53,600	$19,100	$51,400	$1,340	$3,360	$1,730	$4,640
MRN-1-6041133000	$138,000	$562,000	$138,000	$562,000	$8,670	$35,300	$12,500	$50,800
MRN-1-6097154302	$5	$5	$4	$4	$0	$0	$0	$0
MRN-2-6041133000	$644,000	$2,180,000	$602,000	$2,140,000	$40,400	$137,000	$54,400	$193,000
MRN-3-6041132200	$670,000	$1,260,000	$538,000	$1,130,000	$42,000	$79,200	$48,600	$102,000

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SUBUNIT	PRESENT VALUE IMPACTS				ANNUALIZED IMPACTS			
	3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE		3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
MRN-3-6041133000	$8	$8	$7	$7	$1	$1	$1	$1
NAP-1-6055201400	$7,940	$32,200	$7,920	$32,200	$498	$2,020	$716	$2,910
NAP-1-6055201800	$4,990	$19,800	$4,980	$19,800	$313	$1,240	$451	$1,790
NEV-1-6057000801	$1,440,000	$5,420,000	$1,420,000	$5,410,000	$90,000	$340,000	$129,000	$489,000
NEV-1-6057000900	$0	$0	$0	$0	$0	$0	$0	$0
PLA-1-6061020200	$22,500	$22,500	$16,200	$16,200	$1,410	$1,410	$1,470	$1,470
RIV-1-6065043224	$458	$458	$441	$441	$29	$29	$40	$40
SCZ-1-6081613800	$173,000	$362,000	$145,000	$344,000	$10,900	$22,700	$13,100	$31,100
SCZ-1-6087100400	$2,440	$2,440	$1,210	$1,210	$153	$153	$109	$109
SCZ-1-6087100500	$7,980	$7,980	$5,960	$5,960	$501	$501	$538	$538
SCZ-1-6087101200	$4,200	$4,200	$3,140	$3,140	$264	$264	$284	$284
SCZ-1-6087120200	$17,800,000	$28,500,000	$13,900,000	$24,600,000	$1,120,000	$1,790,000	$1,250,000	$2,230,000
SCZ-1-6087120301	$6,990	$27,900	$6,970	$27,900	$439	$1,750	$630	$2,520
SCZ-1-6087120400	$38,100	$101,000	$32,300	$92,300	$2,390	$6,340	$2,920	$8,350
SCZ-1-6087120500	$13	$13	$9	$9	$1	$1	$1	$1
SCZ-1-6087120700	$295	$295	$213	$213	$19	$19	$19	$19
SCZ-2-6087110400	$3	$3	$2	$2	$0	$0	$0	$0
SCZ-2-6087122300	$1,270,000	$1,290,000	$969,000	$1,150,000	$79,400	$80,700	$87,600	$104,000
SLO-1-6029004500	$21,100	$47,900	$19,400	$46,200	$1,320	$3,000	$1,750	$4,180
SLO-1-6053011400	$3	$3	$2	$2	$0	$0	$0	$0
SLO-1-6079010300	$1,470,000	$5,040,000	$1,400,000	$4,970,000	$92,300	$316,000	$127,000	$449,000
SLO-2-6079010000	$38,000	$158,000	$38,000	$157,000	$2,390	$9,880	$3,430	$14,200
SLO-2-6079010400	$3,900,000	$16,200,000	$3,900,000	$16,200,000	$245,000	$1,020,000	$353,000	$1,460,000
SLO-2-6079010500	$10,900	$44,500	$10,800	$44,500	$681	$2,800	$976	$4,020
SLO-2-6079010800	$3,700,000	$3,690,000	$2,670,000	$2,660,000	$232,000	$231,000	$241,000	$241,000
SLO-3-6079010500	$153,000	$474,000	$139,000	$459,000	$9,630	$29,700	$12,500	$41,500
SLO-3-6079010600	$3,190,000	$8,830,000	$2,810,000	$8,480,000	$200,000	$554,000	$254,000	$767,000
SLO-3-6079010800	$13,500,000	$13,500,000	$9,750,000	$9,720,000	$848,000	$846,000	$881,000	$878,000
SLO-3-6079010901	$2,460,000	$3,660,000	$1,880,000	$3,050,000	$155,000	$229,000	$170,000	$276,000
SLO-3-6079010902	$150	$150	$118	$118	$9	$9	$11	$11

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SUBUNIT	PRESENT VALUE IMPACTS				ANNUALIZED IMPACTS			
	3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE		3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
SLO-3-6079011000	$79,700	$315,000	$79,400	$314,000	$5,000	$19,700	$7,180	$28,400
SLO-3-6079011101	$75	$75	$54	$54	$5	$5	$5	$5
SLO-3-6079011102	$2	$2	$1	$1	$0	$0	$0	$0
SLO-3-6079011200	$4,390,000	$18,200,000	$4,380,000	$18,200,000	$275,000	$1,140,000	$396,000	$1,640,000
SLO-3-6079011400	$120	$120	$97	$97	$8	$8	$9	$9
SLO-3-6079011502	$795,000	$1,740,000	$660,000	$1,610,000	$49,900	$109,000	$59,700	$146,000
SLO-3-6079012702	$8,440,000	$30,200,000	$8,030,000	$29,900,000	$529,000	$1,900,000	$726,000	$2,700,000
SLO-3-6079012704	$2,840,000	$11,800,000	$2,840,000	$11,800,000	$178,000	$740,000	$257,000	$1,070,000
SLO-4-6079011502	$8	$8	$6	$6	$0	$0	$0	$0
SLO-4-6079012302	$241	$241	$174	$174	$15	$15	$16	$16
SLO-4-6079012702	$520,000	$2,130,000	$518,000	$2,120,000	$32,600	$133,000	$46,800	$192,000
SNB-1-6053010606	$2	$2	$1	$1	$0	$0	$0	$0
SNB-1-6069000200	$473	$473	$341	$341	$30	$30	$31	$31
SNB-1-6069000800	$13,700,000	$15,400,000	$9,900,000	$11,300,000	$859,000	$968,000	$895,000	$1,020,000
SNB-2-6069000800	$7,350	$10,800	$6,090	$9,580	$461	$680	$551	$866
SNB-3-6053011102	$3,300	$11,500	$3,290	$11,500	$207	$723	$298	$1,040
SNB-3-6053011201	$29	$29	$21	$21	$2	$2	$2	$2
SNB-3-6069000800	$2,390,000	$3,700,000	$1,830,000	$3,090,000	$150,000	$232,000	$165,000	$279,000
SNM-1-6081603000	$0	$0	$0	$0	$0	$0	$0	$0
SNM-1-6081603100	$174	$174	$139	$139	$11	$11	$13	$13
SNM-1-6081603200	$228	$228	$167	$167	$14	$14	$15	$15
SNM-1-6081603300	$121,000	$504,000	$121,000	$504,000	$7,600	$31,600	$10,900	$45,500
SNM-1-6081603400	$55,100	$229,000	$55,000	$228,000	$3,460	$14,300	$4,970	$20,600
SNM-1-6081603500	$18	$18	$13	$13	$1	$1	$1	$1
SNM-1-6081603600	$76	$76	$56	$56	$5	$5	$5	$5
SNM-1-6081613501	$48,900	$45,600	$36,000	$34,400	$3,070	$2,860	$3,260	$3,110
SNM-1-6081613502	$740,000	$2,430,000	$683,000	$2,380,000	$46,400	$153,000	$61,800	$215,000
SNM-1-6081613600	$472,000	$1,870,000	$462,000	$1,850,000	$29,600	$117,000	$41,800	$168,000
SNM-1-6081613700	$1,850,000	$6,900,000	$1,770,000	$6,800,000	$116,000	$433,000	$160,000	$615,000
SNM-2-6081613200	$94,000	$404,000	$94,000	$404,000	$5,900	$25,300	$8,500	$36,500

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SUBUNIT	PRESENT VALUE IMPACTS				ANNUALIZED IMPACTS			
	3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE		3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
SNM-2-6081613400	$110,000	$460,000	$110,000	$460,000	$6,930	$28,900	$9,980	$41,600
SNM-2-6081613700	$88,500	$374,000	$88,500	$374,000	$5,550	$23,500	$8,000	$33,800
SNM-2-6081613800	$14,100,000	$53,100,000	$13,600,000	$52,700,000	$882,000	$3,330,000	$1,230,000	$4,760,000
SNM-2-6085511703	$21,600	$77,800	$20,400	$76,600	$1,350	$4,880	$1,840	$6,930
SNM-2-6087120200	$11,300	$43,800	$11,200	$43,700	$711	$2,750	$1,010	$3,950
SNM-2-6087120500	$32	$32	$23	$23	$2	$2	$2	$2
SOL-1-6055201002	$7,920	$28,800	$7,900	$28,700	$497	$1,800	$715	$2,600
SOL-1-6095250102	$13,300	$43,000	$12,900	$42,600	$833	$2,700	$1,160	$3,850
SOL-1-6095252102	$25,000	$93,800	$24,800	$93,600	$1,570	$5,890	$2,240	$8,460
SOL-1-6095252104	$0	$0	$0	$0	$0	$0	$0	$0
SOL-1-6095252202	$263,000	$931,000	$262,000	$930,000	$16,500	$58,400	$23,700	$84,100
SOL-2-6055201002	$99,500	$369,000	$95,500	$353,000	$6,240	$23,100	$8,630	$31,900
SOL-2-6095252201	$352,000	$1,240,000	$349,000	$1,230,000	$22,100	$77,600	$31,600	$111,000
SOL-3-6055201002	$521,000	$1,060,000	$426,000	$951,000	$32,700	$66,700	$38,600	$86,000
SOL-3-6095252201	$324,000	$1,130,000	$323,000	$1,130,000	$20,300	$70,900	$29,200	$102,000
SON-1-6097151503	$81	$81	$72	$72	$5	$5	$6	$6
SON-1-6097151600	$122	$122	$118	$118	$8	$8	$11	$11
SON-2-6097150303	$1,850	$7,000	$1,850	$7,000	$116	$439	$167	$633
SON-2-6097150500	$2	$2	$1	$1	$0	$0	$0	$0
SON-2-6097150606	$21,400	$78,900	$21,400	$78,900	$1,350	$4,950	$1,940	$7,130
SON-2-6097151309	$21,500	$79,900	$21,400	$79,800	$1,350	$5,010	$1,940	$7,220
SON-3-6041133000	$194	$194	$163	$163	$12	$12	$15	$15
SON-3-6097150800	$34,000	$123,000	$33,800	$122,000	$2,130	$7,690	$3,060	$11,100
SON-3-6097151100	$13	$13	$12	$12	$1	$1	$1	$1
STB-1-6083001800	$6,660	$9,360	$5,050	$7,750	$418	$588	$456	$701
STB-2-6083002006	$1,330,000	$4,780,000	$1,270,000	$4,720,000	$83,600	$300,000	$115,000	$427,000
STB-2-6083002500	$385,000	$1,180,000	$351,000	$1,150,000	$24,200	$74,100	$31,700	$104,000
STB-2-6083002603	$405,000	$409,000	$293,000	$296,000	$25,400	$25,700	$26,500	$26,700
STB-3-6083001800	$33,900	$43,500	$25,700	$34,300	$2,130	$2,730	$2,320	$3,100
STB-3-6083001901	$1,260	$3,830	$1,140	$3,710	$79	$241	$103	$336

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SUBUNIT	PRESENT VALUE IMPACTS				ANNUALIZED IMPACTS			
	3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE		3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
STB-3-6083001905	$31,100	$34,900	$23,300	$27,200	$1,950	$2,190	$2,110	$2,460
STB-4-6083002603	$233	$233	$168	$168	$15	$15	$15	$15
STB-4-6083002805	$1,720	$1,720	$1,240	$1,240	$108	$108	$112	$112
STB-5-6083001906	$6,290	$22,200	$5,980	$21,900	$395	$1,390	$541	$1,980
STB-5-6083002805	$42,000	$41,100	$31,300	$30,700	$2,640	$2,580	$2,830	$2,770
STB-5-6083002910	$1,120	$2,760	$957	$2,590	$70	$173	$87	$234
STB-6-6083001906	$1,740	$6,460	$1,690	$6,400	$109	$405	$152	$579
STB-6-6083002910	$1,610,000	$2,290,000	$1,240,000	$1,970,000	$101,000	$143,000	$112,000	$178,000
STB-7-6083000103	$18	$18	$13	$13	$1	$1	$1	$1
STB-7-6083000501	$2	$2	$2	$2	$0	$0	$0	$0
STB-7-6083000700	$740	$3,000	$739	$3,000	$47	$188	$67	$271
STB-7-6083001500	$15	$15	$11	$11	$1	$1	$1	$1
STB-7-6083001701	$3,380	$8,900	$2,940	$8,450	$212	$558	$266	$764
STB-7-6083001800	$354,000	$510,000	$274,000	$435,000	$22,200	$32,000	$24,800	$39,300
STB-7-6083001906	$1,340,000	$1,420,000	$976,000	$1,050,000	$84,300	$89,100	$88,200	$95,000
STB-7-6083002907	$3	$3	$2	$2	$0	$0	$0	$0
STB-7-6083002910	$2	$2	$2	$2	$0	$0	$0	$0
STB-7-6111000100	$12,100	$12,100	$8,720	$8,720	$759	$759	$789	$789
STC-1-6085503312	$93	$93	$79	$79	$6	$6	$7	$7
STC-1-6085503319	$15	$15	$11	$11	$1	$1	$1	$1
STC-1-6085504201	$4	$4	$3	$3	$0	$0	$0	$0
STC-1-6085504202	$102,000	$422,000	$101,000	$422,000	$6,370	$26,500	$9,170	$38,200
STC-1-6085504308	$137	$137	$99	$99	$9	$9	$9	$9
STC-1-6085512100	$6	$6	$4	$4	$0	$0	$0	$0
STC-1-6085512402	$181	$759	$180	$759	$11	$48	$16	$69
STC-1-6085512700	$2,090,000	$7,930,000	$2,020,000	$7,870,000	$131,000	$498,000	$183,000	$712,000
STC-2-6047002100	$20,200	$53,700	$19,800	$53,300	$1,270	$3,370	$1,790	$4,820
STC-2-6069000100	$310,000	$1,100,000	$290,000	$1,060,000	$19,500	$68,900	$26,300	$95,900
STC-2-6085512402	$414	$1,720	$412	$1,720	$26	$108	$37	$155
STC-2-6085512602	$62,400	$256,000	$62,100	$256,000	$3,920	$16,100	$5,610	$23,100

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SUBUNIT	PRESENT VALUE IMPACTS				ANNUALIZED IMPACTS			
	3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE		3 PERCENT DISCOUNT RATE		7 PERCENT DISCOUNT RATE	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
STC-2-6085512700	$9,120,000	$36,500,000	$8,980,000	$36,400,000	$572,000	$2,290,000	$812,000	$3,290,000
STC-2-6099003400	$3,220	$11,300	$3,090	$11,200	$202	$712	$279	$1,010
VEN-1-6111000902	$1,090,000	$920,000	$792,000	$696,000	$68,200	$57,700	$71,600	$62,900
VEN-1-6111001001	$484	$484	$355	$355	$30	$30	$32	$32
VEN-1-6111001101	$13	$13	$10	$10	$1	$1	$1	$1
VEN-1-6111001102	$254	$881	$241	$867	$16	$55	$22	$78
VEN-1-6111001204	$73	$73	$52	$52	$5	$5	$5	$5
VEN-2-6037920104	$2,850	$2,850	$2,060	$2,060	$179	$179	$186	$186
VEN-2-6111000100	$5,320	$5,320	$3,840	$3,840	$334	$334	$347	$347
VEN-3-6037800201	$1	$1	$0	$0	$0	$0	$0	$0
VEN-3-6037800302	$0	$0	$0	$0	$0	$0	$0	$0
VEN-3-6111007404	$676,000	$2,780,000	$673,000	$2,770,000	$42,400	$174,000	$60,900	$251,000
VEN-3-6111007503	$13,800	$48,900	$13,200	$48,300	$866	$3,070	$1,200	$4,370
VEN-3-6111007506	$22	$22	$16	$16	$1	$1	$1	$1
YUB-1-6115041100	$184,000	$723,000	$183,000	$722,000	$11,600	$45,400	$16,600	$65,300
Total	**$178,000,000**	**$519,000,000**	**$159,000,000**	**$500,000,000**	**$11,200,000**	**$32,500,000**	**$14,400,000**	**$45,200,000**

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EXHIBIT B-3 RANGE OF POST-DESIGNATION BASELINE IMPACTS BY PROPOSED CRITICAL HABITAT SUBUNIT (2009 DOLLARS, APPLYING A SEVEN PERCENT DISCOUNT RATE)

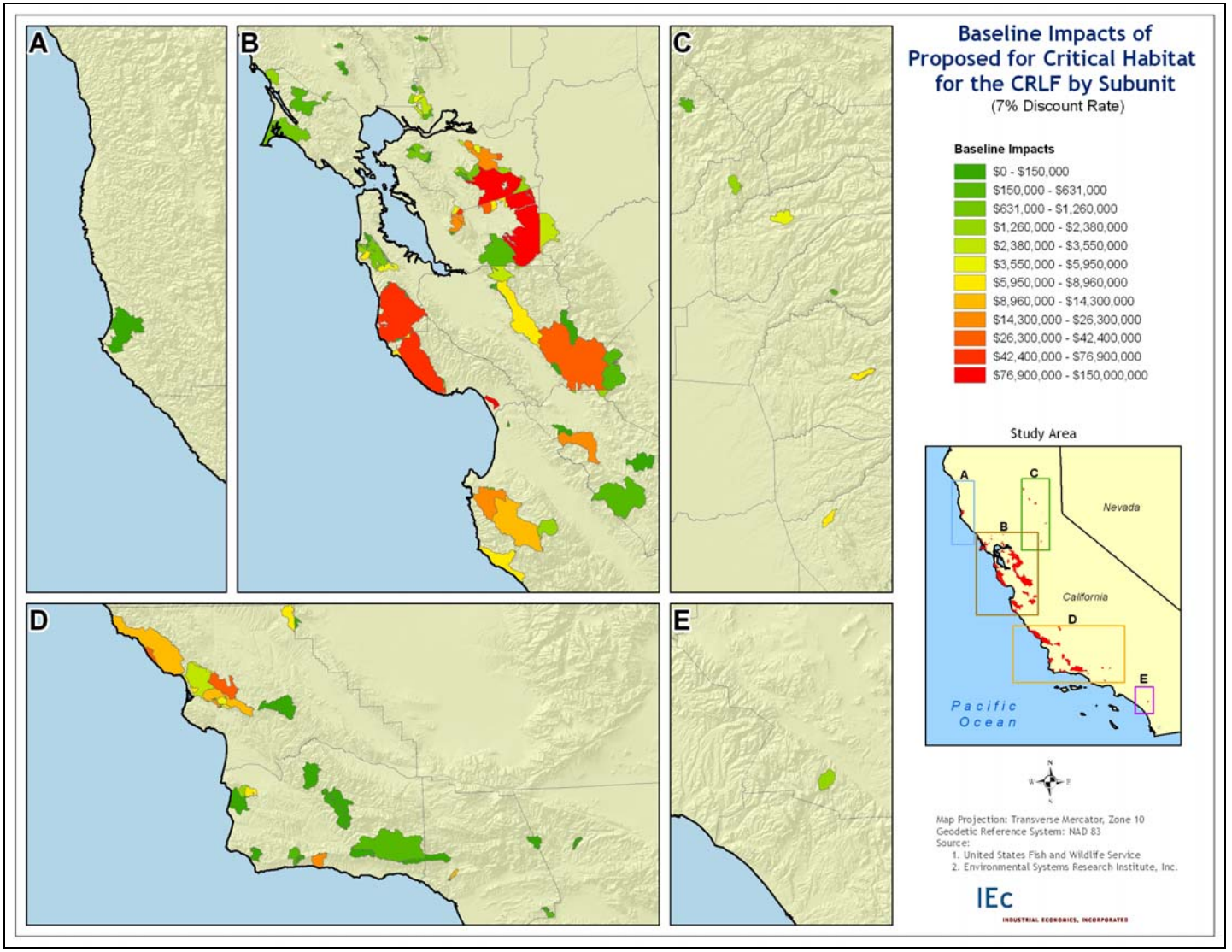

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EXHIBIT B-4 RANGE OF POST-DESIGNATION INCREMENTAL IMPACTS BY PROPOSED CRITICAL HABITAT SUBUNIT (2009 DOLLARS, APPLYING A SEVEN PERCENT DISCOUNT RATE)

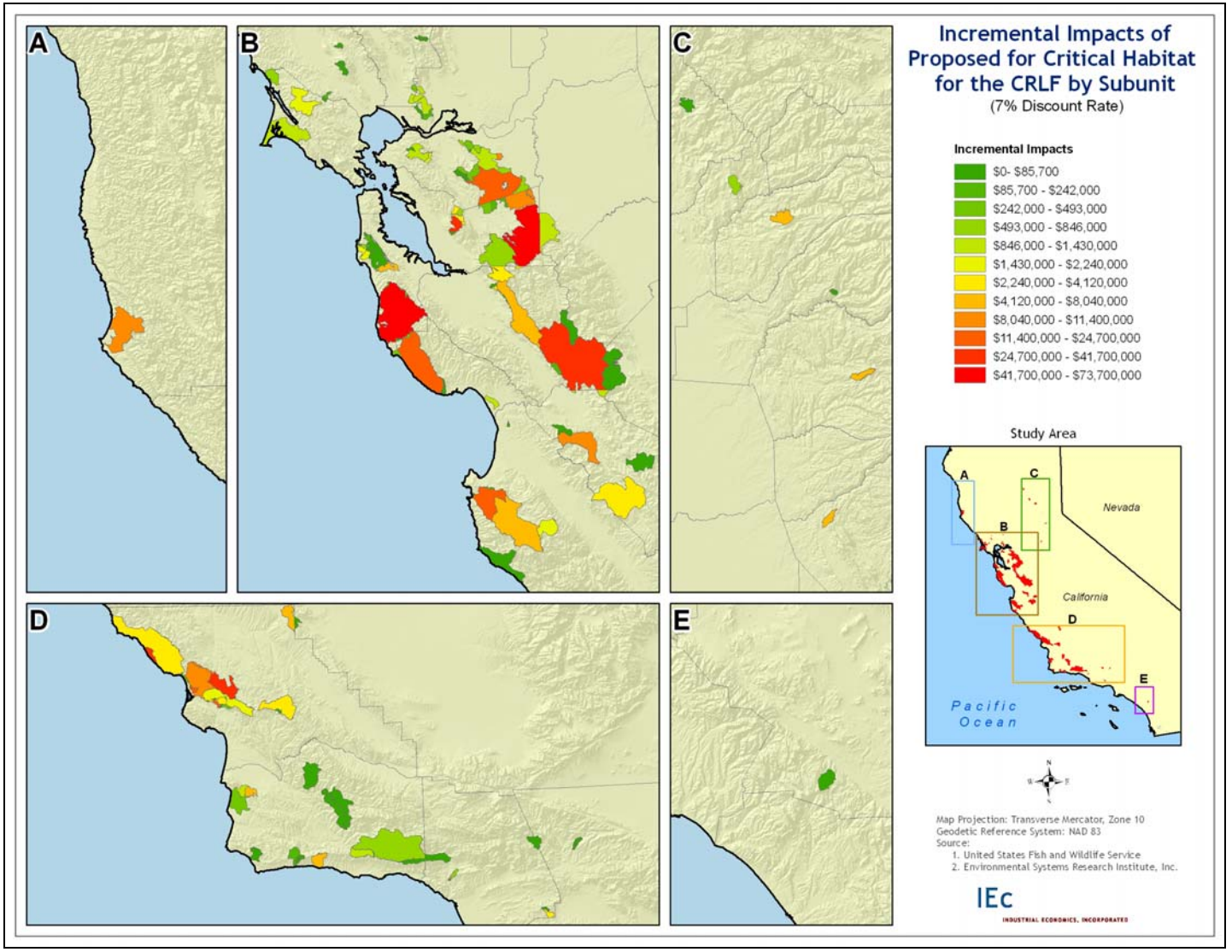

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EXHIBIT B-5 RANGE OF POST-DESIGNATION BASELINE IMPACTS BY PROPOSED CRITICAL HABITAT SUBUNIT (2009 DOLLARS, APPLYING A THREE PERCENT DISCOUNT RATE)

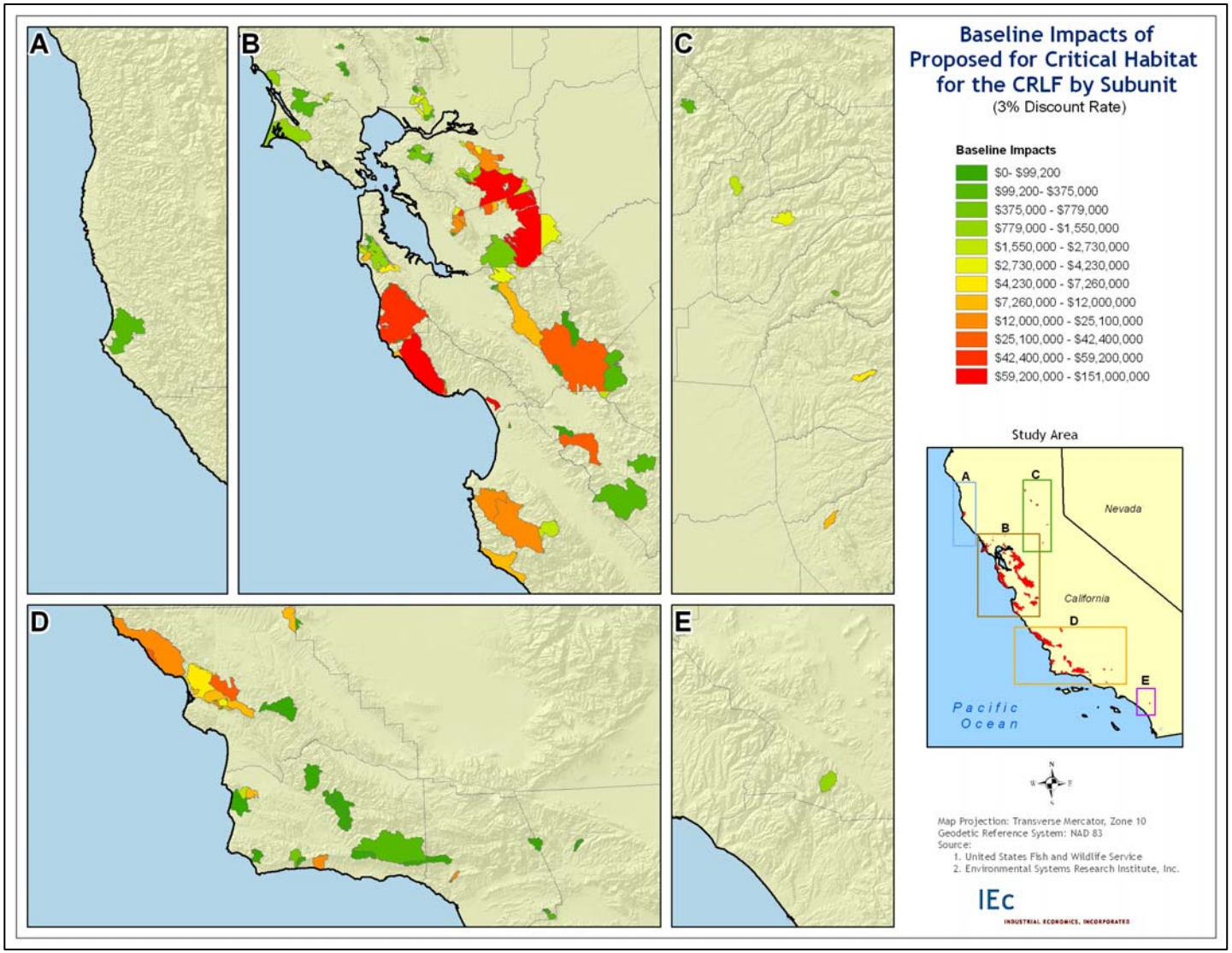

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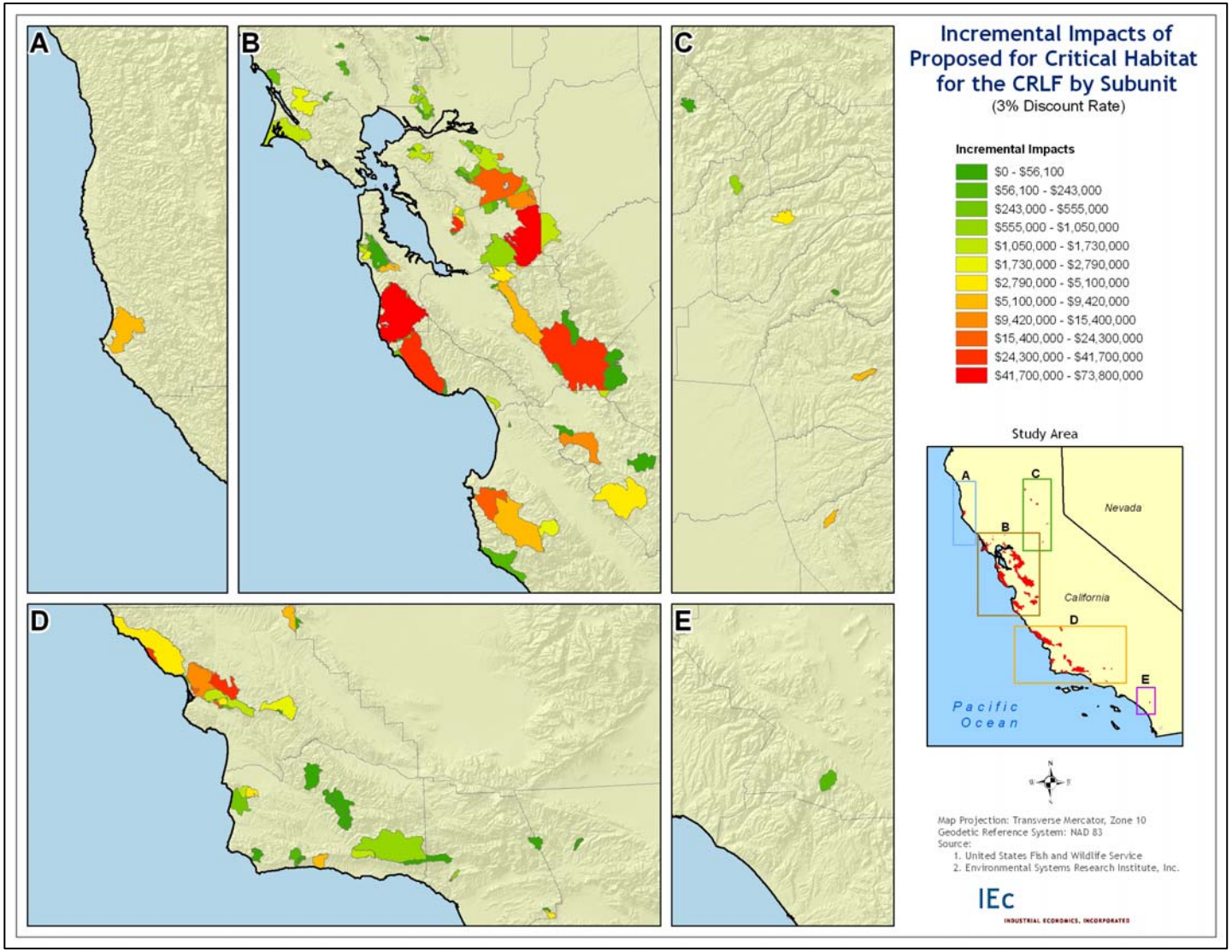
EXHIBIT B-6 RANGE OF POST-DESIGNATION INCREMENTAL IMPACTS BY PROPOSED CRITICAL HABITAT SUBUNIT (2009 DOLLARS, APPLYING A THREE PERCENT DISCOUNT RATE)



APPENDIX C | THREE PERCENT DISCOUNT RATE EXHIBITS

Appendix C provides detailed tables for impacts discussed in the Chapters. Present values and annualized costs are estimated based on a discount rate of three percent.

EXHIBIT C-1 PRESENT VALUE POST-DESIGNATION BASELINE IMPACTS BY PROPOSED CRITICAL HABITAT UNIT AND ACTIVITY (2009 DOLLARS, HIGH-END SCENARIO, THREE PERCENT DISCOUNT RATE)

UNIT	DEVELOPMENT	WATER MANAGEMENT	AGRICULTURE	TIMBER HARVEST	TRANSPORTATION	FIRE MANAGEMENT	UTILITY & PIPELINE	SPECIES MANAGEMENT	TOTAL
ALA-1A	$59,100,000	$22,400	$0	$0	$0	$0	$0	$30	$59,100,000
ALA-1B	$37,600,000	$86,600	$0	$0	$0	$0	$0	$83	$37,700,000
ALA-2	$114,000,000	$192,000	$34,300	$0	$0	$0	$226,000	$2,310	$114,000,000
BUT-1	$0	$60,400	$0	$115,000	$0	$17,700	$0	$69,500	$263,000
CAL-1	$7,650,000	$40,300	$0	$0	$0	$0	$0	$0	$7,690,000
CCS-1	$269,000	$111,000	$270,000	$0	$0	$0	$113,000	$147	$764,000
CCS-2	$259,000,000	$341,000	$1,370,000	$0	$612,000	$0	$338,000	$1,400	$261,000,000
ELD-1	$7,700,000	$60,400	$1,850	$317,000	$0	$0	$0	$123,000	$8,200,000
LOS-1	$0	$40,300	$0	$0	$0	$13,600	$0	$9,010	$62,900
MEN-1	$56,200	$80,600	$0	$0	$0	$0	$0	$0	$137,000
MNT-1	$18,100	$40,600	$0	$0	$0	$0	$0	$75	$58,800
MNT-2	$27,900,000	$203,000	$23,000,000	$0	$913,000	$0	$113,000	$17,800	$52,100,000
MNT-3	$46,800	$99,500	$8,620,000	$0	$0	$0	$0	$4,170	$8,780,000
MRN-1	$1,510,000	$20,100	$2,630	$0	$0	$0	$0	$1,860	$1,530,000
MRN-2	$149,000	$40,300	$7,560	$0	$0	$0	$0	$5,390	$202,000
MRN-3	$1,300,000	$80,600	$175,000	$0	$0	$0	$0	$8,100	$1,560,000
NAP-1	$393,000	$20,100	$10,500	$0	$0	$0	$0	$0	$423,000
NEV-1	$3,620,000	$80,600	$2,770	$546,000	$0	$1,060	$0	$85,000	$4,330,000
PLA-1	$564,000	$71,400	$0	$6,110	$0	$0	$0	$38,100	$680,000
RIV-1	$0	$60,400	$36,300	$0	$0	$0	$0	$0	$96,700
SCZ-1	$105,000,000	$166,000	$84,900,000	$4,550,000	$167,000	$0	$113,000	$97,700	$195,000,000
SCZ-2	$75,600,000	$64,200	$75,300,000	$0	$167,000	$0	$0	$5,710	$151,000,000
SLO-1	$9,190,000	$46,500	$103,000	$0	$0	$0	$226,000	$17,300	$9,580,000
SLO-2	$58,000,000	$109,000	$15,200,000	$0	$0	$0	$113,000	$14,000	$73,400,000
SLO-3	$92,500,000	$172,000	$18,200,000	$0	$310,000	$0	$226,000	$15,100	$111,000,000
SLO-4	$598,000	$74,800	$11,100	$0	$0	$0	$0	$4,550	$688,000
SNB-1	$804,000	$67,900	$35,200,000	$0	$0	$0	$0	$1,470	$36,000,000
SNB-2	$3,070	$23,700	$61,000	$0	$0	$0	$113,000	$701	$201,000
SNB-3	$68,300	$73,600	$48,500	$0	$0	$0	$113,000	$2,590	$306,000

UNIT	DEVELOPMENT	WATER MANAGEMENT	AGRICULTURE	TIMBER HARVEST	TRANSPORTATION	FIRE MANAGEMENT	UTILITY & PIPELINE	SPECIES MANAGEMENT	TOTAL
SNM-1	$20,900,000	$154,000	$2,170,000	$0	$0	$0	$113,000	$340	$23,400,000
SNM-2	$47,100,000	$197,000	$6,130,000	$5,920,000	$0	$0	$0	$2,120	$59,300,000
SOL-1	$5,640,000	$20,100	$76,100	$0	$0	$0	$113,000	$0	$5,850,000
SOL-2	$1,010,000	$20,100	$29,100	$0	$0	$0	$113,000	$0	$1,170,000
SOL-3	$6,140,000	$40,300	$27,500	$0	$0	$0	$113,000	$0	$6,320,000
SON-1	$119,000	$40,300	$524	$0	$0	$0	$0	$0	$160,000
SON-2	$183,000	$20,100	$21,100	$0	$0	$0	$0	$0	$224,000
SON-3	$2,150,000	$40,300	$137,000	$0	$0	$0	$0	$184	$2,330,000
STB-1	$961	$51,300	$0	$0	$0	$0	$0	$6,260	$58,600
STB-2	$7,660,000	$56,100	$3,130,000	$0	$0	$0	$113,000	$8,390	$11,000,000
STB-3	$2,100	$81,300	$15,300	$0	$0	$0	$0	$11,800	$111,000
STB-4	$0	$44,100	$0	$0	$0	$0	$0	$2,030	$46,100
STB-5	$98,900	$66,100	$234,000	$0	$292,000	$0	$226,000	$3,030	$920,000
STB-6	$6,940,000	$65,700	$24,300,000	$0	$0	$0	$226,000	$2,830	$31,600,000
STB-7	$165,000	$166,000	$507,000	$0	$0	$0	$113,000	$41,900	$992,000
STC-1	$7,250,000	$91,000	$1,040,000	$0	$0	$0	$113,000	$309	$8,480,000
STC-2	$30,400,000	$152,000	$1,930,000	$0	$0	$0	$113,000	$3,620	$32,600,000
VEN-1	$505,000	$26,400	$13,800,000	$0	$0	$0	$113,000	$2,010	$14,500,000
VEN-2	$0	$51,500	$0	$0	$0	$1,940	$0	$11,300	$64,800
VEN-3	$0	$91,200	$1,260	$0	$0	$0	$226,000	$3,450	$322,000
YUB-1	$903,000	$40,300	$0	$957,000	$0	$0	$0	$53,600	$1,950,000
Total	**$999,000,000**	**$4,060,000**	**$316,000,000**	**$12,400,000**	**$2,460,000**	**$34,300**	**$3,380,000**	**$678,000**	**$1,340,000,000**

EXHIBIT C-2 PRESENT VALUE POST-DESIGNATION INCREMENTAL IMPACTS BY PROPOSED CRITICAL HABITAT UNIT AND ACTIVITY (2009 DOLLARS, HIGH-END SCENARIO, THREE PERCENT DISCOUNT RATE)

UNIT	DEVELOPMENT	WATER MANAGEMENT	AGRICULTURE	GRAZING	TIMBER HARVEST	TRANSPORTATION	FIRE MANAGEMENT	UTILITY & PIPELINE	SPECIES MANAGEMENT	TOTAL
ALA-1A	$4,590,000	$738	$0	$8,800	$0	$0	$0	$0	$10	$4,600,000
ALA-1B	$44,900,000	$2,020	$0	$24,500	$0	$0	$0	$0	$28	$44,900,000
ALA-2	$78,200,000	$23,700	$127,000	$370,000	$0	$0	$0	$5,670	$770	$78,700,000
BUT-1	$0	$0	$0	$0	$3,880	$0	$0	$0	$0	$3,880
CAL-1	$7,030,000	$0	$0	$0	$0	$0	$0	$0	$0	$7,030,000
CCS-1	$3,040,000	$3,460	$77,900	$0	$0	$0	$0	$2,840	$49	$3,120,000
CCS-2	$35,200,000	$33,100	$338,000	$0	$0	$7,490	$0	$8,510	$465	$35,600,000
ELD-1	$9,510,000	$0	$19,200	$0	$2,080	$0	$0	$0	$0	$9,530,000
LOS-1	$0	$0	$0	$0	$0	$0	$4,530	$0	$3,000	$7,540
MEN-1	$8,480,000	$0	$0	$0	$0	$0	$0	$0	$0	$8,480,000
MNT-1	$4	$119	$0	$0	$0	$0	$0	$0	$25	$148
MNT-2	$14,700,000	$27,400	$3,730,000	$0	$0	$11,200	$0	$2,840	$5,920	$18,500,000
MNT-3	$42,900	$6,320	$3,050	$0	$0	$0	$0	$0	$1,390	$53,600
MRN-1	$559,000	$0	$2,210	$0	$0	$0	$0	$0	$621	$562,000
MRN-2	$2,020,000	$0	$156,000	$0	$0	$0	$0	$0	$1,800	$2,180,000
MRN-3	$795,000	$0	$465,000	$0	$0	$0	$0	$0	$2,700	$1,260,000
NAP-1	$51,700	$0	$282	$0	$0	$0	$0	$0	$0	$52,000
NEV-1	$5,380,000	$0	$924	$0	$4,550	$0	$37,200	$0	$0	$5,420,000
PLA-1	$178	$3,660	$0	$0	$2,040	$0	$16,700	$0	$0	$22,500
RIV-1	$0	$0	$458	$0	$0	$0	$0	$0	$0	$458
SCZ-1	$15,000,000	$21,700	$14,000,000	$0	$0	$2,040	$0	$2,840	$32,600	$29,100,000
SCZ-2	$827,000	$1,250	$453,000	$0	$0	$2,040	$0	$0	$1,900	$1,290,000
SLO-1	$4,840,000	$2,080	$232,000	$0	$0	$0	$0	$5,670	$5,770	$5,080,000
SLO-2	$16,400,000	$16,400	$3,670,000	$0	$0	$0	$0	$2,840	$4,650	$20,100,000
SLO-3	$69,900,000	$17,000	$18,700,000	$0	$0	$3,800	$0	$5,670	$5,030	$88,700,000
SLO-4	$2,120,000	$4,800	$3,700	$0	$0	$0	$0	$0	$1,520	$2,130,000
SNB-1	$476,000	$2,480	$14,900,000	$0	$0	$0	$0	$0	$489	$15,400,000
SNB-2	$4,640	$1,190	$1,940	$0	$0	$0	$0	$2,840	$234	$10,800
SNB-3	$1,510,000	$4,380	$2,200,000	$0	$0	$0	$0	$2,840	$863	$3,710,000
SNM-1	$11,300,000	$4,270	$629,000	$0	$0	$0	$0	$2,840	$113	$12,000,000
SNM-2	$52,800,000	$11,900	$1,670,000	$0	$0	$0	$0	$0	$708	$54,500,000

UNIT	DEVELOPMENT	WATER MANAGEMENT	AGRICULTURE	GRAZING	TIMBER HARVEST	TRANSPORTATION	FIRE MANAGEMENT	UTILITY & PIPELINE	SPECIES MANAGEMENT	TOTAL
SOL-1	$1,090,000	$0	$1,020	$0	$0	$0	$0	$2,840	$0	$1,100,000
SOL-2	$1,520,000	$0	$80,300	$0	$0	$0	$0	$2,840	$0	$1,610,000
SOL-3	$1,790,000	$0	$399,000	$0	$0	$0	$0	$2,840	$0	$2,190,000
SON-1	$28	$0	$175	$0	$0	$0	$0	$0	$0	$203
SON-2	$166,000	$0	$183	$0	$0	$0	$0	$0	$0	$166,000
SON-3	$122,000	$0	$249	$0	$0	$0	$0	$0	$62	$123,000
STB-1	$3,590	$3,690	$0	$0	$0	$0	$0	$0	$2,090	$9,360
STB-2	$5,620,000	$5,280	$738,000	$0	$0	$0	$0	$2,840	$2,800	$6,370,000
STB-3	$16,500	$6,970	$54,900	$0	$0	$0	$0	$0	$3,950	$82,300
STB-4	$0	$1,270	$0	$0	$0	$0	$0	$0	$675	$1,950
STB-5	$23,300	$1,890	$30,700	$0	$0	$3,580	$0	$5,670	$1,010	$66,100
STB-6	$1,150,000	$1,760	$1,130,000	$0	$0	$0	$0	$5,670	$943	$2,290,000
STB-7	$339,000	$28,400	$1,570,000	$0	$0	$0	$0	$2,840	$14,000	$1,950,000
STC-1	$8,130,000	$3,470	$218,000	$0	$0	$0	$0	$2,840	$103	$8,360,000
STC-2	$37,300,000	$10,300	$593,000	$0	$0	$0	$0	$2,840	$1,210	$37,900,000
VEN-1	$118,000	$2,080	$798,000	$0	$0	$0	$0	$2,840	$670	$921,000
VEN-2	$0	$3,740	$0	$0	$0	$0	$646	$0	$3,780	$8,170
VEN-3	$2,820,000	$3,560	$419	$0	$0	$0	$0	$5,670	$1,150	$2,830,000
YUB-1	$720,000	$0	$0	$0	$2,990	$0	$0	$0	$0	$723,000
Total	**$451,000,000**	**$260,000**	**$67,000,000**	**$404,000**	**$15,500**	**$30,100**	**$59,000**	**$85,100**	**$103,000**	**$519,000,000**

EXHIBIT C-3 PRESENT VALUE POST-DESIGNATION IMPACTS BY ACTIVITY AND DISTRIBUTION OF IMPACTS BY ACTIVITY (2009 DOLLARS, HIGH-END SCENARIO, THREE PERCENT DISCOUNT RATE)

ACTIVITY	BASELINE IMPACTS		INCREMENTAL IMPACTS	
	PRESENT VALUE IMPACTS	PERCENT OF TOTAL IMPACTS	PRESENT VALUE IMPACTS	PERCENT OF TOTAL IMPACTS
Development	$999,000,000	75%	$451,000,000	87%
Water Management	$4,060,000	0%	$260,000	0%
Agriculture	$316,000,000	24%	$67,000,000	13%
Grazing	$0	0%	$404,000	0%
Timber Harvest	$12,400,000	1%	$15,500	0%
Transportation	$2,460,000	0%	$30,100	0%
Fire Management	$34,300	0%	$59,000	0%
Utility & Pipeline	$3,380,000	0%	$85,100	0%
Species Management	$678,000	0%	$103,000	0%
Total	**$1,340,000,000**	**100%**	**$519,000,000**	**100%**

EXHIBIT C-4 ANNUALIZED POST-DESIGNATION BASELINE IMPACTS BY PROPOSED CRITICAL HABITAT UNIT AND ACTIVITY (2009 DOLLARS, HIGH-END SCENARIO, THREE PERCENT DISCOUNT RATE)

UNIT	DEVELOPMENT	WATER MANAGEMENT	AGRICULTURE	TIMBER HARVEST	TRANSPORTATION	FIRE MANAGEMENT	UTILITY & PIPELINE	SPECIES MANAGEMENT	TOTAL
ALA-1A	$3,710,000	$1,400	$0	$0	$0	$0	$0	$2	$3,710,000
ALA-1B	$2,360,000	$5,440	$0	$0	$0	$0	$0	$5	$2,360,000
ALA-2	$7,130,000	$12,000	$2,150	$0	$0	$0	$14,200	$145	$7,150,000
BUT-1	$0	$3,790	$0	$7,230	$0	$1,110	$0	$4,360	$16,500
CAL-1	$480,000	$2,530	$0	$0	$0	$0	$0	$0	$483,000
CCS-1	$16,900	$6,970	$17,000	$0	$0	$0	$7,080	$9	$47,900
CCS-2	$16,200,000	$21,400	$86,100	$0	$38,400	$0	$21,200	$88	$16,400,000
ELD-1	$483,000	$3,790	$116	$19,900	$0	$0	$0	$7,730	$515,000
LOS-1	$0	$2,530	$0	$0	$0	$853	$0	$565	$3,950
MEN-1	$3,530	$5,060	$0	$0	$0	$0	$0	$0	$8,580
MNT-1	$1,140	$2,550	$0	$0	$0	$0	$0	$5	$3,690
MNT-2	$1,750,000	$12,700	$1,440,000	$0	$57,300	$0	$7,080	$1,110	$3,270,000
MNT-3	$2,940	$6,240	$541,000	$0	$0	$0	$0	$262	$551,000
MRN-1	$94,700	$1,260	$165	$0	$0	$0	$0	$117	$96,300
MRN-2	$9,330	$2,530	$475	$0	$0	$0	$0	$338	$12,700
MRN-3	$81,300	$5,060	$11,000	$0	$0	$0	$0	$508	$97,800
NAP-1	$24,600	$1,260	$656	$0	$0	$0	$0	$0	$26,600
NEV-1	$227,000	$5,060	$174	$34,300	$0	$67	$0	$5,340	$272,000
PLA-1	$35,400	$4,480	$0	$383	$0	$0	$0	$2,390	$42,700
RIV-1	$0	$3,790	$2,280	$0	$0	$0	$0	$0	$6,070
SCZ-1	$6,620,000	$10,400	$5,330,000	$285,000	$10,500	$0	$7,080	$6,130	$12,300,000
SCZ-2	$4,740,000	$4,030	$4,720,000	$0	$10,500	$0	$0	$358	$9,480,000
SLO-1	$577,000	$2,920	$6,460	$0	$0	$0	$14,200	$1,090	$601,000
SLO-2	$3,640,000	$6,870	$956,000	$0	$0	$0	$7,080	$876	$4,610,000
SLO-3	$5,800,000	$10,800	$1,140,000	$0	$19,500	$0	$14,200	$946	$6,990,000
SLO-4	$37,500	$4,690	$697	$0	$0	$0	$0	$285	$43,200
SNB-1	$50,400	$4,260	$2,210,000	$0	$0	$0	$0	$92	$2,260,000
SNB-2	$193	$1,490	$3,830	$0	$0	$0	$7,080	$44	$12,600
SNB-3	$4,290	$4,620	$3,040	$0	$0	$0	$7,080	$163	$19,200
SNM-1	$1,310,000	$9,650	$136,000	$0	$0	$0	$7,080	$21	$1,470,000

UNIT	DEVELOPMENT	WATER MANAGEMENT	AGRICULTURE	TIMBER HARVEST	TRANSPORTATION	FIRE MANAGEMENT	UTILITY & PIPELINE	SPECIES MANAGEMENT	TOTAL
SNM-2	$2,960,000	$12,400	$385,000	$371,000	$0	$0	$0	$133	$3,720,000
SOL-1	$354,000	$1,260	$4,780	$0	$0	$0	$7,080	$0	$367,000
SOL-2	$63,500	$1,260	$1,830	$0	$0	$0	$7,080	$0	$73,700
SOL-3	$385,000	$2,530	$1,720	$0	$0	$0	$7,080	$0	$396,000
SON-1	$7,470	$2,530	$33	$0	$0	$0	$0	$0	$10,000
SON-2	$11,500	$1,260	$1,320	$0	$0	$0	$0	$0	$14,100
SON-3	$135,000	$2,530	$8,630	$0	$0	$0	$0	$12	$146,000
STB-1	$60	$3,220	$0	$0	$0	$0	$0	$393	$3,670
STB-2	$481,000	$3,520	$197,000	$0	$0	$0	$7,080	$526	$688,000
STB-3	$132	$5,100	$961	$0	$0	$0	$0	$743	$6,940
STB-4	$0	$2,770	$0	$0	$0	$0	$0	$127	$2,890
STB-5	$6,200	$4,150	$14,700	$0	$18,400	$0	$14,200	$190	$57,800
STB-6	$435,000	$4,120	$1,530,000	$0	$0	$0	$14,200	$177	$1,980,000
STB-7	$10,300	$10,400	$31,800	$0	$0	$0	$7,080	$2,630	$62,200
STC-1	$455,000	$5,710	$65,000	$0	$0	$0	$7,080	$19	$532,000
STC-2	$1,910,000	$9,530	$121,000	$0	$0	$0	$7,080	$227	$2,040,000
VEN-1	$31,700	$1,650	$867,000	$0	$0	$0	$7,080	$126	$908,000
VEN-2	$0	$3,230	$0	$0	$0	$122	$0	$712	$4,070
VEN-3	$0	$5,730	$79	$0	$0	$0	$14,200	$216	$20,200
YUB-1	$56,600	$2,530	$0	$60,100	$0	$0	$0	$3,360	$123,000
Total	**$62,700,000**	**$255,000**	**$19,800,000**	**$779,000**	**$154,000**	**$2,150**	**$212,000**	**$42,600**	**$84,000,000**

EXHIBIT C-5 ANNUALIZED POST-DESIGNATION INCREMENTAL IMPACTS BY PROPOSED CRITICAL HABITAT UNIT AND ACTIVITY (2009 DOLLARS, HIGH-END SCENARIO, THREE PERCENT DISCOUNT RATE)

UNIT	DEVELOPMENT	WATER MANAGEMENT	AGRICULTURE	GRAZING	TIMBER HARVEST	TRANSPORTATION	FIRE MANAGEMENT	UTILITY & PIPELINE	SPECIES MANAGEMENT	TOTAL
ALA-1A	$288,000	$46	$0	$552	$0	$0	$0	$0	$1	$288,000
ALA-1B	$2,820,000	$127	$0	$1,540	$0	$0	$0	$0	$2	$2,820,000
ALA-2	$4,910,000	$1,490	$7,950	$23,200	$0	$0	$0	$356	$48	$4,940,000
BUT-1	$0	$0	$0	$0	$243	$0	$0	$0	$0	$243
CAL-1	$441,000	$0	$0	$0	$0	$0	$0	$0	$0	$441,000
CCS-1	$191,000	$217	$4,890	$0	$0	$0	$0	$178	$3	$196,000
CCS-2	$2,210,000	$2,080	$21,200	$0	$0	$470	$0	$534	$29	$2,230,000
ELD-1	$597,000	$0	$1,200	$0	$131	$0	$0	$0	$0	$598,000
LOS-1	$0	$0	$0	$0	$0	$0	$284	$0	$188	$473
MEN-1	$532,000	$0	$0	$0	$0	$0	$0	$0	$0	$532,000
MNT-1	$0	$7	$0	$0	$0	$0	$0	$0	$2	$9
MNT-2	$925,000	$1,720	$234,000	$0	$0	$701	$0	$178	$372	$1,160,000
MNT-3	$2,690	$396	$192	$0	$0	$0	$0	$0	$87	$3,370
MRN-1	$35,100	$0	$139	$0	$0	$0	$0	$0	$39	$35,300
MRN-2	$127,000	$0	$9,810	$0	$0	$0	$0	$0	$113	$137,000
MRN-3	$49,900	$0	$29,200	$0	$0	$0	$0	$0	$169	$79,200
NAP-1	$3,240	$0	$18	$0	$0	$0	$0	$0	$0	$3,260
NEV-1	$337,000	$0	$58	$0	$285	$0	$2,330	$0	$0	$340,000
PLA-1	$11	$230	$0	$0	$128	$0	$1,040	$0	$0	$1,410
RIV-1	$0	$0	$29	$0	$0	$0	$0	$0	$0	$29
SCZ-1	$940,000	$1,360	$879,000	$0	$0	$128	$0	$178	$2,040	$1,820,000
SCZ-2	$51,900	$78	$28,500	$0	$0	$128	$0	$0	$119	$80,700
SLO-1	$304,000	$130	$14,600	$0	$0	$0	$0	$356	$362	$319,000
SLO-2	$1,030,000	$1,030	$230,000	$0	$0	$0	$0	$178	$292	$1,260,000
SLO-3	$4,390,000	$1,070	$1,170,000	$0	$0	$238	$0	$356	$315	$5,560,000
SLO-4	$133,000	$301	$232	$0	$0	$0	$0	$0	$95	$133,000
SNB-1	$29,900	$156	$938,000	$0	$0	$0	$0	$0	$31	$968,000
SNB-2	$291	$75	$122	$0	$0	$0	$0	$178	$15	$680
SNB-3	$94,500	$275	$138,000	$0	$0	$0	$0	$178	$54	$233,000
SNM-1	$712,000	$268	$39,500	$0	$0	$0	$0	$178	$7	$752,000
SNM-2	$3,310,000	$747	$105,000	$0	$0	$0	$0	$0	$44	$3,420,000
SOL-1	$68,600	$0	$64	$0	$0	$0	$0	$178	$0	$68,800

UNIT	DEVELOPMENT	WATER MANAGEMENT	AGRICULTURE	GRAZING	TIMBER HARVEST	TRANSPORTATION	FIRE MANAGEMENT	UTILITY & PIPELINE	SPECIES MANAGEMENT	TOTAL
SOL-2	$95,500	$0	$5,040	$0	$0	$0	$0	$178	$0	$101,000
SOL-3	$112,000	$0	$25,000	$0	$0	$0	$0	$178	$0	$138,000
SON-1	$2	$0	$11	$0	$0	$0	$0	$0	$0	$13
SON-2	$10,400	$0	$12	$0	$0	$0	$0	$0	$0	$10,400
SON-3	$7,690	$0	$16	$0	$0	$0	$0	$0	$4	$7,700
STB-1	$225	$231	$0	$0	$0	$0	$0	$0	$131	$588
STB-2	$353,000	$331	$46,300	$0	$0	$0	$0	$178	$175	$400,000
STB-3	$1,030	$437	$3,440	$0	$0	$0	$0	$0	$248	$5,160
STB-4	$0	$80	$0	$0	$0	$0	$0	$0	$42	$122
STB-5	$1,460	$119	$1,920	$0	$0	$225	$0	$356	$63	$4,150
STB-6	$72,200	$110	$71,100	$0	$0	$0	$0	$356	$59	$144,000
STB-7	$21,300	$1,780	$98,500	$0	$0	$0	$0	$178	$876	$123,000
STC-1	$510,000	$218	$13,700	$0	$0	$0	$0	$178	$6	$524,000
STC-2	$2,340,000	$648	$37,200	$0	$0	$0	$0	$178	$76	$2,380,000
VEN-1	$7,390	$130	$50,100	$0	$0	$0	$0	$178	$42	$57,800
VEN-2	$0	$235	$0	$0	$0	$0	$41	$0	$237	$513
VEN-3	$177,000	$223	$26	$0	$0	$0	$0	$356	$72	$177,000
YUB-1	$45,200	$0	$0	$0	$188	$0	$0	$0	$0	$45,400
Total	**$28,300,000**	**$16,300**	**$4,210,000**	**$25,300**	**$975**	**$1,890**	**$3,700**	**$5,340**	**$6,460**	**$32,500,000**

EXHIBIT C-6 RANGE OF POST-DESIGNATION BASELINE IMPACTS BY PROPOSED CRITICAL HABITAT SUBUNIT (2009 DOLLARS)

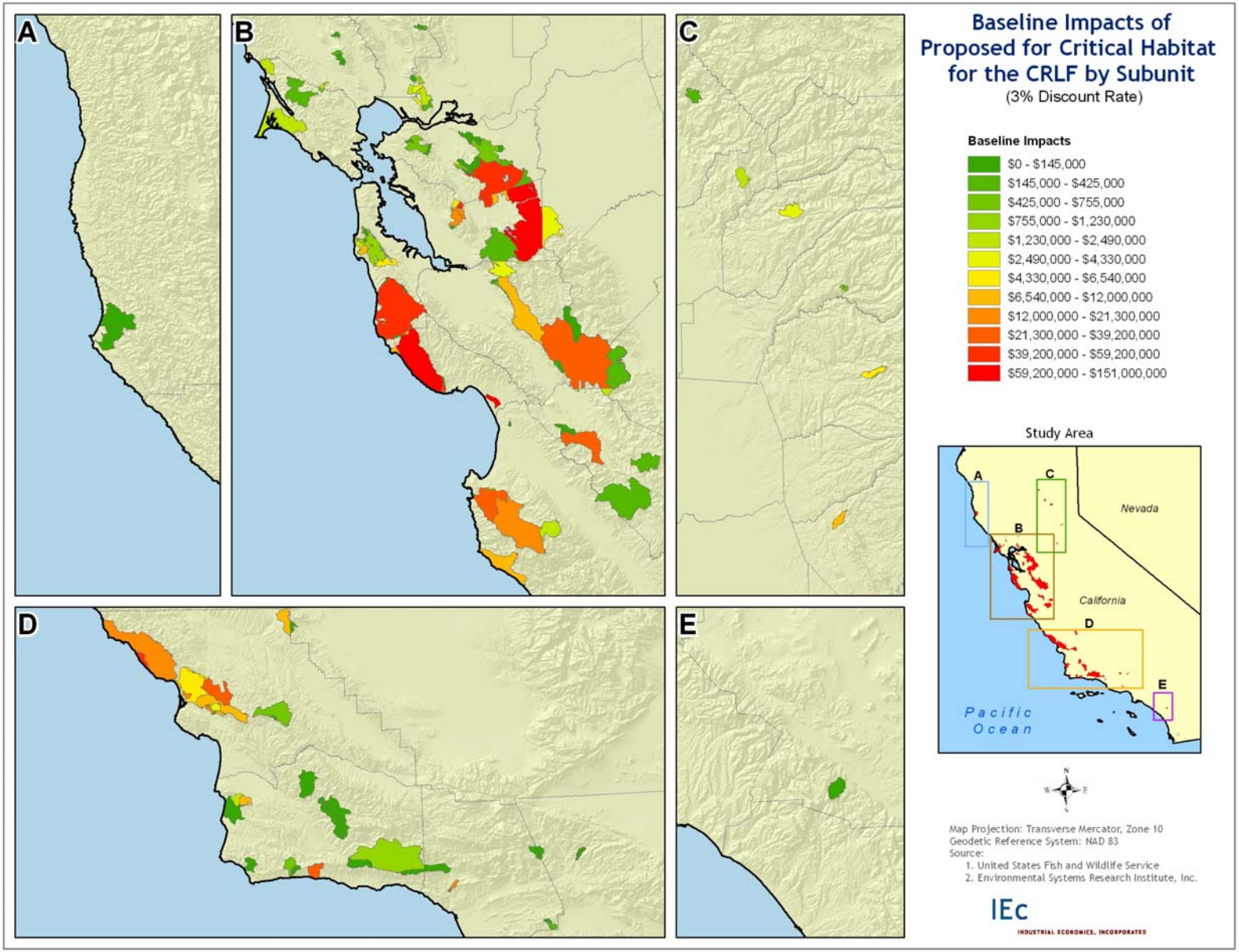
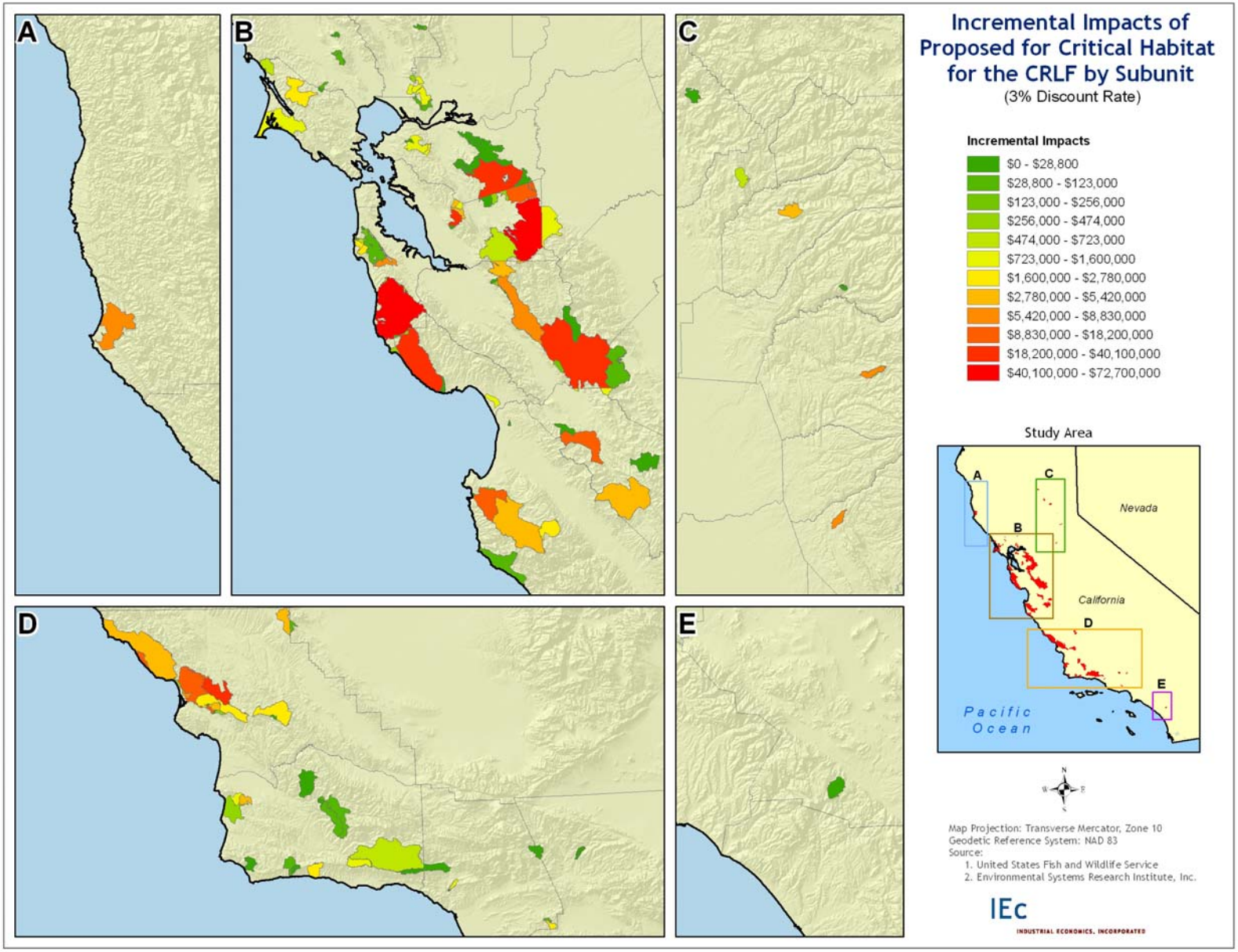


EXHIBIT C-7 RANGE OF POST-DESIGNATION INCREMENTAL IMPACTS BY PROPOSED CRITICAL HABITAT SUBUNIT (2009 DOLLARS)



APPENDIX D | UNDISCOUNTED IMPACTS TO ACTIVITIES BY UNIT

This appendix provides details of the undiscounted impacts by year for each activity. These details are provided in accordance with OMB guidelines for developing benefit and cost estimates. OMB directs the analysis to: "include separate schedules of the monetized benefits and costs that show the type and timing of benefits and costs, and express the estimates in this table in constant, undiscounted dollars."[223] For this analysis, this applies to the cost estimates for future years. Circular A-4 directs that future estimates of value should be presented in undiscounted terms. This is an important way to clarify future costs. For example, if a program will cost $10,000 ten years in the future, that future cost estimate should be noted as such to clarify what the cost estimate is in that year.

[223] Office of Management and Budget, Circular A-4, September 17, 2003, p. 18). The reference to "constant" dollars indicates that the effects of general price level inflation (the tendency of all prices to increase over time) should be removed through the use of an inflation adjustment index.

EXHIBIT D-1 UNDISCOUNTED POST-DESIGNATION BASELINE IMPACTS TO RESIDENTIAL AND COMMERCIAL DEVELOPMENT

UNIT	PROJECT MODIFICATIONS*		CEQA COSTS**		ADMINISTRATIVE COSTS***		FREQUENCY	DESCRIPTION/SOURCE
	LOW	HIGH	LOW	HIGH	THIRD PARTIES	FEDERAL AGENCIES		
ALA-1A	$14,600,000	$49,700,000	$8,320,000	$9,330,000	$1,040	$635	2009; except Administrative Cost to Federal Agencies, which are incurred annually from 2009-2030	* Project Modifications: Low End: Habitat Restoration + Delay Costs ($50,000/ acre) High End: Mitigation + Delay Costs ($50,000/ acre) Personal communication with Westervelt mitigation bank staff, Bay Area and Placer County, December 8, 2008; Industrial Economics, Inc., "Addendum to the Economic Analysis of Critical Habitat Designation for the San Bernardino Kangaroo Rat," March 2002, pp 11-13. ** CEQA Costs Low End: CEQA administrative and delay costs for areas with and without a Federal nexus. High End: CEQA administrative, delay, and mitigation costs for areas without a Federal nexus; and, CEQA administrative and delay costs for areas with a Federal nexus. Industrial Economics, Incorporated, "Draft Economic Analysis of Proposed Critical Habitat Designation for the La Graciosa Thistle," prepared for the U.S. Fish and Wildlife Service, November 2008. *** Administrative Costs of section 7 consultations:
ALA-1B	$9,220,000	$31,700,000	$5,340,000	$5,920,000	$594	$364		
ALA-2	$28,900,000	$95,400,000	$15,300,000	$18,100,000	$2,910	$1,780		
BUT-1	$0	$0	$0	$0	$0	$0		
CAL-1	$2,620,000	$6,250,000	$484,000	$1,390,000	$935	$573		
CCS-1	$71,000	$226,000	$34,300	$43,700	$10	$6		
CCS-2	$65,500,000	$217,000,000	$35,000,000	$41,300,000	$6,400	$3,920		
ELD-1	$2,240,000	$6,390,000	$809,000	$1,300,000	$506	$310		
LOS-1	$0	$0	$0	$0	$0	$0		
MEN-1	$15,200	$46,900	$6,800	$9,220	$2	$2		
MNT-1	$5,290	$15,000	$1,880	$3,070	$1	$1		
MNT-2	$6,940,000	$23,500,000	$3,890,000	$4,420,000	$546	$335		
MNT-3	$12,500	$39,200	$5,880	$7,620	$2	$1		
MRN-1	$389,000	$1,270,000	$200,000	$242,000	$44	$27		
MRN-2	$38,200	$125,000	$19,700	$23,900	$4	$3		
MRN-3	$336,000	$1,090,000	$170,000	$209,000	$40	$25		
NAP-1	$100,000	$330,000	$52,500	$62,900	$11	$7		
NEV-1	$1,020,000	$3,010,000	$404,000	$604,000	$206	$126		
PLA-1	$174,000	$466,000	$51,000	$97,900	$48	$30		
RIV-1	$0	$0	$0	$0	$0	$0		
SCZ-1	$28,000,000	$88,300,000	$13,300,000	$17,100,000	$3,950	$2,420		
SCZ-2	$20,100,000	$63,300,000	$9,490,000	$12,300,000	$2,890	$1,770		
SLO-1	$2,570,000	$7,660,000	$1,050,000	$1,530,000	$488	$299		
SLO-2	$14,600,000	$48,700,000	$7,940,000	$9,220,000	$1,310	$806		
SLO-3	$23,300,000	$77,700,000	$12,700,000	$14,700,000	$2,090	$1,280		
SLO-4	$150,000	$503,000	$81,800	$95,100	$14	$8		
SNB-1	$214,000	$673,000	$101,000	$131,000	$31	$19		

UNIT	PROJECT MODIFICATIONS*		CEQA COSTS**		ADMINISTRATIVE COSTS***		FREQUENCY	DESCRIPTION/SOURCE
	LOW	HIGH	LOW	HIGH	THIRD PARTIES	FEDERAL AGENCIES		
SNB-2	$817	$2,570	$386	$500	$0	$0		Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
SNB-3	$18,200	$57,200	$8,570	$11,100	$3	$2		
SNM-1	$5,160,000	$17,600,000	$2,950,000	$3,300,000	$364	$223		
SNM-2	$11,800,000	$39,600,000	$6,520,000	$7,470,000	$976	$598		
SOL-1	$1,760,000	$4,660,000	$497,000	$984,000	$501	$307		
SOL-2	$323,000	$832,000	$83,100	$178,000	$98	$60		
SOL-3	$1,930,000	$5,060,000	$525,000	$1,070,000	$565	$346		
SON-1	$34,500	$98,900	$12,700	$20,100	$8	$5		
SON-2	$54,200	$152,000	$18,600	$31,200	$13	$8		
SON-3	$635,000	$1,780,000	$219,000	$366,000	$151	$93		
STB-1	$251	$806	$124	$155	$0	$0		
STB-2	$1,980,000	$6,430,000	$1,010,000	$1,230,000	$227	$139		
STB-3	$548	$1,760	$271	$339	$0	$0		
STB-4	$0	$0	$0	$0	$0	$0		
STB-5	$25,800	$82,900	$12,800	$16,000	$3	$2		
STB-6	$1,810,000	$5,810,000	$897,000	$1,120,000	$229	$140		
STB-7	$43,000	$138,000	$21,300	$26,600	$5	$3		
STC-1	$1,800,000	$6,100,000	$1,010,000	$1,150,000	$142	$87		
STC-2	$7,610,000	$25,600,000	$4,200,000	$4,820,000	$645	$395		
VEN-1	$131,000	$423,000	$66,000	$81,200	$16	$10		
VEN-2	$0	$0	$0	$0	$0	$0		
VEN-3	$0	$0	$0	$0	$0	$0		
YUB-1	$245,000	$754,000	$109,000	$148,000	$40	$25		

EXHIBIT D-2 UNDISCOUNTED POST-DESIGNATION INCREMENTAL IMPACTS TO RESIDENTIAL AND COMMERCIAL DEVELOPMENT

UNIT	PROJECT MODIFICATIONS*		CEQA COSTS**		ADMINISTRATIVE COSTS***		FREQUENCY	DESCRIPTION/SOURCE
	LOW	HIGH	LOW	HIGH	THIRD PARTIES	FEDERAL AGENCIES		
ALA-1A	$1,100,000	$3,890,000	$666,000	$692,000	$495	$303	2009; except Administrative Cost to Federal Agencies, which are incurred annually from 2009-2030	* Project Modifications: Low End: Habitat Restoration + Delay Costs ($50,000/ acre) High End: Mitigation + Delay Costs ($50,000/ acre) Personal communication with Westervelt mitigation bank staff, Bay Area and Placer County, December 8, 2008; Industrial Economics, Inc., "Addendum to the Economic Analysis of Critical Habitat Designation for the San Bernardino Kangaroo Rat," March 2002, pp 11-13. ** CEQA Costs Low End: CEQA administrative and delay costs for areas with and without a Federal nexus. High End: CEQA administrative, delay, and mitigation costs for areas without a Federal nexus; and, CEQA administrative and delay costs for areas with a Federal nexus. Industrial Economics, Incorporated, "Draft Economic Analysis of Proposed Critical Habitat Designation for the La Graciosa Thistle," prepared for the U.S. Fish and Wildlife Service, November 2008. *** Administrative Costs of section 7 consultations:
ALA-1B	$10,700,000	$38,100,000	$6,590,000	$6,800,000	$1,420	$871		
ALA-2	$18,800,000	$66,400,000	$11,300,000	$11,800,000	$3,610	$2,210		
BUT-1	$0	$0	$0	$0	$0	$0		
CAL-1	$2,120,000	$6,070,000	$649,000	$940,000	$1,990	$1,220		
CCS-1	$732,000	$2,580,000	$440,000	$458,000	$110	$67		
CCS-2	$8,550,000	$29,900,000	$5,030,000	$5,290,000	$3,600	$2,200		
ELD-1	$2,490,000	$8,120,000	$1,200,000	$1,380,000	$1,170	$720		
LOS-1	$0	$0	$0	$0	$0	$0		
MEN-1	$2,130,000	$7,220,000	$1,160,000	$1,260,000	$565	$346		
MNT-1	$0	$0	$0	$0	$0	$0		
MNT-2	$3,550,000	$12,500,000	$2,140,000	$2,220,000	$684	$419		
MNT-3	$10,600	$36,500	$5,970	$6,390	$3	$2		
MRN-1	$136,000	$475,000	$80,100	$84,100	$38	$23		
MRN-2	$492,000	$1,720,000	$290,000	$304,000	$85	$52		
MRN-3	$194,000	$676,000	$113,000	$119,000	$49	$30		
NAP-1	$12,600	$43,900	$7,380	$7,760	$6	$4		
NEV-1	$1,380,000	$4,590,000	$704,000	$787,000	$546	$335		
PLA-1	$0	$0	$0	$0	$16	$10		
RIV-1	$0	$0	$0	$0	$0	$0		
SCZ-1	$3,700,000	$12,700,000	$2,090,000	$2,230,000	$2,150	$1,320		
SCZ-2	$202,000	$694,000	$114,000	$122,000	$1,010	$619		
SLO-1	$1,240,000	$4,120,000	$638,000	$709,000	$572	$351		
SLO-2	$3,940,000	$13,900,000	$2,380,000	$2,470,000	$968	$594		
SLO-3	$16,800,000	$59,300,000	$10,200,000	$10,600,000	$2,960	$1,810		

UNIT	PROJECT MODIFICATIONS*		CEQA COSTS**		ADMINISTRATIVE COSTS***		FREQUENCY	DESCRIPTION/SOURCE
	LOW	HIGH	LOW	HIGH	THIRD PARTIES	FEDERAL AGENCIES		
SLO-4	$509,000	$1,800,000	$308,000	$320,000	$73	$45		Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
SNB-1	$118,000	$405,000	$66,300	$70,900	$37	$23		
SNB-2	$1,150	$3,940	$646	$691	$0	$0		
SNB-3	$373,000	$1,280,000	$209,000	$224,000	$88	$54		
SNM-1	$2,690,000	$9,620,000	$1,680,000	$1,720,000	$375	$230		
SNM-2	$12,600,000	$44,800,000	$7,730,000	$7,990,000	$1,850	$1,140		
SOL-1	$301,000	$935,000	$125,000	$154,000	$332	$204		
SOL-2	$426,000	$1,310,000	$169,000	$213,000	$284	$174		
SOL-3	$498,000	$1,540,000	$201,000	$251,000	$474	$291		
SON-1	$0	$0	$0	$0	$3	$2		
SON-2	$44,200	$142,000	$20,300	$23,800	$24	$15		
SON-3	$33,000	$104,000	$14,500	$17,400	$67	$41		
STB-1	$879	$3,050	$508	$538	$0	$0		
STB-2	$1,370,000	$4,780,000	$803,000	$845,000	$318	$195		
STB-3	$4,040	$14,000	$2,330	$2,470	$1	$1		
STB-4	$0	$0	$0	$0	$0	$0		
STB-5	$5,700	$19,800	$3,290	$3,480	$2	$1		
STB-6	$282,000	$977,000	$163,000	$172,000	$132	$81		
STB-7	$83,000	$288,000	$47,900	$50,800	$18	$11		
STC-1	$1,940,000	$6,900,000	$1,190,000	$1,230,000	$271	$166		
STC-2	$8,920,000	$31,600,000	$5,460,000	$5,650,000	$1,280	$787		
VEN-1	$28,700	$100,000	$16,800	$17,700	$11	$6		
VEN-2	$0	$0	$0	$0	$0	$0		
VEN-3	$677,000	$2,390,000	$409,000	$425,000	$93	$57		
YUB-1	$180,000	$612,000	$98,400	$107,000	$61	$38		

EXHIBIT D-3 UNDISCOUNTED POST-DESIGNATION BASELINE IMPACTS TO WATER MANAGEMENT

UNIT	ERECTING SILT FENCING*	ADMINISTRATIVE COSTS**	FREQUENCY	DESCRIPTION/SOURCE
ALA-1A	$1,230	$135	2009 – 2030 (annually)	* Erecting Silt Fencing: Personal communications with Rich Boyer from Monterey Water Management District on January 6, 2009. ** Administrative Costs of section 7 consultations: Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
ALA-1B	$4,910	$369		
ALA-2	$7,360	$4,340		
BUT-1	$3,680	$0		
CAL-1	$2,450	$0		
CCS-1	$6,130	$632		
CCS-2	$14,700	$6,050		
ELD-1	$3,680	$0		
LOS-1	$2,450	$0		
MEN-1	$4,910	$0		
MNT-1	$2,450	$22		
MNT-2	$7,360	$5,010		
MNT-3	$4,910	$1,150		
MRN-1	$1,230	$0		
MRN-2	$2,450	$0		
MRN-3	$4,910	$0		
NAP-1	$1,230	$0		
NEV-1	$4,910	$0		
PLA-1	$3,680	$669		
RIV-1	$3,680	$0		
SCZ-1	$6,130	$3,970		
SCZ-2	$3,680	$228		
SLO-1	$2,450	$380		
SLO-2	$3,680	$2,990		
SLO-3	$7,360	$3,120		
SLO-4	$3,680	$877		
SNB-1	$3,680	$453		
SNB-2	$1,230	$217		

UNIT	ERECTING SILT FENCING*	ADMINISTRATIVE COSTS**	FREQUENCY	DESCRIPTION/SOURCE
SNB-3	$3,680	$801		
SNM-1	$8,590	$781		
SNM-2	$9,820	$2,180		
SOL-1	$1,230	$0		
SOL-2	$1,230	$0		
SOL-3	$2,450	$0		
SON-1	$2,450	$0		
SON-2	$1,230	$0		
SON-3	$2,450	$0		
STB-1	$2,450	$674		
STB-2	$2,450	$964		
STB-3	$3,680	$1,270		
STB-4	$2,450	$233		
STB-5	$3,680	$345		
STB-6	$3,680	$321		
STB-7	$4,910	$5,180		
STC-1	$4,910	$634		
STC-2	$7,360	$1,890		
VEN-1	$1,230	$379		
VEN-2	$2,450	$684		
VEN-3	$4,910	$650		
YUB-1	$2,450	$0		

EXHIBIT D-4 UNDISCOUNTED POST-DESIGNATION INCREMENTAL IMPACTS TO WATER MANAGEMENT

UNIT	ADMINISTRATIVE COSTS*	FREQUENCY	DESCRIPTION/SOURCE
ALA-1A	$45	2009 - 2030 (annually)	* Administrative Costs of section 7 consultations: Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
ALA-1B	$123		
ALA-2	$1,450		
CCS-1	$211		
CCS-2	$2,020		
MNT-1	$7		
MNT-2	$1,670		
MNT-3	$385		
PLA-1	$223		
SCZ-1	$1,320		
SCZ-2	$76		
SLO-1	$127		
SLO-2	$996		
SLO-3	$1,040		
SLO-4	$292		
SNB-1	$151		
SNB-2	$72		
SNB-3	$267		
SNM-1	$260		
SNM-2	$725		
STB-1	$225		
STB-2	$321		
STB-3	$425		
STB-4	$78		
STB-5	$115		
STB-6	$107		
STB-7	$1,730		

UNIT	ADMINISTRATIVE COSTS*	FREQUENCY	DESCRIPTION/SOURCE
STC-1	$211		
STC-2	$629		
VEN-1	$126		
VEN-2	$228		
VEN-3	$217		

EXHIBIT D-5 UNDISCOUNTED POST-DESIGNATION BASELINE IMPACTS TO AGRICULTURE ACTIVITIES

UNIT	PROJECT MODIFICATIONS*		ADMINISTRATIVE COSTS**	EPA PESTICIDE ACTIVE INGREDIENT ASSESSMENT***		DESCRIPTION / FREQUENCY / SOURCE
	LOW	HIGH		LOW	HIGH	
ALA-2	$0	$0	$11,600	$255	$677	***** Project Modifications: Frequency = annually from 2009-2030 Low End: Value of Cropland taken out of production (applying a 60 ft. buffer) High End: Value of Cropland taken out of production (applying a 200 ft. buffer) USDA National Agriculture Statistics Service (NASS), Census of Agriculture. Table 1: County Highlights (Market value of crops sold). Available at: http://www.agcensus.usda.gov/Publications/2002/Volume_1,_Chapter_2_County_Level/California/index.asp ****** Administrative Costs of section 7 consultations: Frequency = 2009, 2010 and 2011 Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation. *** EPA Pesticide Active Ingredient Assessment (staff time and data search fees): Frequency = 2009 Note: The total EPA costs are the same under the low and high scenarios. However, the distribution of costs to individual units varies between the two scenarios. The costs are distributed by multiplying the total EPA costs by the percentage of the total affected acres contained in each unit. In some cases, a unit has a higher percentage of affected acres under the low scenario than under the high scenario. Thus, the costs to some units are greater under the low scenario than under the high scenario. Personal communication with Arty Williams, EPA, January 13, 2009.
CCS-1	$12,500	$12,700	$1,580	$58,100	$57,300	
CCS-2	$64,600	$71,400	$15,500	$155,000	$155,000	
ELD-1	$0	$0	$636	$0	$0	
MNT-2	$1,380,000	$1,390,000	$12,000	$171,000	$166,000	
MNT-3	$521,000	$521,000	$3,140	$64,600	$62,300	
MRN-1	$0	$0	$902	$0	$0	
MRN-2	$0	$0	$2,600	$0	$0	
MRN-3	$7,590	$8,180	$3,870	$28,200	$29,300	
NAP-1	$224	$572	$291	$90	$222	
NEV-1	$0	$0	$952	$0	$0	
RIV-1	$72	$2,090	$472	$21	$585	
SCZ-1	$5,100,000	$5,140,000	$8,190	$607,000	$593,000	
SCZ-2	$4,340,000	$4,560,000	$466	$405,000	$410,000	
SLO-1	$4	$4	$2,070	$93,000	$96,900	
SLO-2	$899,000	$899,000	$13,500	$452,000	$437,000	
SLO-3	$1,040,000	$1,070,000	$13,700	$534,000	$527,000	
SLO-4	$0	$0	$3,810	$0	$0	
SNB-1	$1,990,000	$2,120,000	$3,510	$392,000	$398,000	
SNB-2	$2,760	$2,760	$2,000	$10,200	$9,880	
SNB-3	$1,230	$1,360	$7,320	$4,550	$4,870	
SNM-1	$111,000	$127,000	$3,620	$69,600	$77,500	
SNM-2	$310,000	$343,000	$10,800	$465,000	$476,000	
SOL-1	$3,810	$4,250	$1,050	$3,020	$3,250	
SOL-2	$653	$1,660	$221	$517	$1,270	
SOL-3	$710	$1,340	$259	$2,630	$4,780	
SON-1	$0	$0	$180	$0	$0	

UNIT	PROJECT MODIFICATIONS*		ADMINISTRATIVE COSTS**	EPA PESTICIDE ACTIVE INGREDIENT ASSESSMENT***		DESCRIPTION / FREQUENCY / SOURCE
	LOW	HIGH		LOW	HIGH	
SON-2	$461	$1,200	$188	$305	$768	
SON-3	$6,230	$6,550	$257	$28,500	$29,100	
STB-2	$151,000	$182,000	$4,140	$134,000	$135,000	
STB-3	$0	$0	$5,260	$0	$0	
STB-5	$12,100	$12,300	$1,060	$29,900	$29,400	
STB-6	$1,450,000	$1,470,000	$1,340	$247,000	$241,000	
STB-7	$23,900	$24,900	$13,100	$59,200	$59,500	
STC-1	$51,500	$52,400	$5,750	$161,000	$159,000	
STC-2	$59,300	$106,000	$18,000	$121,000	$132,000	
VEN-1	$818,000	$834,000	$331	$127,000	$127,000	
VEN-3	$0	$0	$431	$0	$0	

EXHIBIT D-6 UNDISCOUNTED POST-DESIGNATION INCREMENTAL IMPACTS TO AGRICULTURE ACTIVITIES

UNIT	PROJECT MODIFICATIONS*		ADMINISTRATIVE COSTS**	DESCRIPTION / FREQUENCY / SOURCE
	LOW	HIGH		
ALA-2	$5,710	$7,040	$3,850	* Project Modifications: Frequency = annually from 2009-2030 Low End: Value of Cropland taken out of production (applying a 60 ft. buffer) High End: Value of Cropland taken out of production (applying a 200 ft. buffer) USDA National Agriculture Statistics Service (NASS), Census of Agriculture. Table 1: County Highlights (Market value of crops sold). Available at: http://www.agcensus.usda.gov/Publications/2002/Volume_1,_Chapter_2_County_Level/California/index.asp Note: 60-foot and 200-foot buffers are applied to agricultural lands within the study area for baseline areas (areas of known frog occurrence) and incremental areas (areas considered unoccupied by the frog) separately. In some cases, baseline buffer areas overlap with incremental buffer areas. In these cases, the area of overlap is classified as part of the baseline. Thus, some areas classified as incremental applying a 60-foot buffer, are classified as baseline applying a 200-foot buffer due to additional overlap with baseline areas. To the extent that areas classified as incremental applying a 60-foot buffer are classified as baseline applying a 200-foot buffer, incremental impacts related to project modification are higher under the low scenario than the high scenario. ** Administrative Costs of section 7 consultations: Frequency = 2009, 2010, and 2011 Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
CCS-1	$4,260	$4,650	$528	
CCS-2	$19,900	$19,700	$5,160	
ELD-1	$922	$1,130	$212	
MNT-2	$237,000	$226,000	$4,000	
MNT-3	$0	$0	$1,050	
MRN-1	$13	$81	$301	
MRN-2	$8,880	$9,370	$865	
MRN-3	$28,500	$28,100	$1,290	
NAP-1	$0	$0	$97	
NEV-1	$0	$0	$317	
RIV-1	$0	$0	$157	
SCZ-1	$868,000	$853,000	$2,730	
SCZ-2	$63,800	$27,600	$155	
SLO-1	$14,000	$14,000	$691	
SLO-2	$223,000	$223,000	$4,480	
SLO-3	$1,150,000	$1,140,000	$4,570	
SLO-4	$0	$0	$1,270	
SNB-1	$826,000	$910,000	$1,170	
SNB-2	$0	$0	$666	
SNB-3	$122,000	$133,000	$2,440	
SNM-1	$35,400	$38,100	$1,210	
SNM-2	$103,000	$101,000	$3,610	
SOL-1	$0	$0	$349	
SOL-2	$1,060	$4,880	$74	
SOL-3	$20,500	$24,300	$87	
SON-1	$0	$0	$60	
SON-2	$0	$0	$63	

UNIT	PROJECT MODIFICATIONS*		ADMINISTRATIVE COSTS**	DESCRIPTION / FREQUENCY / SOURCE
	LOW	HIGH		
SON-3	$0	$0	$86	
STB-2	$44,700	$44,700	$1,380	
STB-3	$2,810	$3,030	$1,750	
STB-5	$1,860	$1,810	$353	
STB-6	$80,500	$68,900	$448	
STB-7	$95,900	$94,800	$4,350	
STC-1	$13,900	$13,000	$1,920	
STC-2	$32,900	$35,100	$6,000	
VEN-1	$64,100	$48,600	$110	
VEN-3	$0	$0	$144	

EXHIBIT D-7 UNDISCOUNTED POST-DESIGNATION INCREMENTAL IMPACTS TO GRAZING ACTIVITIES[2]

UNIT	ADMINISTRATIVE COSTS*	FREQUENCY	SOURCE
ALA-1A	$536	2009-2030 (annually)	* Administrative Costs of section 7 consultations: Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
ALA-1B	$1,490		
ALA-2	$22,600		

[2] There are no post-designation baseline impacts to grazing activities.

EXHIBIT D-8 UNDISCOUNTED POST-DESIGNATION BASELINE IMPACTS TO TIMBER MANAGEMENT

UNIT	PRIVATE TIMBER HARVEST MODIFICATIONS*		PRIVATE TIMBER HARVEST DELAYS*	FROG EDUCATION PROGRAMS*	REVIEW OF TIMBER HARVEST PLANS BY CAL FIRE**	CAL FIRE TIMBER HARVEST COSTS**	ADMIN COSTS OF SECTION 7 CONSULTATIONS***	FREQUENCY	SOURCE
	LOW	HIGH							
BUT-1	$750	$6,230	$0	$0	$45	$38	$709	2009-2030 (annually)	* Timber Harvest Impacts/Education Costs: Personal communication with private timberland owners, including: the Soper-Wheeler Company, Siller Brothers Inc., Applied Forest Management, and the Big Creek Lumber Company on various dates in April and May 2009. ** CAL FIRE Costs: Written communication with Chris Browder, CAL FIRE, January 9, 2009 ***Administrative Costs of section 7 consultations: Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
ELD-1	$2,280	$18,900	$0	$0	$16	$0	$380		
NEV-1	$5,610	$32,400	$0	$0	$26	$2	$831		
YUB-1	$6,940	$57,700	$0	$0	$72	$0	$547		
PLA-1	$0	$0	$0	$0	$0	$0	$372		
SCZ-1	$3,050	$137,000	$135,000	$4,200	$3,200	$3,150	$0	2009	
				$1,030				2010-2030 (annually)	
SNM-2	$3,950	$177,000	$180,000	$5,580	$732	$610	$0	2009	
				$1,360				2010-2030 (annually)	

EXHIBIT D-9 UNDISCOUNTED POST-DESIGNATION INCREMENTAL IMPACTS TO TIMBER MANAGEMENT

UNIT	ADMIN COSTS OF SECTION 7 CONSULTATIONS*	FREQUENCY	SOURCE
BUT-1	$236	2009-2030 (annually)	*Administrative Costs of section 7 consultations: Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
ELD-1	$127		
NEV-1	$277		
PLA-1	$124		
YUB-1	$182		

EXHIBIT D-10 UNDISCOUNTED POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS TO TRANSPORTATION ACTIVITIES

SUBUNIT	ASSORTED PROJECT COSTS*		ADMIN COSTS OF SECTION 7 CONSULTATIONS**	FREQUENCY	DESCRIPTION / SOURCE
	LOW	HIGH			
BASELINE IMPACTS					
CCS-2	$83,000	$299,000	$11,400	2009-2010 (annually)	* Assorted Project Costs: Low End: $53,000 - Estimated Bank Credits, In-Lieu, Conservation Easements, and Coop Agreements $0 - Avoidance and Minimization Efforts $25,000 - Habitat Creation and Restoration $5,000 - Monitoring High End: $159,000 - Estimated Bank Credits, In-Lieu, Conservation Easements, and Coop Agreements $9,750 - Avoidance and Minimization Efforts $80,000 - Habitat Creation and Restoration $50,000 - Monitoring FHWA - California Division - Endangered Species Act Annual Impact and Mitigation Report Submittal. Forwarded by Amy Pettler, Senior Endangered Species Coordinator and Wildlife Biologist, California Department of Transportation Division of Environmental Analysis, on January 5, 2009. ** Administrative Costs of section 7 consultations: Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
MNT-2	$83,000	$299,000	$11,400	2009	
	$166,000	$598,000	$22,800	2010	
SCZ-1	$83,000	$299,000	$11,400	2030	
SCZ-2	$83,000	$299,000	$11,400	2030	
SLO-3	$83,000	$299,000	$11,400	2009	
STB-5	$83,000	$299,000	$11,400	2011	

SUBUNIT	ASSORTED PROJECT COSTS*		ADMIN COSTS OF SECTION 7 CONSULTATIONS**	FREQUENCY	DESCRIPTION / SOURCE
	LOW	HIGH			
INCREMENTAL IMPACTS					
CCS-2	$0	$0	$3,800	2009-2010 (annually)	** Administrative Costs of section 7 consultations: Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
MNT-2	$0	$0	$3,800	2009	
	$0	$0	$7,600	2010	
SCZ-1	$0	$0	$3,800	2030	
SCZ-2	$0	$0	$3,800	2030	
SLO-3	$0	$0	$3,800	2009	
STB-5	$0	$0	$3,800	2011	

EXHIBIT D-11 UNDISCOUNTED POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS TO UTILITY AND OIL & GAS PIPELINE CONSTRUCTION AND MAINTENANCE

UNIT	PROJECT MODIFICATION COSTS*		ADMIN COSTS OF SECTION 7 CONSULTATIONS**	FREQUENCY	DESCRIPTION / SOURCE
	LOW	HIGH			
BASELINE IMPACTS					
ALA-2	$2,730	$12,700	$1,040	2009-2030 (annually)	* Project Modification Costs Low End: $0 - Avoidance and Minimization Efforts $25,000 - Habitat Creation and Restoration $5,000 - Monitoring High End: $9,750 - Avoidance and Minimization Efforts $80,000 - Habitat Creation and Restoration $50,000 - Monitoring FHWA - California Division - Endangered Species Act Annual Impact and Mitigation Report Submittal. Forwarded by Amy Pettler, Senior Endangered Species Coordinator and Wildlife Biologist, California Department of Transportation Division of Environmental Analysis, on January 5, 2009 ** Administrative Costs of section 7 consultations: Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
CCS-1	$1,360	$6,350	$518		
CCS-2	$4,090	$19,100	$1,550		
MNT-2	$1,360	$6,350	$518		
SCZ-1	$1,360	$6,350	$518		
SLO-1	$2,730	$12,700	$1,040		
SLO-2	$1,360	$6,350	$518		
SLO-3	$2,730	$12,700	$1,040		
SNB-2	$1,360	$6,350	$518		
SNB-3	$1,360	$6,350	$518		
SNM-1	$1,360	$6,350	$518		
SOL-1	$1,360	$6,350	$518		
SOL-2	$1,360	$6,350	$518		
SOL-3	$1,360	$6,350	$518		
STB-2	$1,360	$6,350	$518		
STB-5	$2,730	$12,700	$1,040		
STB-6	$2,730	$12,700	$1,040		
STB-7	$1,360	$6,350	$518		
STC-1	$1,360	$6,350	$518		
STC-2	$1,360	$6,350	$518		
VEN-1	$1,360	$6,350	$518		
VEN-3	$2,730	$12,700	$1,040		
INCREMENTAL IMPACTS					
ALA-2	$0	$0	$345	2009-2030 (annually)	** Administrative Costs of section 7 consultations: Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
CCS-1	$0	$0	$173		
CCS-2	$0	$0	$518		

UNIT	PROJECT MODIFICATION COSTS*		ADMIN COSTS OF SECTION 7 CONSULTATIONS**	FREQUENCY	DESCRIPTION / SOURCE
	LOW	HIGH			
MNT-2	$0	$0	$173		
SCZ-1	$0	$0	$173		
SLO-1	$0	$0	$345		
SLO-2	$0	$0	$173		
SLO-3	$0	$0	$345		
SNB-2	$0	$0	$173		
SNB-3	$0	$0	$173		
SNM-1	$0	$0	$173		
SOL-1	$0	$0	$173		
SOL-2	$0	$0	$173		
SOL-3	$0	$0	$173		
STB-2	$0	$0	$173		
STB-5	$0	$0	$345		
STB-6	$0	$0	$345		
STB-7	$0	$0	$173		
STC-1	$0	$0	$173		
STC-2	$0	$0	$173		
VEN-1	$0	$0	$173		
VEN-3	$0	$0	$345		

EXHIBIT D-12 UNDISCOUNTED POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS TO FIRE MANAGEMENT

SUBUNIT	CAL FIRE FUEL MANAGEMENT COSTS*	ADMIN COSTS OF SECTION 7 CONSULTATIONS**	FREQUENCY	SOURCE
BASELINE IMPACTS				
BUT-1	$1,080	$0	2009-2030 (annually)	* CAL FIRE Fuel Management Costs: Chris Browder, CAL FIRE, January 9, 2009. ** Administrative Costs of section 7 consultations: Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
NEV-1	$65	$0		
LOS-1	$0	$828		
VEN-2	$0	$118		
INCREMENTAL IMPACTS				
LOS-1	$0	$276	2009-2030 (annually)	** Administrative Costs of section 7 consultations: Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
VEN-2	$0	$39		
NEV-1	$0	$2,270		
PLA-1	$0	$1,010		

EXHIBIT D-13 UNDISCOUNTED POST-DESIGNATION BASELINE IMPACTS TO SPECIES MANAGEMENT

SUBUNIT	MONITORING & DATABASE MANAGEMENT*	ADMIN COSTS OF SECTION 7 CONSULTATIONS**	FREQUENCY	SOURCE
ALA-1A	$0	$2	2009-2030 (annually)	* Monitoring & Database Management: Tina Mark, Tahoe National Forest, January 7, 2009. ** Administrative Costs of section 7 consultations: Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
ALA-1B	$0	$5		
ALA-2	$0	$141		
BUT-1	$4,230	$0		
CCS-1	$0	$9		
CCS-2	$0	$85		
ELD-1	$7,500	$0		
LOS-1	$0	$549		
MNT-1	$0	$5		
MNT-2	$0	$1,080		
MNT-3	$0	$254		
MRN-1	$0	$113		
MRN-2	$0	$328		
MRN-3	$0	$493		
NEV-1	$5,180	$0		
PLA-1	$2,320	$0		
SCZ-1	$0	$5,950		
SCZ-2	$0	$348		
SLO-1	$0	$1,050		
SLO-2	$0	$850		
SLO-3	$0	$919		
SLO-4	$0	$277		
SNB-1	$0	$89		
SNB-2	$0	$43		
SNB-3	$0	$158		
SNM-1	$0	$21		
SNM-2	$0	$129		

SUBUNIT	MONITORING & DATABASE MANAGEMENT*	ADMIN COSTS OF SECTION 7 CONSULTATIONS**	FREQUENCY	SOURCE
SON-3	$0	$11		
STB-1	$0	$381		
STB-2	$0	$511		
STB-3	$0	$721		
STB-4	$0	$123		
STB-5	$0	$185		
STB-6	$0	$172		
STB-7	$0	$2,550		
STC-1	$0	$19		
STC-2	$0	$221		
VEN-1	$0	$122		
VEN-2	$0	$691		
VEN-3	$0	$210		
YUB-1	$3,270	$0		

EXHIBIT D-14 UNDISCOUNTED POST-DESIGNATION INCREMENTAL IMPACTS TO SPECIES MANAGEMENT

SUBUNIT	ADMIN COSTS OF SECTION 7 CONSULTATIONS**	FREQUENCY	SOURCE
ALA-1A	$1	2009-2030 (annually)	** Administrative Costs of section 7 consultations: Based on a review of the historical consultation frequency in the areas proposed for critical habitat from 1996-2008 and administrative costs of consultation.
ALA-1B	$2		
ALA-2	$47		
CCS-1	$3		
CCS-2	$28		
LOS-1	$183		
MNT-1	$2		
MNT-2	$361		
MNT-3	$85		
MRN-1	$38		
MRN-2	$109		
MRN-3	$164		
SCZ-1	$1,980		
SCZ-2	$116		
SLO-1	$351		
SLO-2	$283		
SLO-3	$306		
SLO-4	$92		
SNB-1	$30		
SNB-2	$14		
SNB-3	$53		
SNM-1	$7		
SNM-2	$43		
SON-3	$4		
STB-1	$127		
STB-2	$170		
STB-3	$240		

SUBUNIT	ADMIN COSTS OF SECTION 7 CONSULTATIONS**	FREQUENCY	SOURCE
STB-4	$41		
STB-5	$62		
STB-6	$57		
STB-7	$851		
STC-1	$6		
STC-2	$74		
VEN-1	$41		
VEN-2	$230		
VEN-3	$70		

APPENDIX E | TECHNICAL INFORMATION FOR IMPACTS ON URBAN DEVELOPMENT

308. This appendix provides additional detail on the approach to estimating development impacts. It first describes a theoretical framework for estimating the change in value of developable land resulting from project modifications and delay. Next, it describes the procedures for forecasting development in the area of proposed critical habitat. It then explains the methodology for quantifying project modification impacts, including a description of each of the components of the equation for calculating project modification impacts. This appendix then reviews the methodology for estimating the economic impacts from delay. Finally, it elaborates on the interest rates used to calculate the delay impacts.

309. In general, the urban development analysis seeks to estimate project modification and delay costs as reflected in the value of developable land upon designation of critical habitat. Because specific data on the resultant change in land values are not available, the analysis employs certain assumptions regarding the cost of capital to developers and the likely rate of growth of land values to estimate these impacts.

E.1 VALUE OF DEVELOPMENT

310. The per-acre returns from development are equal to

$$v = \frac{p - k_H}{\lambda}$$

Equation 1,

where p is the market price of a new house, k_H is the cost of developing and building the new house, and λ is what is referred to as the inverse density (i.e., land area per house). The above expression is commonly referred to as the extensive margin value of land.[224]

311. The value at time t_0 of a parcel that will be developed at time t_1 is equal to

$$V(t_0) = \int_{t_0}^{t_1} Se^{-r(t-t_0)}dt + \left(\frac{p - k_H}{\lambda}\right)_{t_1} e^{-r(t_1-t_0)}$$

Equation 2,

[224] For more information on how this equation is derived, see Glaeser, E. and J. Gyourko. "The Impacts of Building Restrictions on Housing Affordability." Federal Reserve Board of New York Economic Policy Review, 2003; and Sunding, D. and A. Swoboda, "Regulation and the Shadow Value of Housing," Regional Science and Urban Economics, 2009 forthcoming.

where S is the return to land in an undeveloped condition (i.e., agricultural rents), and r is the developer's discount rate. This expression is equivalent to the developer's willingness to pay for land that will be developed at some time $t_1 - t_0$ periods in the future. Regulations such as critical habitat designation that affect the profitability of future development will be capitalized into the current market price of land; that is, costs incurred in order to protect the frog from development activities will have a negative affect on the value of land at the time the regulation is implemented.

312. Critical habitat can affect future development costs, mainly through required project modifications such as mitigation and/or restoration of disturbed habitat. Taking the partial derivative of Equation 2 with respect to k_H, shows that a unit increase in future development costs affects the equilibrium price of land by the following amount:

$$\frac{\partial V(t_0)}{\partial k_H} = -\frac{1}{\lambda} e^{(\delta - r)(t_1 - t_0)}$$

Equation 3,

where δ is the growth rate in the extensive margin value of land.

313. In addition to the administrative costs of consultations and the project modifications necessary to satisfy consultation requirements, implementing frog conservation measures also results in the delay of project completion. Delay cost is measured as the change in land value that results from completing development at time $t_1 + \Delta t$ rather than at t_1. Using Leibniz' Rule in taking the partial derivative of Equation 2 with respect to t_1, this marginal cost can be expressed as:

$$\frac{\partial V(t_0)}{\partial t_1} = -r\left(\frac{p - k_H}{\lambda} - S\right)_{t_0} e^{(\delta - r)(t_1 - t_0)}$$

Equation 4,

314. Treating future development times as discrete, the change in land value resulting from the increased development costs presented in Equation 3 and the increased development time presented in Equation 4 associated with the designation of critical habitat is expressed as follows:

$$dW = \sum_{t_i > t_0} \alpha_{t_i} \left[\frac{\Delta k_H}{\lambda} + r\left(\frac{p - k_H}{\lambda} - S\right)_{t_0} \Delta t_i\right] e^{(\delta - r)(t_i - t_0)}$$

Equation 5,

where α_{t_i} represents the acres projected for development within the area of critical habitat at time t_i, Δk_H is the cost of project modifications per house, and Δt_i is the amount of delay caused by critical habitat.

315. The following sections elaborate on each of the components of Equation 5. First, the methodology for determining the α_{t_i} term, or the acres projected for development, is

explained. Next, the appendix explains the way in which the $\frac{\Delta k_H}{\lambda}$ term, or the project modification costs, is estimated. Section E.4 describes the way in which the net per-acre returns from development, or $\left(\frac{p-k_H}{\lambda}-S\right)$, are estimated. The net per-acre returns from development form the basis of the economic impacts from delay. Finally, the growth rate and the discount rate used to estimate the costs associated with each type of impact are described in Section E.5.

E.2 DEVELOPMENT PROJECTIONS

316. The following section of the appendix explains how the analysis projects acreage growth (α_{t_i} in Equation 5 above) in the area of proposed critical habitat. Specifically, it explains the analytical steps behind Exhibit 4-4: Number of Acres Forecast to Be Developed by Unit. Estimating the acres projected for development within the area of proposed critical habitat requires information about growth projections from local governments, the spatial allocation of growth within the study area, the timing of future growth, and the effect of the proposed critical habitat rule on the growth projections.

E.2.1 LOCAL GOVERNMENT PROJECTIONS

317. To determine the increase in the number of new housing units within the study area, this analysis relies on growth projection data available through local planning authorities. Ideally this analysis would use census tracts as the geographic unit of analysis. The census tract is the finest level of distinction at which the applicable data are published. Predicting growth at the smallest geographic unit possible is important because local or even neighborhood-level characteristics can be responsible for a high degree of heterogeneity in the effects of habitat conservation. A unit-level analysis may not be sensitive enough to discern any noticeable effects even though the effects are large on a smaller scale.

318. However, the study area for this analysis extends across 28 counties from Mendocino and Butte Counties in the north to Riverside County in the south. As a result, available data varies significantly across the study area. For example, while the Association of Bay Area Governments (ABAG) and the Southern California Association of Governments (SCAG) provide growth projection data through 2030 at the census tract level, local planning authorities in other regions of California provide 2030 population and housing growth projections by geographic areas different than census tracts:

- Sacramento Council of Governments (SACOG) (including Yuba, Placer and El Dorado counties) forecasts growth at the Regional Analysis District, or RAD.[225]
- The Association of Monterey Bay Area Governments (AMBAG) forecasts growth for incorporated and unincorporated regions of Santa Cruz, San Benito, and Monterey counties.[226]

[225] SACOG growth projections obtained from http://www.sacog.org/demographics/pophsg, electronic communication with Associate Research Analyst, SACOG, January 7, 2009. Associated GIS shapefiles obtained from http://www.sacog.org/mapping/clearinghouse.

- San Luis Obispo Council of Governments (SLOCOG) delineates "planning areas" which generally correspond to city boundaries and unincorporated areas to project population growth.[227]
- Santa Barbara County Association of Governments (SBCAG) projects population growth at the Census County Division, or CCD, a US Census Bureau boundary.[228]

319. For areas that provide housing and population projections at geographic units larger than census tracts, this analysis uses the average housing density in each county to translate available housing projection data to acres at the census tract level. Average density (houses per acre) in each county was calculated by dividing the number of households obtained from the California Department of Finance by the number of acres classified as "urbanized" by the California Farmland Mapping and Monitoring Program (FMMP). The available housing projections were divided by the average density to obtain the projected number of acres.[229]

320. Growth projections in Butte, Nevada, Calaveras, Mendocino, San Joaquin, Stanislaus, Merced, and Kern Counties were obtained from Applied Geographic Solutions (AGS).[230] AGS forecasts population and households at the census tract level for the entire state of California through the year 2018. Growth through 2030 was projected linearly.

321. There are two basic components to the growth projection methodology used by the local planning authorities. The first is termed the cohort-survival method and is used by most of the planning authorities relied upon in this analysis to develop population projections over time. This method works by starting with a population for each county, identified by age cohorts, ethnicity and gender, and growing it over time using specific information about birth rates, birth timing, death rates, and net migration based on the composition of the planning authority's population. Generally, population data, data on birth and death rates, and the breakdown of net migration by racial/ethnic category are supplied by the California State Department of Finance (DOF), Demographic Research Unit, and the US Census Bureau.

322. The second component of the growth projection methodology used by the local planning authorities links the demographic projections completed in step one to economic trends

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[226] AMBAG growth projections obtained from http://www.ambag.org/publications/reports/2004%20Forecast/Forecast%20Results.pdf. Associated GIS shapefiles obtained from electronic communication with GIS Associate, AMBAG, January 5, 2009.

[227] SLOCOG growth projections obtained from electronic communication with Transportation Planner III, SLOCOG, December 18, 2008. Associated GIS shapefiles obtained from electronic communication with Transportation Planner. SLOCOG, January 6, 2009.

[228] SBCAG growth projections obtained from http://www.sbcag.org/PDFs/publications/ReginalGrowthforecastComplete%20Final.pdf. Associated GIS shapefiles obtained from http://www.census.gov/geo/www/cob/cs_metadata.html#ccd.

[229] For the SLOCOG and SBCAG data, household size was also needed to forecast housing growth from population growth. Data from AGS were used to determine average household size for San Luis Obispo and Santa Barbara counties.

[230] Electronic communication with Sr. Vice President, Applied Geographic Solutions, January 8, 2009. For more information, see http://www.appliedgeographic.com/about_ags.html

and the availability of space (vacant land, under-utilized existing developed areas, and building sites that can be reused or redeveloped). Economic trends shape labor force participation rates (which are applied to the working age population) and net migration. The projections are also compared to the local land use designations; space must be adequate to allow for the forecast levels. The result of this two-phase methodology used by the local planning authorities is demographic growth projections tempered by economic trends and space availability.[231]

323. Applied Geographic Solutions' growth projection methodology differs slightly from those used by the local planning authorities. AGS's estimates are based on data compiled from a range of Federal and State authorities, including the latest county population estimates from the Census Bureau, the American Community Survey (ACS), reviews of building permit statistics, the Current Population Survey (CPS), and additional local sources. AGS uses a model that estimates population given historical patterns, the latest Census age distributions using cohort survival techniques, and population counts from the INSOURCE database.[232] Special consideration is given to the population age 65 and over by applying zip code-level counts by age and sex of all Medicare eligible persons. The results are then calibrated to the county and city level population estimates to ensure consistency with current Census Bureau estimates.[233]

E.2.2 BEC GROWTH ALLOCATION MODEL

324. The next step for projecting the number of new housing units in the study area is to spatially allocate projected growth within each census tract. It is important not to assume growth will occur uniformly over the area of each census tract because such an assumption, which is almost always untrue, would cause a mis-attribution of development within the study area. This would happen because the boundary of critical habitat does not usually match that of census tracts. Certain areas of proposed critical habitat may be unsuitable for development; conserving this habitat will not result in any additional costs. The assumption of uniform development would erroneously attribute development (and conservation costs) to these areas. Conversely, conserved habitat may occupy the last portions of undeveloped land within a tract, meaning the majority of future development in a census tract will be projected to occur within the species' habitat. These scenarios illustrate the need for more precise growth allocation.

325. Allocating growth within each census tract requires modeling the process of the conversion of undeveloped land into an urban landscape (which the analysis refers to as

[231] Descriptions of COG growth projection methodology was obtained from SLOCOG website at http://www.slocog.org/Library/PDF/FINAL_JULY_2006_ERA_POP__EMP_FORECAST_REPORT.pdf on April 1, 2009; SACOG website, at http://www.sacog.org/demographics/ on April 6, 2009; SCAG website at http://www.scag.ca.gov/forecast/methods.htm on April 6, 2009; and ABAG website at http://www.abag.ca.gov/planning/currentfcst/ modeling7.html on April 1, 2009.

[232] INSOURCE is a database at the household and individual level that Experian provides to AGS for use in its demographic estimates. For more information see Experian's website at: http://www.experian.com/products/insource.html.

[233] AGS website, available at http://www.appliedgeographic.com/AGS2008MethodologyGuide.pdf, accessed on April 1, 2009.

"Greenfield development"). This analysis utilizes a growth allocation model created by BEC.

326. The BEC growth allocation model is a statistical model that incorporates both spatial and non-spatial data to project urban growth in California. Its explanatory variables include demand variables, pertaining to job accessibility and income level; location-specific variables, such as freeway proximity, whether the land is classified as farmland, and whether it lies in a flood-plain; and regulatory variables, such as whether a location is in an incorporated city.

327. The model divides the State into a matrix of grid cells. It outputs a probabilistic score (between 0 and 1) that a given cell will be converted from undeveloped to developed in the next 22 years. The sum of probability scores within each census tract, scaled by a fixed multiplier, is equal to the total projected Greenfield development for that tract. The sum of the probability scores for the cells that fall in the habitat is the total projected Greenfield development within the habitat in each census tract. For each census tract, the sum of the probabilistic scores within the critical habitat area is divided by the sum of the probabilistic scores within the corresponding census tract to determine the share of development within the tract that is projected to occur within the area of critical habitat. That "development share" is multiplied by the number of acres projected for development within the census tract to attain the number of acres projected for development in the critical habitat area in each census tract.

E.2.3. TIMING OF GROWTH PROJECTIONS

328. This analysis is conducted under the assumption that development in the study area will occur uniformly over the time period of this analysis. As noted in Exhibit 4-14, if projects occur more frequently in earlier periods, costs presented in this analysis have been understated. Conversely, if development activity is more likely in later periods, impacts have been overstated.

329. A uniform rate of growth is assumed because information to make credible predictions about the absorption rate of development over the study period is not available. The uniform growth rate assumption was corroborated by another expert in the field who reviewed this analysis.[234]

E.2.4. CRITICAL HABITAT DOES NOT AFFECT THE GROWTH PROJECTIONS

330. The amount and location of development is assumed to be exogenous to the critical habitat rule, decided instead by demand variables and local government regulations, among other factors. This assumption is supported by the fact that the amount of land projected for development is relatively small compared to the total developable acres within the red-legged frog proposed critical habitat area. As explained in section 4.3, a total of 7,099 acres are projected for development across the study area over the 22-year time period of this analysis, whereas the total number of privately owned acres in the study area is approximately 1.3 million acres. Thus, the acres projected for development

[234] Personal communication with Jason Moody, Principal, Economic Planning Systems, March 25, 2009.

account for less than one percent of the developable land. Furthermore, much of the land purchased by developers to offset impacts to the frog will occur off-site. Thus the land necessary for offsetting development impacts will not influence development within the study area.

E.3 PROJECT MODIFICATION COSTS

331. This section of the Technical Appendix describes the ($\Delta k_H / \lambda$) term in Equation 5 above, which is the additional cost per acre from purchasing compensating habitat or implementing habitat restoration measures. Under the scenario in which the Service requires the purchase of compensating habitat, ($\Delta k_H / \lambda$) represents the cost of purchasing a mitigation bank credit multiplied by the Service's specified habitat preservation ratio. Under the scenario in which the Service recommends habitat restoration measures, ($\Delta k_H / \lambda$) represents the per-acre cost of those restoration measures. Information on the cost of purchasing a mitigation bank credit, the Service's specified habitat preservation ratio, and the cost of habitat restoration measures was provided in section 4.7.2 above.

E.4 DELAY IMPACTS

332. This section of the Technical Appendix elaborates on the components of the delay impacts calculation in Equation 5 above. As presented in Equations 1 and 5, the per-acre economic surplus from development is equal to the difference between the selling price of a new house (p) and the cost of developing the new house (k), divided by λ, the inverse density (acres per house). The methodology used to estimate each of these parameters is discussed below.

E.4.1 NEW HOME SALE PRICE (p)

333. Data on the selling prices of new homes were obtained from DataQuick Information Systems, which maintains a database of new home transactions in the study area. Based on information gathered from county recorders and assessors, the database provides a rich set of house descriptors, including assessor's parcel number, census tract, home size, lot size, number of stories, number of bedrooms, number of bathrooms, build year, sale price, and sale date for all transactions dating back to 1993. Each observation is spatially referenced by census tract using a geographic information system (GIS).

334. Because California home prices fluctuate, the nominal sale prices reported by DataQuick are not directly comparable across time. The prices were adjusted to real dollars using the Office of Federal Housing Enterprise Oversight's home price index. This index provides quarterly data on price inflation for detached, single-family dwellings by metropolitan statistical area (MSA).

E.4.2 HOME DEVELOPMENT COST (k)

335. The cost of development includes construction costs, design costs, and local development impact fees. Construction costs include labor and materials. Design costs include architecture, grading, utilities, and the provision of common space. Development impact

fees include utility hookup charges and other local charges. Data on the cost of construction were obtained from Marshall & Swift, which publishes a quarterly guide to building cost per square foot indexed by region, construction quality (average, good, very good, or excellent), and home size. New homes were assumed to be one story, stud-framed with stucco siding and of either average or good construction quality, which is typical for newly constructed tract homes. The design cost is assumed to be equal to twenty percent of the cost of construction. Development impact fees (which include local fees such as utility hookups and are included in the cost of house development) were collected from the engineering and planning departments in the local governments across California.[235] An average development impact fee for the State was assumed, equal to 20 percent of the development build costs, which vary by region.[236]

E.4.3 INVERSE DENSITY (λ)

336. The inverse density of development (acres per house) represents the number of acres developed divided by the number of houses built.[237] Because data availability varies across the study area, the following sections summarize the variables and methodology used to estimate this parameter by geographic region.

337. For the majority of counties, density was estimated using a four-step process:[238]

- **Step 1**. Define the area within each county that is classified as "urbanized" based on GIS data from the California FMMP.[239]
- **Step 2**. Estimate the percent of the "urbanized" area that is covered by development, including homes, sidewalks, parks, and greenways based on visual inspection of aerial photography of a random sample of points within the urbanized area.[240]
- **Step 3**. Estimate the total area developed by multiplying the acres in the "urbanized" area by the percent of the "urbanized" area that is covered by development.

[235] This analysis assumes a utility hookup fee of $10,000 per acre based on interviews conducted in 2007 and 2008 with planning departments in 12 cities, including Brisbane, Chula Vista, Highlands, Hemet, Morgan Hill, Palo Alto, Redlands, Redwood City, San Jose, San Mateo, Temecula, and San Bernardino.

[236] Personal communication with California Home Builders Association of Northern California, 2004.

[237] Note that unlike the lot size, the inverse density includes streets, sidewalks, and other amenities developed per number of houses built.

[238] Including Butte, El Dorado, Kern, Kings, Merced, Monterey, Nevada, Placer, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Santa Cruz, Stanislaus, Ventura, and Yuba.

[239] California Farmland Mapping and Monitoring Program. http://www.conservation.ca.gov/dlrp/fmmp/Pages/Index.aspx.

[240] National Agriculture Imagery Program. http://165.221.201.14/NAIP.html. Imagery freely available at http://casil.ucdavis.edu/casil/imageryBaseMapsLandCover/imagery/naip_2005/.

- **Step 4**. Generate the average gross density in each county by dividing the total developed area (in acres) by the number of homes obtained from the California Department of Finance.[241]

338. For the remaining counties, alternative data were available resulting in the following geographic-specific methodologies:

- **Association of Bay Area Governments (ABAG) Region**.[242] Density for the ABAG region was obtained directly from ABAG projections by dividing number of houses by developed acres.
- **Riverside and Los Angeles Counties**. Density in Riverside and Los Angeles counties was estimated from the lot size variable in DataQuick because there were a sufficient number of single family home sales observations to provide a reliable county average lot size: 1,385 observations in Riverside and 535 observations in Los Angeles.
- **Calaveras and Mendocino Counties**. Neither FMMP nor DataQuick data were available for Calaveras and Mendocino counties. In the absence of these data, density is assumed to be equal to that calculated for the nearest county (Nevada County).

339. All of this information was then used to estimate the average value of developable land by census tract. Results of this methodology are shown in Exhibit E-1 below.

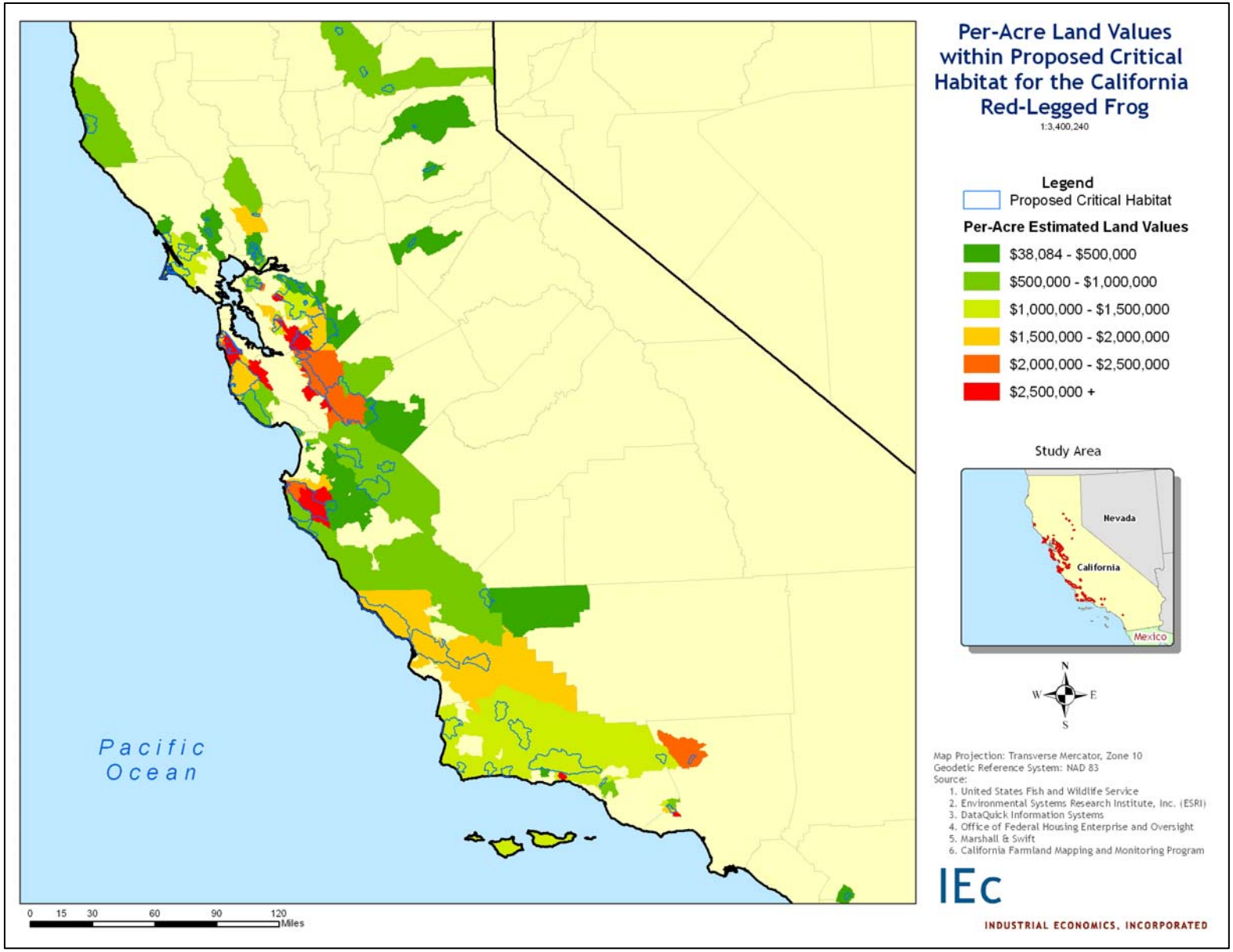
340. When estimating the impacts of delay on projected development it is important to net the salvage value of land. Land has a minimum value, referred to in this analysis as the salvage value, which does not depend on use or improvements of the land. Thus, delay of development only affects the value of a parcel of land that is above and beyond the parcel's salvage value. This analysis assumes that the salvage value of land is approximately 11 percent and the net value of land is therefore approximately 89 percent of the gross value of land.[243] Thus, the υ term in Equation 1 above is 89 percent of the gross value of land estimated according to Equation 2.

[241] California Department of Finance, County/State Population and Housing Estimates, Revised January 1, 2007.

[242] Including Alameda, Contra Costa, Marin, Napa, San Mateo, Santa Clara Solano, and Sonoma.

[243] Economic and Planning Systems, Economic Analysis of Critical Habitat Designation for the Arroyo Toad, March 2005, p. 39.

EXHIBIT E-1 VALUE OF DEVELOPABLE LAND PER ACRE IN THE STUDY AREA



E.5 INTEREST RATES

341. This section of the Technical Appendix discusses the components of the last term in Equation 5 above, $e^{(\delta - r)(t_1 - t_0)}$. Specifically, this section describes how δ and r are derived.

E.5.1 DISCOUNT RATE (r)

342. The appropriate interest rate to determine the present value costs of delay to developers is their own cost of capital (i.e., not a conventional social rate of three or seven percent). Because the present value of delay costs to developers will be capitalized into the value of developable land upon designation (i.e., in 2009), no further adjustments using social rates are necessary.

343. This analysis utilizes a rate of fifteen percent to reflect developers' cost of capital. This is the rate commonly used by developers to value a risky cash flow. In 2004 and 2005, interviews were conducted with developers (The Irvine Company, Henderson Land Development Company, Tejon Ranch, The Newhall Land and Farming Company, and Plum Creek Timber Company) and home builders that are also developers (Lennar Corporation, Centex Corporation, and Pulte Homes) to determine this rate.

344. The capital asset pricing model (CAPM) can be used to verify the rate quoted by developers. The CAPM, developed by William Sharpe in the 1960s, is a model that describes the relationship between risk and expected return and that is used in the pricing of risky securities. It is represented in the following formula:

$$R_i = R_f + \beta_i \left(R_m - R_f \right)$$

Equation 6,

where

R_i = the expected return on the capital asset (which in this case is developed land),

R_f = the risk-free interest rate (e.g. the rate on the 30-year Treasury Bond),

β_i = the sensitivity of the asset to market returns (i.e. the beta), and

R_m = the expected market rate of return.

345. Using a risk-free interest rate of 4 percent, the average beta for publicly traded land development companies (1.4)[244], and the post-World War II average market rate of return (11 percent), the expected interest rate on developed land (R_i in the equation above) is 13.8 percent, which is close to the 15 percent rate cited by developers.

[244] Beta values of publicly traded land development companies obtained from Google finance website.

E.5.2 GROWTH RATES (δ)

346. Finally, it is necessary to account for the annual growth rate of the value of land over the time period of the analysis. The analysis assumes that land values grow at a rate of approximately 6.86 percent annually. This figure was estimated by evaluating the following equation:

$$v_{2030} = v_{2008} e^{\delta 22}$$

Equation 7,

where v_{2008} represents the value of land in 2008 and v_{2030} is the value of land at the end of the study period. The variable δ is the rate of growth of the value of land. To estimate δ, the value of v_{2008} and v_{2030} must first be specified. The value of land in 2008 was estimated according to Equation 1 above. The value of land in 2030, v_{2030}, was estimated using the formula:

$$\frac{pe^{r(p)22} - ke^{r(k)22}}{\lambda e^{r(\lambda)22}}$$

Equation 8,

where p is selling price of a new house, k is the cost of developing the new house, and λ is the inverse density (acres per house) and each of these three components has its own growth rate, r(p), r(k), and r(λ), respectively. The growth rates of each of the three components of land value were estimated using data from the study area over the past fifteen years, which was the longest historical time period that the data are available. Using the housing price index data from the OFHEO from 1993 to 2008, the average annual growth rate in house prices in the study area was estimated to be 4.4 percent. The producer price index for new construction from 1993 through 2008 was used to estimate the annual growth rate in home construction costs, or 3.1 percent.245 The annual growth rate in inverse density, -0.14 percent, was estimated from the lot size variable in the DataQuick dataset of home sales between 1993 and 2008. According to Equation 8 above, the value of land in 2030 was estimated for each new home sale transaction in the DataQuick dataset. By dividing the natural log of the ratio of the value of land in 2030 to the value of land in 2008 by the time period of the analysis (22 years) for each new home sale observation, the annual growth rate of the value of land was calculated for each new home sale. The average annual growth rate of the value of land was then estimated to be 6.86 percent.

347. The 6.86 percent rate was used to grow both the value of land for the delay calculations as well as the value of land for purchasing compensation offsets for the project modification calculations. For the habitat restoration costs and administrative costs, this analysis assumed that these costs would grow at the rate of inflation over the time period

[245] Bureau of Labor Statistics, Producer Price Index Tables, accessed at: http://data.bls.gov/cgi-bin/dsrv, May 5, 2009.

for the analysis. The inflation rate, 2.99 percent was estimated from a twenty-year history of the Consumer Price Index (CPI) from 1988 to 2008.[246]

[246] Bureau of Labor Statistics, Consumer Price Index Tables, accessed at: http://www.bls.gov/cpi/home.htm, May 19, 2009.