



ECONOMIC ANALYSIS OF CRITICAL
HABITAT DESIGNATION FOR FOUR
CENTRAL TEXAS SALAMANDERS

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prepared for:

U.S. Fish and Wildlife Service

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LIST OF ACRONYMS AND ABBREVIATIONS

Act or ESA	Endangered Species Act
CAMPO	Capital Area Metropolitan Planning Organization
Clearwater	Clearwater Underground Water Conservation District
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
DOI	U.S. Department of the Interior
EPA	U.S. Environmental Protection Agency
EQIP	Environmental Quality Incentive Program
FERC	Federal Energy Regulatory Commission
GIS	Geographic Information Systems
HCP	Habitat Conservation Plan
IEc	Industrial Economics, Incorporated
LCRA	Lower Colorado River Authority
NAICS	North American Industry Classification System
NRCS	Natural Resource Conservation Service
OMB	Office of Management and Budget
PCEs	primary constituent elements
RFA	Regulatory Flexibility Act
RHA	Rivers and Harbors Act
SBA	Small Business Administration
SBREFA	Small Business Regulatory Enforcement Fairness Act
Service	U.S. Fish and Wildlife Service
SSA	Sole Source Aquifer
STIPs	State Transportation Improvement Plans
SWPPP	Stormwater Pollution Prevention Plan
TAZ	Traffic analysis zone
TCEQ	Texas Commission on Environmental Quality
TPDES	Texas Pollution Discharge Elimination System
WHIP	Wildlife Habitat Incentive Program

EXECUTIVE SUMMARY

1. The purpose of this report is to evaluate the potential economic impacts associated with the designation of critical habitat for Austin blind salamander (*Eurycea waterlooensis*), Jollyville Plateau salamander (*Eurycea tonkawae*), Georgetown salamander (*Eurycea naufragia*), and Salado salamander (*Eurycea chisholmensis*) (hereafter collectively “the salamanders”). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service (Service).
2. The Service proposed to list the four salamanders as endangered under the Endangered Species Act (the Act) on August 22, 2012.¹ In conjunction with the listing of the salamanders, the Service initially proposed to designate as critical habitat 52 units within Bell, Travis, and Williamson Counties. This original proposed critical habitat totaled 120 acres (49 hectares) for the Austin blind salamander; 4,460 acres (1,816 hectares) for the Jollyville Plateau salamander; 1,031 acres (423 hectares) for the Georgetown salamander; and 372 acres (152 hectares) for the Salado salamander. The Service subsequently revised the proposed designation based on additional information on springs in which the salamanders are found. As a result, the proposed designation now includes 49 units, consisting of 120 acres (49 hectares) for the Austin blind salamander; 4,934 acres (1,997 hectares) for the Jollyville Plateau salamander; 1,031 acres (423 hectares) for the Georgetown salamander; and 372 acres (172 hectares) for the Salado salamander.² The proposed units include both surface and subsurface habitat. These areas include lands under city, county, state, Federal, and private ownership. The Service is presently considering for exclusion from critical habitat approximately 152 acres (62 hectares) in Unit 19 for the Jollyville Plateau salamander and 22 acres (9 hectares) in Unit 1 for the Austin blind salamander.³
3. Since water quality and quantity in springs and subterranean aquatic habitat depend heavily on conditions in surrounding areas, in addition to considering activities that threaten specific critical habitat units, this analysis considers threats relevant to the entire watersheds within which the critical habitat units are located. The study area for this analysis is therefore defined as all lands within the watersheds containing areas proposed for critical habitat designation, including those lands being considered for exclusion. Exhibit ES-1 provides an overview map of study area.

¹ 2012 Proposed Rule. 77 FR 50768.

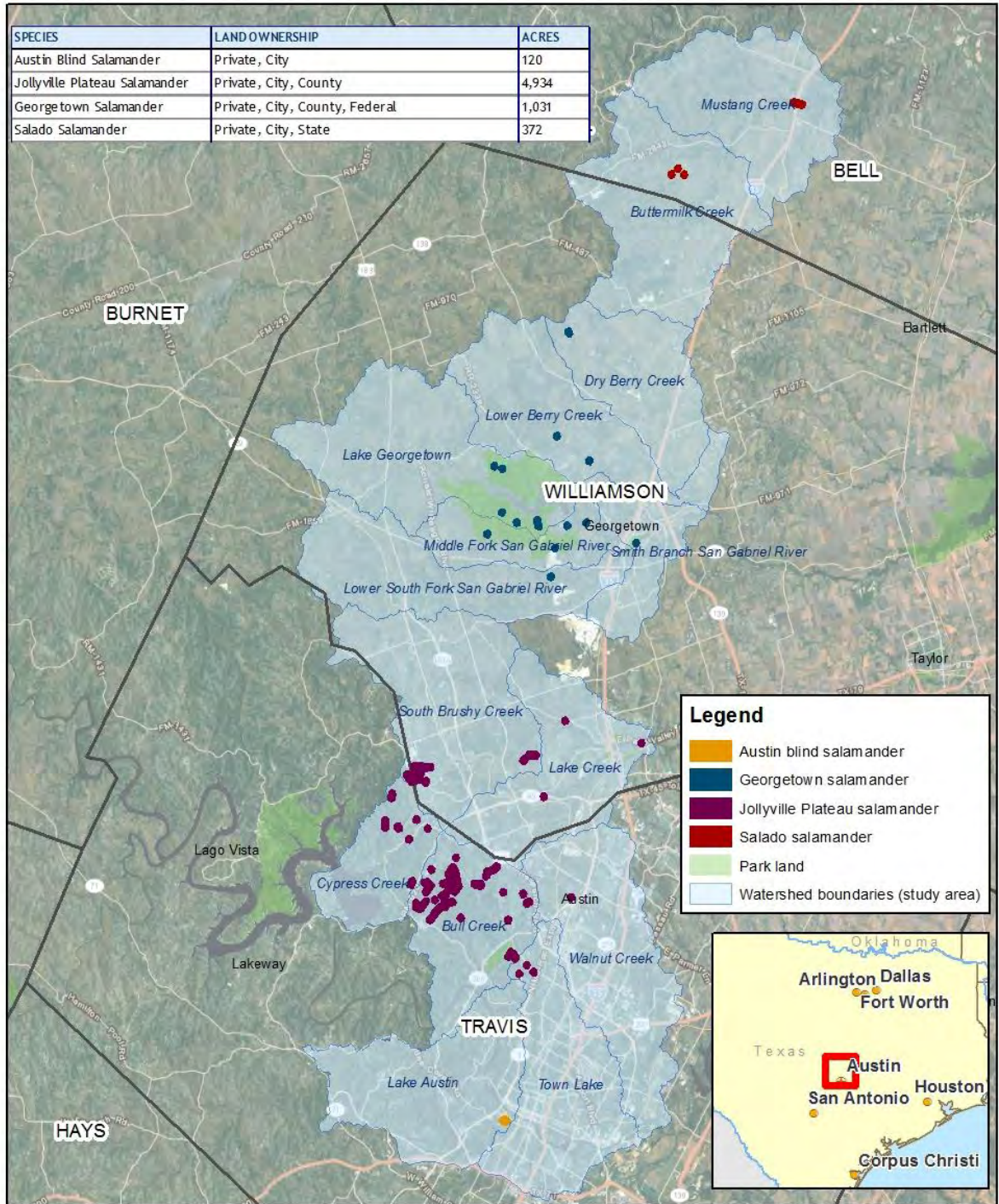
² 2012 Proposed Rule. 77 FR 50811-50812; and U.S. Fish and Wildlife Service, Regional Listing Biologist, Southwest Regional Office. Email communication on November 15, 2012.

³ 2012 Proposed Rule. 77 FR 50824.

4. This analysis first describes existing plans and regulations that provide protection for the salamanders and their habitat: for example, Habitat Conservation Plans (HCPs) and water quality regulations currently prescribe land management and conservation practices that protect the salamanders within the study area. These are “baseline” protections accorded the salamanders even absent the designation of critical habitat.
5. The discussion of the regulatory baseline provides context for the evaluation of the economic impacts of critical habitat designation, which are the focus of this analysis. These “incremental” economic impacts are those not expected to occur absent the designation of critical habitat for the invertebrates. This information is intended to assist the Secretary of the U.S. Department of the Interior (DOI) in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.⁴
6. Review of the Proposed Rule and existing conservation plans identified the following economic activities as potential threats to the salamanders and their habitat within the boundaries of the watersheds containing critical habitat:
 1. **Development.** Development may result in increased impervious cover and stormwater runoff, degraded water quality and resulting reductions in water quantity due to additional groundwater pumping.
 2. **Water management activities.** Construction of dams and impoundments alter the natural hydrological regime and may negatively affect salamander habitat.
 3. **Transportation projects.** Road construction and improvement projects may negatively affect water quality within the habitat area as a result of increased sedimentation and stormwater runoff.
 4. **Utility projects.** Construction of underground pipelines may negatively affect salamander habitat by removing subsurface material and disrupting groundwater flow.
 5. **Mining.** Limestone mining occurs throughout the Edwards Aquifer presenting a threat to all species included in this analysis except the Austin blind salamander.
 6. **Livestock grazing.** Livestock grazing near streams may negatively affect salamander habitat by increasing sedimentation and altering stream nutrient levels and temperature.
7. The analysis considers impacts to economic activities occurring from 2013 (expected year of final critical habitat designations) to 2035. This 23-year analysis period reflects the maximum amount of time under which future activities and economic impacts associated with the Proposed Rule can be reliably projected, given available data and information. Economic impacts are estimated for development, transportation, mining, and species and habitat management activities. No impacts are forecast for water management activities, utility projects, and livestock grazing activities. For these activities, no projects with a Federal nexus were identified within the study area.

⁴ 16 U.S.C. §1533(b)(2).

EXHIBIT ES-1. OVERVIEW OF PROPOSED CRITICAL HABITAT STUDY AREA FOR FOUR CENTRAL TEXAS SALAMANDERS



Sources:
 1. U.S. Fish and Wildlife Service
 2. Environmental Systems Research Institute, Inc. (ESRI)



KEY FINDINGS

7. The Service anticipates that in most cases conservation efforts recommended through section 7 consultation due to the listing of the species (i.e., to avoid jeopardy) will also avoid adverse modification of critical habitat.⁵ In some limited instances, the Service has indicated that concern regarding potential adverse modification of critical habitat may generate recommendations for additional conservation; however, at this time, the Service is unable to predict the types of projects that may require different conservation efforts. As a result, this analysis focuses on quantifying incremental impacts associated with the administrative effort of addressing potential adverse modification of critical habitat in section 7 consultation.
8. Exhibit ES-2 summarizes the total incremental impacts for all areas proposed for designation assuming a seven percent and three percent discount rate. This exhibit separately summarizes the impacts in the areas presently being considered for exclusion from designation. The key findings are as follows:
 - Total present value impacts anticipated to result from the designation of all areas proposed as salamander critical habitat are approximately \$29 million over 23 years following the designation, assuming a seven percent discount rate (\$40 million assuming a three percent discount rate).
 - Within the areas presently being considered for exclusion from salamander critical habitat, present value impacts are \$55,000 assuming a seven percent discount rate (\$60,000 assuming a three percent discount rate).
 - All incremental costs are administrative in nature and result from the consideration of adverse modification in section 7 consultations and re-initiation of consultations for existing management plans.
9. Exhibit ES-3 presents total incremental impacts by unit for each species, including impacts in both areas that are presently being considered for exclusion and areas not presently being considered for exclusion. In Exhibit ES-3 and the remainder of the report, impacts are presented assuming a seven percent discount rate. Appendix B presents the results applying a three percent discount rate to highlight the sensitivity of the findings to the discount rate assumption. Exhibit ES-3 shows that:
 - Proposed Unit 1 for the Austin blind salamander and proposed Unit 32 for the Jollyville Plateau salamander are likely to experience the greatest incremental impacts on a relative basis.
 - Impacts in proposed Unit 1 for the Austin blind salamander are estimated at \$3.7 million in present value terms (13.0 percent of total present value impacts) and result from a portion of the consultation associated with the Mopac Expressway, approximately 21 consultations annually on development projects within Unit 1

⁵ Throughout this document, use of the term 'adverse modification' should be read to reference the full relevant standard under section 7 of the Act (i.e., each Federal agency must ensure that any action it authorizes, funds, or carries out is not likely to result in the destruction or adverse modification of critical habitat). 16 U.S.C. §1536(a)(2).

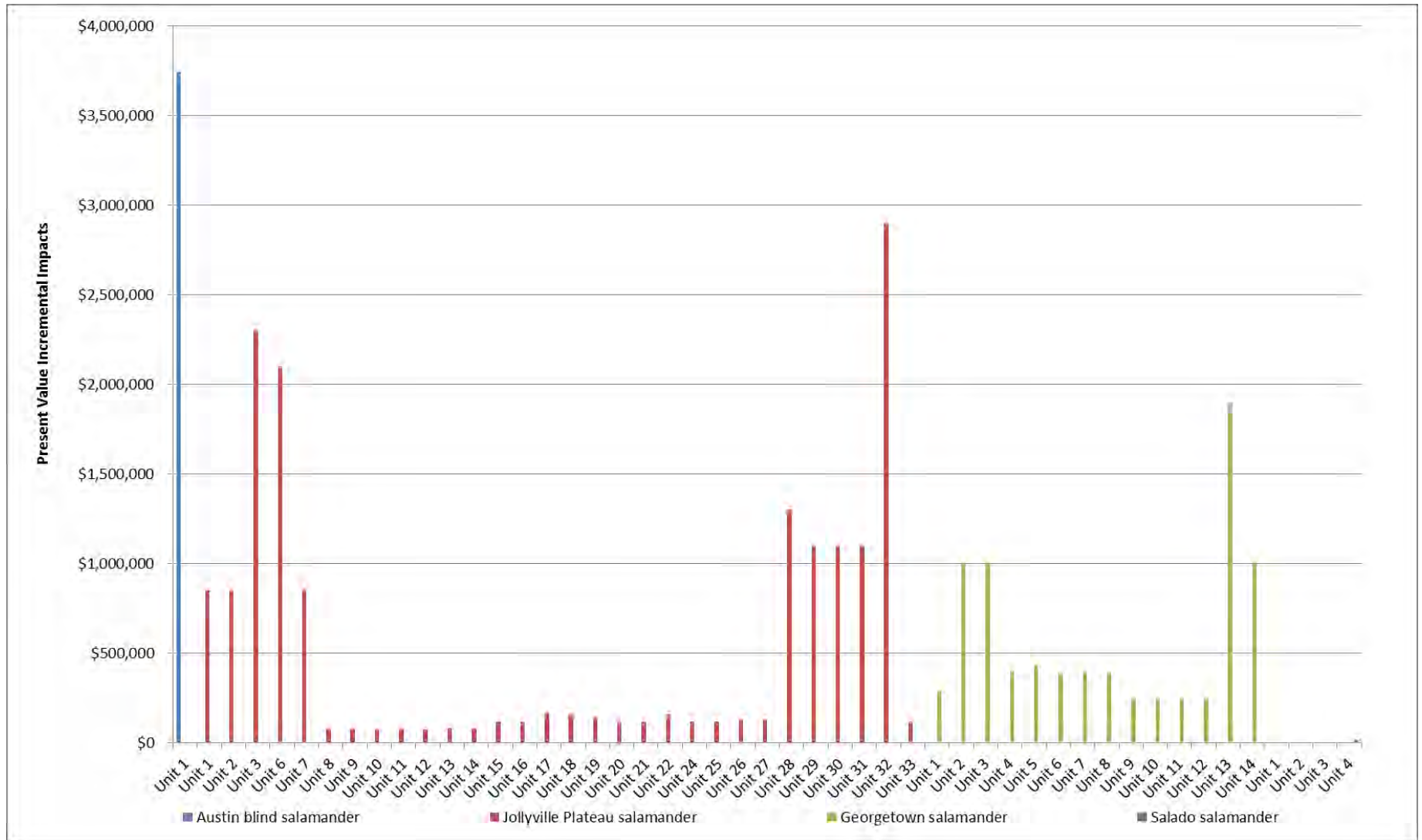
itself and the Lake Austin watershed, and re-initiations of section 7 consultation for three HCPs within the Lake Austin watershed.

- Impacts in proposed Unit 32 for the Jollyville Plateau salamander are estimated at \$2.9 million in present value terms (10.1 percent of total present value impacts) and result from a portion of the consultations associated with three transportation projects and approximately 17 consultations annually on development projects within Unit 32 itself and the Walnut Creek watershed.

EXHIBIT ES-2. SUMMARY OF TOTAL FORECAST ECONOMIC IMPACTS, 2013-2035 (2012\$, DISCOUNTED AT SEVEN AND THREE PERCENT)

PROPOSED CRITICAL HABITAT AREA	SEVEN PERCENT DISCOUNT RATE		THREE PERCENT DISCOUNT RATE	
	PRESENT VALUE INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS	PRESENT VALUE INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
AUSTIN BLIND SALAMANDER				
Not Considered for Exclusion	\$3,700,000	\$310,000	\$5,200,000	\$310,000
Considered for Exclusion	\$43,000	\$3,500	\$43,000	\$2,500
Austin blind total	\$3,800,000	\$310,000	\$5,200,000	\$310,000
JOLLYVILLE PLATEAU SALAMANDER				
Not Considered for Exclusion	\$17,000,000	\$1,400,000	\$23,000,000	\$1,400,000
Considered for Exclusion	\$12,000	\$1,000	\$17,000	\$1,000
Jollyville Plateau total	\$17,000,000	\$1,400,000	\$23,000,000	\$1,400,000
GEORGETOWN SALAMANDER				
Not Considered for Exclusion	\$8,200,000	\$680,000	\$11,000,000	\$680,000
Considered for Exclusion	n/a	n/a	n/a	n/a
Georgetown total	\$8,200,000	\$680,000	\$11,000,000	\$680,000
SALADO SALAMANDER				
Not Considered for Exclusion	\$30,000	\$2,500	\$36,000	\$2,100
Considered for Exclusion	n/a	n/a	n/a	n/a
Georgetown total	\$30,000	\$2,500	\$36,000	\$2,100
ALL SALAMANDERS				
Not Considered for Exclusion	\$29,000,000	\$2,400,000	\$40,000,000	\$2,400,000
Considered for Exclusion	\$55,000	\$4,500	\$60,000	\$3,500
Grand total	\$29,000,000	\$2,400,000	\$40,000,000	\$2,400,000
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.				

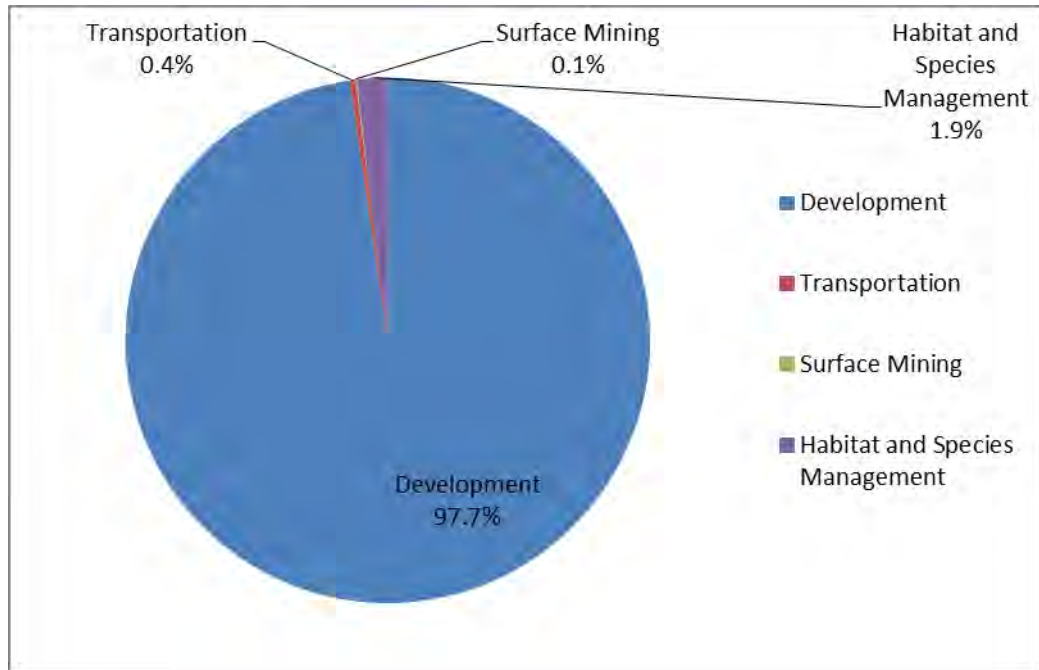
EXHIBIT ES-3. FORECAST INCREMENTAL IMPACTS BY UNIT, 2013-2035 (2012\$, DISCOUNTED AT SEVEN PERCENT)⁶



⁶ Note: Present value impacts in Units 1, 2, and 3 for the Salado salamander are \$3,900. Impacts in Unit 4 for the Salado salamander are \$18,000.

10. Impacts associated with specific activities are discussed below. Exhibit ES-4 presents the breakdown of total incremental impacts by activity. As shown in the exhibit, consultations associated with development activities account for approximately 97.7 percent of incremental impacts in this analysis.

EXHIBIT ES-4. FORECAST PRESENT VALUE INCREMENTAL IMPACTS BY ACTIVITY, 2013-2035 (2012\$, DISCOUNTED AT SEVEN PERCENT)



Development

11. Proposed critical habitat for the salamanders occurs within increasingly urbanized areas. In particular, the study area for the Georgetown, Jollyville Plateau, and Austin blind salamanders includes fast growing cities such as Austin, Cedar Park, Georgetown, and Round Rock. The study area for the Salado salamander within Bell County remains relatively undeveloped and rapid population growth is not expected within the coming decades.⁷ For this reason, we assume that development primarily impacts Williamson and Travis Counties. To forecast future development projects in these areas, we identify all lands that are currently vacant and are not publicly-owned or known to be preserved. The number of projects is estimated using data on population projections and average project size within the study area. Incremental impacts associated with consultations for development projects are estimated to be \$28 million in present value terms, discounted at seven percent, in areas not considered for exclusion, and \$13,000 in present value terms, discounted at seven percent, in areas being considered for exclusion.

⁷ Personal Communication with T. Brown, Bell County Commissioner and D. Aaron, Clearwater General Manager on November 8, 2012.

Transportation Projects

12. Using information from the Texas State Transportation Improvement Plans (STIPs), the Capital Area Metropolitan Planning Organization, and the Killeen-Temple Planning Organization, this analysis identified nine transportation projects with a Federal nexus that are expected to occur within the study area over the next 23 years. Incremental impacts to transportation projects are estimated to be \$110,000 in present value terms, discounted at seven percent. All impacts are within areas not considered for exclusion.

Surface Mining Operations

13. Surface mining may have a Federal nexus for section 7 consultation through the Corps permitting process. This analysis uses historical data on Corps permitted mining activity to forecast future mining within the study area.⁸ In total two future section 7 consultations associated with mining activities are forecast. Future mining activities are expected to affect the proposed critical habitat for the Salado salamander. Incremental impacts associated with mining activities are estimated to be \$16,000 in present value terms, discounted at seven percent. All impacts are within areas not considered for exclusion.

Habitat and Species Management

14. The Service has indicated that critical habitat designation may trigger re-initiation of section 7 consultation for many existing conservation plans. This analysis estimates incremental impacts associated with programmatic re-initiation of 13 existing HCPs: the Balcones Canyonlands Preserve, Barton Creek HCP, Barton Springs Pool HCP, Bee Cave Oaks HCP, Concordia HCP, Fleur HCP, GDF HCP, Lakeline Mall HCP, Ribelin Ranch HCP, Russell Park Estates HCP, Shadow Canyon HCP, Silverado HCP, and Williamson County Regional HCP. We assume these 13 re-initiations will occur in 2013, immediately following the designation of critical habitat. Incremental impacts associated with these re-initiated consultations are estimated to be \$500,000 in present value terms, discounted at seven percent, in areas not considered for exclusion, and \$42,000 in present value terms, discounted at seven percent, in areas being considered for exclusion.

POTENTIAL BENEFITS

15. The primary purpose of this rulemaking is to enhance conservation of the salamanders. 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 to Federal agencies on best practices for preparing economic analyses of proposed rulemakings, the Office of Management and Budget (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. Rather than rely on economic measures, the Service believes that the direct benefits of the Proposed Rule are best

⁸ The study area for this analysis is based on hydrologic unit code (HUC) 12 watersheds. The Corps database is organized around HUC-8 watersheds. As a result, the information on permitting rates provided by the Corps spans a significantly larger geographic area than the study area for this analysis.

expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking. In this report, we include a general, qualitative description of the categories of benefits that may result from the designation of critical habitat.

IMPACTS TO SMALL ENTITIES AND THE ENERGY INDUSTRY

16. Appendix A of this report includes an analysis of the distributional impacts of the proposed critical habitat designations on small entities and the energy industry. Exhibit ES-5 presents the results of the threshold analysis developed to support the Service's determination regarding whether the Proposed Rule will have a significant economic impact on a substantial number of small entities, as required by the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA). In the threshold analysis we consider two possible scenarios for development and mining activity, one in which a single small entity undertakes all projects within the study area and another in which a different entity undertakes each forecast project. This method enables us to bound the results. The threshold analysis shows that:
 - Between 1 and 3,754 small residential and commercial development entities will be affected by the designation and the per-entity impact of the designation will amount to between 0.02 and 3.1 percent of annual revenues;
 - Between 1 and 2 small surface mining entities will be affected by the designation and the per-entity impact of the designation will amount to between 0.01 and 0.02 percent of annual revenues; and
 - Up to nine small HCP permittees will be affected by the designation and the per-entity impact of the designation will amount to between 0.21 and 0.63 percent of annual revenues.
17. In addition, Executive Order 13211 requires agencies to prepare and submit a "Statement of Energy Effects" for all "significant energy actions." As described in that appendix, the Proposed Rule is unlikely to have any effect on energy production in the U.S.

EXHIBIT ES-5. RFA/SBREFA THRESHOLD ANALYSIS RESULTS SUMMARY

ACTIVITY	TYPE OF IMPACT	AFFECTED ENTITIES	SMALL ENTITIES AFFECTED	% OF SMALL ENTITIES	ANNUALIZED IMPACTS EXCLUDING FEDERAL COSTS (7% DISCOUNT RATE)	IMPACTS PER ENTITY	ANNUAL REVENUES PER SMALL ENTITY	IMPACTS AS % OF ANNUAL REVENUES
Transportation	Admin. costs only	Federal, State, and County agencies	None	n/a	n/a	n/a	n/a	n/a
Habitat and Species Management	Admin. costs only	City of Austin; Travis and Williamson Counties; Simon Properties Group; Stratus Properties, Inc; Schlumberger, Ltd.; Lessors of Residential Buildings and Dwellings (531110); Lessors of Nonresidential Buildings (except Miniwarehouses) (531120)	9	0.25%	\$48,000	\$2,300 - \$6,900	\$1.1 million	0.21% - 0.63%
Residential and Commercial Development	Admin. costs only	New Single-Family Housing Construction (236115); New Multifamily Housing Construction (236116); New Housing Operative Builders (236117); Land Subdivision (237210); Commercial and Institutional Building (236220)	1 to 3,754	0.02% to 68%	\$140,000	\$880	\$4.6 million	0.02% to 3.1%
Surface Mining	Admin. costs only	Crushed and Broken Limestone Mining and Quarrying (212312)	1 to 2	25% to 50%	\$960	\$880	\$10 million	0.01% to 0.02%
<p>Note: This estimate excludes the additional incremental costs of consultation that would be borne by the Federal action agency and the Service. These costs are not relevant to this screening analysis as these entities (Federal agencies) are not small. Costs are estimated as described in Chapter 4.</p>								

KEY SOURCES OF UNCERTAINTY

18. At the end of Chapter 4, we include a discussion of the key sources of uncertainty and major assumptions affecting the estimation of impacts. The assumptions that are likely to have the most significant effect on the estimated impacts include:

- The Service will not request additional project modifications to address adverse modification beyond what is requested to avoid jeopardy;
- All future development projects within the study area will have a Federal nexus;
- Average county population density used to calculate the projected acres of development is applicable to all areas within the county;
- Average development project size is 7.16 acres; and
- Development projects are spread evenly over the 23-year period of this analysis.

The direction of the potential bias introduced by these assumptions is mixed (i.e., in some cases leading to an underestimate and in some cases leading to an overestimate) and in some cases unknown.

CHAPTER 1 | INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

19. This chapter provides an overview of the proposed critical habitat for Austin blind salamander (*Eurycea waterlooensis*), Jollyville Plateau salamander (*Eurycea tonkawae*), Georgetown salamander (*Eurycea naufragia*), and Salado salamander (*Eurycea chisholmensis*) (hereafter collectively “the salamanders”). We include a description of the species, a summary of publications that relate to the current proposal, a summary of land ownership within the current proposal, an overview map of the proposed units, and a summary of threats to the proposed critical habitat. All official definitions and boundaries should be taken from the Proposed Rule.⁹

1.2 SPECIES DESCRIPTION

20. The salamanders are aquatic amphibians without lungs. They rely on high quality water from the Edwards Aquifer, a karst aquifer distinguished by the presence of caves and other cavities. Habitat for the subterranean Austin blind salamander is found in the Barton Springs Segment of the Edwards Aquifer in Travis County, Texas. Habitat for the surface-dwelling Jollyville Plateau salamander exists in the Jollyville Plateau and Brushy Creek parts of the Edwards Plateau in both Travis and Williamson Counties, Texas. Georgetown salamanders occupy springs along tributaries to the San Gabriel River and several caves in Williamson County, Texas. Salado salamander habitat occurs in several springs in Bell County. The Jollyville Plateau, Georgetown, and Salado salamanders occur in close proximity to one another in the Northern Segment of the Edwards Aquifer and divides in groundwater are thought to separate the habitat extents of the three species.¹⁰

1.3 PREVIOUS FEDERAL ACTIONS

21. Below, we summarize key milestones in the Federal regulatory history for the salamanders.

Listing: All four salamander species were proposed for listing as endangered under the Endangered Species Act (the Act) on August 22, 2012.¹¹

Proposed critical habitat: In conjunction with the proposed listing of the salamanders on August 22, 2012, the Service proposed to designate 52 critical habitat

⁹ 2012 Proposed Rule. 77 FR 50768.

¹⁰ *Ibid.*

¹¹ *Ibid.*

units for the four species. The Service subsequently revised the proposed designation based on additional information to include only 49 critical habitat units. As a result, the proposed critical habitat designation, following this revision, totals 120 acres (49 hectares) for the Austin blind salamander; 4,934 acres (1,997 hectares) for the Jollyville Plateau salamander; 1,031 acres (423 hectares) for the Georgetown salamander; and 372 acres for the Salado salamander (152 hectares).

1.4 PROPOSED CRITICAL HABITAT DESIGNATION

22. The Proposed Rule, as revised, would designate approximately 6,458 acres (2,613 hectares) of critical habitat across 49 units in Travis, Williamson, and Bell Counties, Texas. Of these units, one is proposed as critical habitat for the Austin blind salamander, 30 for the Jollyville Plateau salamander, 14 for the Georgetown salamander, and four for the Salado salamander. All units are known to be occupied by one of the four salamander species. The proposed units include both surface and subsurface habitat: proposed surface critical habitat comprises spring outlets up to the high water line and 164 feet of downstream habitat, and proposed subsurface critical habitat encompasses a 984-foot radius surrounding the spring.¹² Acreages reported in Exhibit 1-1 reflect the extent of subsurface habitat but also encompass surface habitat. These areas include lands under city, county, State, Federal, and private ownership.¹³ Approximately 152 acres (62 hectares) of Unit 19 for the Jollyville Plateau salamander are being considered for exclusion under section 4(b)(2) of the Act due to the baseline protection afforded the salamander by the existing Four Points Habitat Conservation Plan (HCP).¹⁴ The remaining 102 acres within Unit 19 are not presently being considered for exclusion. Similarly, 22 acres (9 hectares) of proposed critical habitat for the Austin blind salamander are presently being considered for exclusion due to the baseline protection afforded the salamander by the existing Barton Springs Pool HCP. An additional 98 acres for the Austin blind salamander are not considered for exclusion.
23. Salamander habitat, particularly water quality, may be affected by activities occurring upstream within the watershed.¹⁵ As a result, the “study area” for the Economic Analysis is defined as all lands within the watersheds containing areas proposed for critical habitat designation, including those lands being considered for exclusion. Exhibit 1-1 provides a breakdown of proposed critical habitat land ownership and acreage by unit.
24. Exhibit 1-2 provides an overview map of the study area. The majority of the proposed critical habitat is located within or near the highly urbanized areas of the Cities of Austin and Georgetown. In particular, the Austin blind salamander and Jollyville Plateau salamander occur within the City of Austin, and the Georgetown salamander occurs

¹² These distances represent the greatest distance salamanders have been known to travel from spring outlets.

¹³ 2012 Proposed Rule. 77 FR 50811-50812.

¹⁴ 2012 Proposed Rule. 77 FR 50824.

¹⁵ U.S. Fish and Wildlife Service, “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Four Central Texas Salamanders,” August 22, 2012. (p. 6)

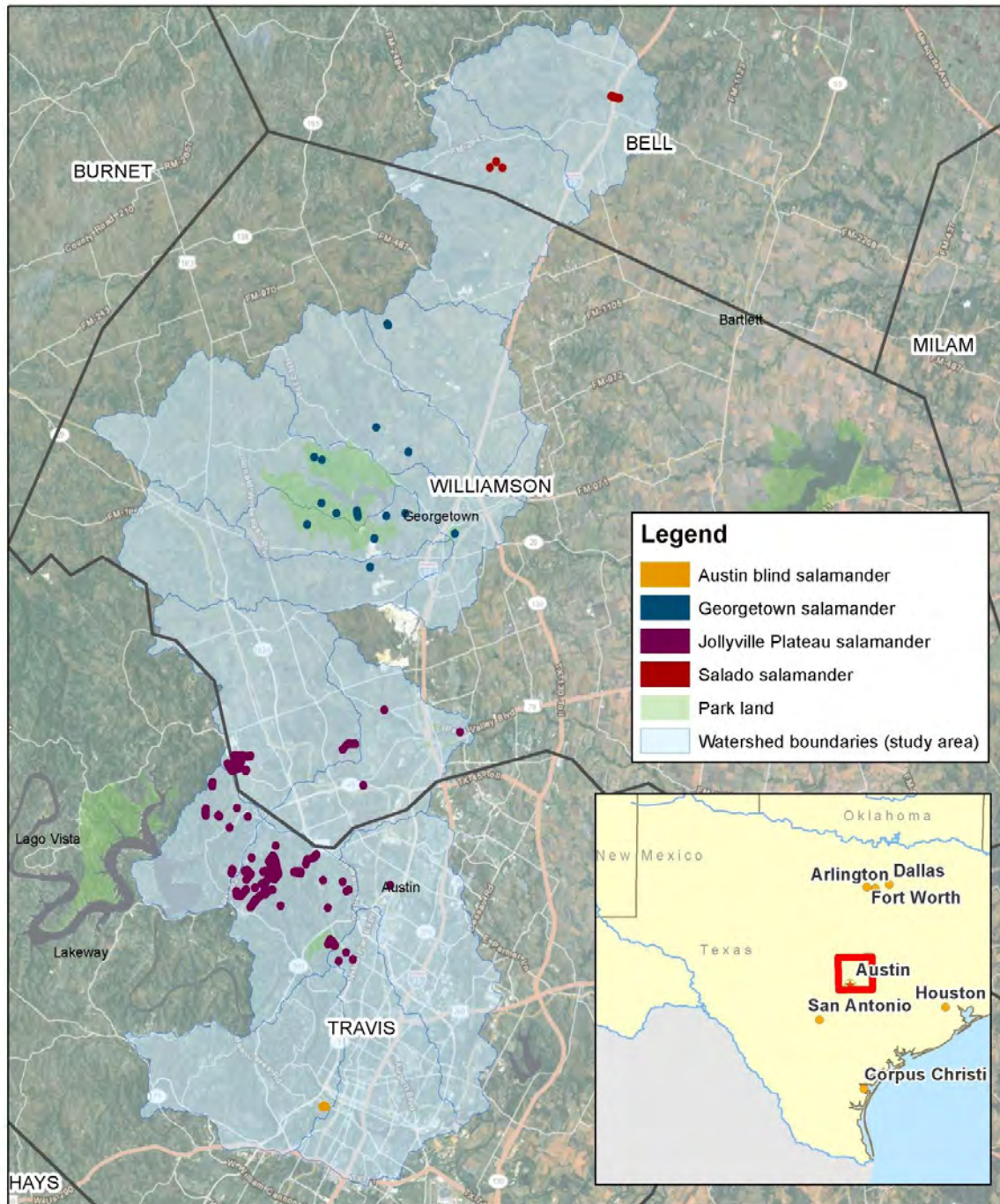
within the City of Georgetown. The Salado salamander occurs in relatively undeveloped areas near the Village of Salado.

EXHIBIT 1-1. SUMMARY OF LAND OWNERSHIP OF PROPOSED CRITICAL HABITAT

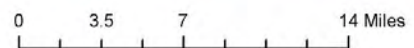
UNIT NUMBER	UNIT NAME	LAND OWNERSHIP	ACRES
AUSTIN BLIND SALAMANDER			
1	Barton Springs Unit	City, Private	98*
Total			98*
JOLLYVILLE PLATEAU SALAMANDER			
1	Krienke Spring Unit	Private	68
2	Brushy Creek Spring Unit	Private	68
3	Buttercup Creek Unit	Private, State, City	699
6	Avery Spring Unit	Private	237
7	PC Spring Unit	Private	68
8	Baker and Audubon Spring Unit	Private	110
9	Wheless Spring Unit	Private, County	145
10	Blizzard R-Bar-B Spring Unit	Private	88
11	House Spring Unit	Private	68
12	Kelly Hollow Spring Unit	Private	68
13	MacDonald Well Unit	Private, County	68
14	Kretschmarr Unit	Private, County	112
15	Pope and Hiers (Canyon Creek) Spring Unit	Private	68
16	Fern Gully Spring Unit	Private, City	68
17	Bull Creek 1 Unit	Private, City, County	1,198
18	Bull Creek 2 Unit	Private, City, County	237
19	Bull Creek 3 Unit	Private, City	102*
20	Moss Gulley Spring Unit	City, County	68
21	Ivanhoe Spring Unit	City	68
22	Sylvia Spring Area Unit	Private, City, County	238
24	Long Hog Hollow Unit	Private	68
25	Tributary 3 Unit	Private	68
26	Sierra Spring Unit	Private	68
27	Troll Spring Unit	Private	98
28	Stillhouse Unit	Private	203
29	Salamander Cave Unit	Private	68
30	Indian Spring Unit	Private	68

UNIT NUMBER	UNIT NAME	LAND OWNERSHIP	ACRES
31	Spicewood Spring Unit	Private	68
32	Balcones District Park Spring Unit	Private, City	68
33	Tributary 4 Unit	Private, City	159
Total			4,782*
GEORGETOWN SALAMANDER			
1	Cobb Unit	Private	83
2	Cowen Creek Spring Unit	Private	68
3	Bat Well Unit	Private	68
4	Walnut Spring Unit	Private, County	68
5	Twin Springs Unit	Private, County	68
6	Hogg Hollow Spring Unit	Private, Federal	68
7	Cedar Hollow Spring Unit	Private	68
8	Lake Georgetown Unit	Federal, Private	132
9	Water Tank Cave Unit	Private	68
10	Avant Spring Unit	Private	68
11	Buford Hollow Spring Unit	Federal, Private	68
12	Swinbank Spring Unit	City, Private	68
13	Shadow Canyon Unit	City, Private	68
14	San Gabriel Springs Unit	City	68
Total			1,031
SALADO SALAMANDER			
1	Hog Hollow Spring Unit	Private	68
2	Solana Spring #1 Unit	Private	68
3	Cistern Spring Unit	Private	68
4	IH-35 Unit	Private, State, City	168
Total			372
AREAS CONSIDERED FOR EXCLUSION			
AUSTIN BLIND SALAMANDER			
1	Barton Springs Unit	City, Private	22
JOLLYVILLE PLATEAU SALAMANDER			
19	Bull Creek 3 Unit	Private, City	152
<p>Note: Acreages marked with an asterisk do not include areas considered for exclusion, which are shown at the bottom of the table. Totals may not sum due to rounding. Acreages reflect the size of the subsurface portion of proposed critical habitat, but also encompass surface habitat. All units are considered occupied by the species.</p> <p>Sources: 2012 Proposed Rule. 77 FR 50811-50812; and U.S. Fish and Wildlife Service, Regional Listing Biologist, Southwest Regional Office. Email communication on November 15, 2012.</p>			

EXHIBIT 1-2. OVERVIEW OF PROPOSED CRITICAL HABITAT STUDY AREA FOR FOUR CENTRAL TEXAS SALAMANDERS



Sources:
 1. U.S. Fish and Wildlife Service
 2. Environmental Systems Research Institute, Inc. (ESRI)



25. Since water quality and quantity in springs and subterranean aquatic habitat depend heavily on conditions in surrounding areas, this analysis will consider threats relevant to the entire watersheds within which the critical habitat units are located in addition to considering activities that threaten the specific critical habitat units. The Austin blind salamander proposed critical habitat occurs in the Lake Austin watershed. Proposed critical habitat units for the Jollyville Plateau salamander are located in six watersheds. Units for the Georgetown salamander are located in six separate watersheds. Proposed critical habitat for the Salado salamander occurs across two watersheds. No watershed contains critical habitat for more than one species. Units 3 and 28 for the Jollyville Plateau salamander are the only units that span more than one watershed. Exhibit 1-3 summarizes the relevant watersheds and the units located within each.

EXHIBIT 1-3. SUMMARY OF WATERSHEDS WITH CRITICAL HABITAT UNITS

WATERSHED NAME	AREA (ACRES)	CRITICAL HABITAT UNIT(S)
AUSTIN BLIND SALAMANDER		
Lake Austin	34,117	Austin Blind Unit 1
JOLLYVILLE PLATEAU SALAMANDER		
South Brushy Creek	39,311	Jollyville Plateau Units 3, 6
Lake Creek	28,978	Jollyville Plateau Units 1, 2, 7
Cypress Creek	15,901	Jollyville Plateau Units 3, 8, 9, 10, 11, 12, 13, 14
Bull Creek	24,331	Jollyville Plateau Units 15, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 33
Town Lake	32,037	Jollyville Plateau Units 28, 29, 30, 31
Walnut Creek	36,493	Jollyville Plateau Unit 32
GEORGETOWN SALAMANDER		
Lake Georgetown	40,367	Georgetown Units 4, 5, 6, 7, 8
Middle Fork San Gabriel River	13,770	Georgetown Unit 9, 10, 11, 12
Lower South Fork San Gabriel River	31,012	Georgetown Unit 13
Dry Berry Creek	24,218	Georgetown Unit 1
Lower Berry Creek	31,761	Georgetown Units 2, 3
Smith Branch San Gabriel River	13,854	Georgetown Unit 14
SALADO SALAMANDER		
Buttermilk Creek	39,481	Salado Units 1, 2, 3
Mustang Creek	32,667	Salado Unit 4

1.5 ECONOMIC ACTIVITIES CONSIDERED IN THIS ANALYSIS

26. Review of the Proposed Rule and existing conservation plans identified the following economic activities as potential threats to the salamanders and their habitat within the boundaries of the watersheds containing critical habitat:

(1) **Development.** The potential for additional residential and commercial development constitutes a primary threat to salamander habitat. Development

may result in increased impervious cover and stormwater runoff, degraded water quality from contaminants and hazardous material spills, and reductions in water quantity due to additional groundwater pumping.

- (2) **Water management activities.** Construction of dams and impoundments alter the natural hydrological regime and may negatively affect salamander habitat. In particular, the entire range of the Austin blind salamander has been affected by the construction of impoundments for recreational purposes in the Barton Springs system.
- (3) **Transportation projects.** Road construction and improvement projects may negatively affect water quality within the habitat area as a result of increased sedimentation and stormwater runoff. Interstate Highway 35 crosses the watersheds supporting proposed critical habitat for all four species. The Salado salamander can be found as close as 760 feet downstream of this interstate.
- (4) **Utility projects.** Construction of underground pipelines may negatively affect salamander habitat by removing subsurface material and disrupting groundwater flow. In particular, the Longhorn pipeline runs through the Barton Springs system and may affect the Austin blind salamander.
- (5) **Mining.** Limestone mining occurs throughout the Edwards Aquifer. At least three Georgetown salamander sites are located adjacent to active limestone quarries. Of the four species, only the Austin blind salamander is unlikely to be affected by limestone mining because of the location of its habitat in the City of Austin.
- (6) **Livestock grazing.** Livestock grazing near streams may negatively affect salamander habitat by increasing sedimentation through erosion. In addition, livestock grazing can lead to changes in water quality by altering nutrient levels and stream temperature. Livestock grazing is known to occur on multiple sites occupied by the Georgetown salamander and Salado salamander.

1.6 ORGANIZATION OF THE REPORT

27. The remainder of this report proceeds through four additional chapters. Chapter 2 discusses the framework employed in the analysis. Chapter 3 describes the extensive baseline protections that apply to the salamanders. Chapter 4 provides an assessment of the potential incremental economic impacts to the activities listed above. In conclusion, Chapter 5 describes the potential benefits of the proposed critical habitat designation.
28. In addition, this report includes the following appendices: Appendix A considers potential impacts on small entities and the energy industry; Appendix B discusses the sensitivity of the results to discount rate, including undiscounted values; Appendix C provides the basis for identifying the incremental effects of critical habitat designation; and Appendix D provides detailed maps of the units proposed as critical habitat for the salamanders.

CHAPTER 2 | FRAMEWORK FOR THE ANALYSIS

29. The purpose of this report is to estimate the economic impact of actions taken to protect the salamanders and their habitat. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the species and their habitat within and affecting the proposed critical habitat areas. This analysis employs "without critical habitat" and "with critical habitat" scenarios. The "without critical habitat" scenario represents the baseline for the analysis, considering protections otherwise accorded the salamanders; 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.
30. This information is intended to assist the Secretary of the U.S. Department of Interior in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.¹⁶ In addition, this information allows the Service to address the requirements of Executive Orders 12866 (as amended by 13563) and 13211, and the RFA, as amended by SBREFA.¹⁷
31. This chapter describes the framework for this analysis. We describe case law that led to the selection of the framework applied in this report. Next, we describe in economic terms the general categories of economic effects that are the focus of the impact analysis, including a discussion of both efficiency and distributional effects. This chapter then defines the analytic framework used to measure these impacts in the context of critical habitat regulation and the consideration of benefits. We conclude with a presentation of the information sources relied upon in the analysis and notes on the presentation of the results.

2.1 BACKGROUND

32. The U.S. Office of Management and Budget's (OMB) guidelines for conducting an 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

¹⁶ 16 U.S.C. §1533(b)(2).

¹⁷ Executive Order 12866, Regulatory Planning and Review, September 30, 1993; Executive Order 13563, Improving Regulation and Regulatory Review, January 18, 2011; 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 Contract with America Advancement Act of 1996, Title II, Pub Law No. 104-121.

the world would look absent the proposed action."¹⁸ 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 designation.

33. In 2001, the U.S. Court of Appeals for the Tenth Circuit 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.¹⁹ 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].”²⁰

34. 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.²¹ 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,

¹⁸ U.S. Office of Management and Budget, “Circular A-4,” September 17, 2003, available at <http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf>

¹⁹ *New Mexico Cattle Growers Assn v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

²⁰ *Ibid.*

²¹ Later decisions note that in *New Mexico Cattle Growers*, the U.S. Court of Appeals for the Tenth Circuit relied on a Service regulation that defined “destruction and adverse modification” in the context of section 7 consultation as effectively identical to the standard for “jeopardy.” Courts had since found that this definition of “adverse modification” was too narrow. For more details, see the discussion of *Gifford Pinchot Task Force v. United States Fish and Wildlife Service* provided later in this section.

“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.’”²²

35. More recently, in 2010, the U.S Court of Appeals for the Ninth Circuit came to similar conclusions during its review of critical habitat designation for the Mexican spotted owl and 15 vernal pool species.²³ Plaintiffs in both cases requested review by the Supreme Court, which declined to hear the cases in 2011.
36. In order to address the divergent opinions of the courts and provide the most complete information to decision-makers, this economic analysis:
 - Describes the baseline protections accorded the four salamanders absent critical habitat designation (Chapter 3); and
 - Monetizes the potential incremental impacts precipitated specifically by the critical habitat designation for the species (Chapter 4).
37. Several Courts of Appeal, including the Ninth Circuit and the Fifth Circuit, have invalidated the Service’s regulation defining destruction or adverse modification of critical habitat.²⁴ At this time the Service is analyzing whether destruction or adverse modification would occur based on the statutory language of the Act itself, which requires the Service to consider whether the agency’s action is likely “to result in the destruction or adverse modification of habitat which is determined by the Service to be critical” to the conservation of the species. To perform this analysis, the Service considers how the proposed action is likely to impact the ability of critical habitat to carry out its intended function and conservation role. To assist us in evaluating these likely impacts, the Service provided information regarding what potential consultations could occur in the critical habitat units for the salamanders and what projection modifications may be imposed as a result of critical habitat designation. The Service also provided a memorandum characterizing the effects of critical habitat designation over and above those associated with the listing (see Appendix C). A detailed description of the methodology used to define baseline and incremental impacts is provided at the end of this chapter.

²² *Center for Biological Diversity v. United States Bureau of Land Management*, 422 F. Supp.2d 1115 (N.D. Cal. 2006).

²³ *Home Builders Association of Northern California v. United States Fish and Wildlife Service*, 616 F.3d 983 (9th Cir. 2010), cert. denied, 179 L. Ed 2d 301, 2011 U.S. Lexis 1392, 79 U.S.L.W. 3475 (2011); *Arizona Cattle Growers v. Salazar*, 606 F. 3d 1160 (9th Cir. 2010), cert. denied, 179 L. Ed. 2d 300, 2011 U.S. Lexis 1362, 79 U.S.L.W. 3475 (2011).

²⁴ *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 salamanders and their habitat (hereafter referred to collectively as “salamander 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 salamander conservation efforts.
39. This analysis also addresses the distribution of impacts associated with the designations, including an assessment of any local or regional impacts of habitat conservation. 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.

2.2.1 EFFICIENCY EFFECTS

40. At the guidance of OMB and in compliance with Executive Order 12866 "Regulatory Planning and Review," Federal agencies measure changes in economic efficiency in order to understand how society, as a whole, will be affected by a regulatory action. In the context of regulations that protect the salamanders' 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.²⁵
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 may enter into a section 7 consultation with the Service to ensure that a particular activity is not likely to 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 a compliance activity is not expected to significantly affect markets -- that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price -- the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.

²⁵ 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>.

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 the salamanders and their habitat. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. However, if the cost of conservation efforts is expected to significantly impact markets, there can be changes in consumer and/or producer surplus in affected markets. In the case of the salamanders, conservation efforts are not anticipated to significantly affect markets; therefore, this report focuses solely on compliance costs.

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.²⁶ 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.²⁷ In addition, in response to Executive Order 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.²⁸

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

²⁶ U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf>

²⁷ 5 U.S.C. §601 *et seq.*

²⁸ Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001.

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 in 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 impacted businesses. In addition, the flow of goods and services across the regional boundaries defined in the model may change as a result of the regulation, compensating for a potential decrease in economic activity within the region.
48. Despite these and other limitations, in certain circumstances regional economic impact analyses 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. Given the limited nature of incremental impacts likely to result from these designations (see Chapter 4), measurable regional impacts are not anticipated.

2.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

49. This analysis: 1) identifies those economic activities most likely to threaten the salamanders and their habitat; 2) describes the baseline regulatory protection for the species; and 3) monetizes the incremental economic impacts resulting from expected actions to avoid adverse modification of the proposed critical habitat.²⁹ This section provides a description of the methodology used by the Service to separately identify baseline protections from the incremental impacts stemming from the designation of critical habitat. This evaluation of impacts in a "with critical habitat" versus a "without critical habitat" framework effectively measures the net change in economic activity associated with the Proposed Rule. Specific discussion of the analytic approach used to identify baseline and incremental impacts associated with the salamanders is provided in Section 2.3.2.

²⁹ Throughout this document, use of the term 'adverse modification' should be read to reference the full relevant standard under section 7 of the Act (i.e., each Federal agency must ensure that any action it authorizes, funds, or carries out is not likely to result in the destruction or adverse modification of critical habitat). 16 U.S.C. §1536(a)(2).

2.3.1 IDENTIFYING BASELINE IMPACTS

50. The baseline for this analysis is the existing state of regulation, prior to the designation of critical habitat, which provides protection to the species under the Act, as well as under other Federal, State and local laws and guidelines. This "without critical habitat" 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.
51. Baseline protections include sections 7, 9, and 10 of the 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. This analysis describes these baseline regulations. The primary focus, however, is not on baseline costs, since these will not be affected by the proposed regulation. Instead, the focus of this analysis is on monetizing the incremental impacts forecast to result from the proposed critical habitat designations.
- Section 7 of the Act, absent critical habitat designation, requires Federal agencies to consult with the Service to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species. Consultations under section 7 result in administrative costs, as well as impacts of conservation efforts resulting from consultation.
 - 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."³⁰ 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 a habitat conservation plan (HCP) for a listed animal species in order to meet the conditions for issuance of an incidental take permit in connection with a land or water use activity or project.³¹ The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are minimized and mitigated to the maximum extent practicable. 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.

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

³⁰ 16 U.S.C. 1532.

³¹ U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at <http://endangered.fws.gov/hcp/>.

52. 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 (CWA) 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

53. This analysis quantifies the potential 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 resulting from existing required or voluntary conservation efforts being undertaken due to other Federal, State, and local regulations or guidelines.
54. When critical habitat is designated, section 7 requires Federal agencies to consult on their actions regarding the potential 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 conservation efforts (i.e., conservation measures and reasonable and prudent alternatives in the case of an adverse modification finding) 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.
55. Incremental impacts may be the direct compliance costs associated with additional effort for consultations, new consultations occurring specifically because of the designation, and additional conservation efforts that would not be requested during consultation for the listed species without critical habitat. Additionally, incremental impacts may include indirect impacts resulting from reaction to the potential designation of critical habitat (e.g., implementing salamander conservation 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 perceptual effects on markets.

Direct Impacts

56. 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 conservation efforts requested by the Service through section 7 consultation to avoid potential destruction or adverse modification of critical habitat.³²

³² The term conservation efforts is intended to broadly capture efforts that stakeholders may undertake for the species, regardless of whether these efforts are explicitly called for in a section 7 consultation.

57. Section 7(a)(2) of the Act requires Federal agencies to consult with the Service whenever activities that they undertake, authorize, permit, or fund may affect a listed species or designated critical habitat. Parties involved in section 7 consultations include the Service, a Federal “action agency,” such as the U.S. Army Corps of Engineers (the Corps), and in some cases, a private entity involved in the project or land use activity (“applicant”), such as the recipient of a CWA section 404 permit. If there is an applicant, the action agency (i.e., the agency with the Federal nexus necessitating the consultation) consults with the Service and also serves as the liaison between the applicant and the Service.
58. During consultation, the Service, the action agency, and the entity applying for Federal funding or permitting (if applicable) communicate in an effort to minimize potential adverse effects to the species and/or to the critical habitat. Communication between these parties may occur via written letters, phone calls, in-person meetings, or any combination of these interactions. The duration and complexity of these interactions depends on a number of variables, including the type of consultation, the species, the activity of concern, and the potential effects to the species and designated critical habitat associated with the proposed activity, the Federal agency, and whether there is a private applicant involved.
59. Section 7 consultations with the Service may be either informal or formal. *Informal consultations* consist of discussions between the Service, the action agency, and the applicant concerning an action that may have discountable, insignificant, or beneficial effects on a listed species. By contrast, a *formal consultation* is required if the action agency determines that its proposed action is likely to adversely affect the listed species or adversely modify designated critical habitat. The formal consultation process results in the Service’s determination in its Biological Opinion of whether the action is likely to jeopardize a species or destroy or adversely modify critical habitat. Regardless of the type of consultation or proposed project, section 7 consultations can require substantial administrative effort on the part of all participants.

Administrative Section 7 Consultation Costs

60. As described above, parties involved in section 7 consultations include the Service, the Federal action agency, and in some cases, a third-party applicant. While consultations are required for activities that involve a Federal nexus and may affect a 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 affect 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 and any project modification costs incurred solely to address critical habitat impacts are considered incremental impacts of the designation.

2. **Re-initiation of consultation to address adverse modification** - Consultations that have already been completed on a project or activity (but for which the project or activity is not yet completed) 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. **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 a listed species. All associated administrative and project modification costs of these 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 multiple 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.³³
63. Exhibit 2-1 provides the incremental administrative consultation costs applied in this analysis. To estimate the fractions of the total administrative consultation costs that are baseline and incremental, the following assumptions are applied.
 - The greatest effort will be associated with consultations that consider both jeopardy and adverse modification. To the extent that the consultation is precipitated by the listing, costs will be attributed to the listing rule, and to the extent that costs are precipitated by designation of critical habitat, costs will be attributed to the proposed rule designating critical habitat.
 - 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 10 percent of the cost of the entire consultation.³⁴ The remaining 90

³³ The validity of these cost estimates was confirmed for this analysis by Service and U.S. Forest Service biologists. U.S. Fish and Wildlife Service. Carlsbad Field Office biologist. Personal communication on May 23, 2012; and Winter, Kirsten. U.S. Forest Service biologist at Cleveland National Forest. Personal communication on May 22, 2012.

³⁴ *Ibid.*

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

Section 7 Conservation Effort Impacts

64. Section 7 consultation considering critical habitat may also result in additional conservation effort recommendations specifically addressing potential destruction or adverse modification of critical habitat. For future consultations considering jeopardy and adverse modification, and for re-initiations of past consultations to consider critical habitat, the economic impacts of conservation efforts undertaken to avoid adverse modification are considered incremental impacts of critical habitat designation. For consultations that are forecast to occur specifically because of the designation, impacts of all associated conservation efforts 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.

EXHIBIT 2-1. RANGE OF INCREMENTAL ADMINISTRATIVE CONSULTATION COSTS (2012\$)

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	\$2,210	n/a	\$1,050	n/a	\$3,260
Informal	\$9,500	\$3,100	\$2,050	\$2,000	\$16,600
Formal	\$21,300	\$6,200	\$3,500	\$4,800	\$35,800
Programmatic	\$64,600	\$13,900	\$13,900	\$5,600	\$84,000
NEW CONSULTATION CONSIDERING ONLY ADVERSE MODIFICATION (UNOCCUPIED HABITAT)					
Technical Assistance	\$1,100	n/a	\$788	n/a	\$1,890
Informal	\$4,750	\$2,330	\$1,540	\$1,500	\$10,100
Formal	\$10,700	\$4,650	\$2,630	\$3,600	\$21,500
Programmatic	\$32,300	\$10,400	\$10,400	\$4,200	\$46,900
RE-INITIATION OF CONSULTATION TO ADDRESS ADVERSE MODIFICATION					
Technical Assistance	\$1,100	n/a	\$525	n/a	\$1,630
Informal	\$4,750	\$1,550	\$1,030	\$1,000	\$8,320
Formal	\$10,700	\$3,100	\$1,750	\$2,400	\$17,900
Programmatic	\$32,300	\$6,930	\$6,930	\$2,800	\$42,000
INCREMENTAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION					
Technical Assistance	\$1,100	n/a	\$263	n/a	\$1,370
Informal	\$4,750	\$775	\$513	\$500	\$6,540
Formal	\$10,700	\$1,550	\$875	\$1,200	\$14,300
Programmatic	\$32,300	\$3,460	\$3,460	\$1,400	\$37,100
<p>Source: IEC analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2012, and a review of consultation records from several Service field offices across the country conducted in 2002. Estimates have been updated based on input from the Service's incremental memorandum for these species (see Appendix C).</p> <p>Notes: Estimates are rounded to three significant digits and may not sum due to rounding; Estimates reflect average hourly time required by staff.</p>					

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 meet the requirements of section 10 of the Act and avoid unauthorized take of listed species. Sixteen existing HCPs provide some protection to the salamanders. These HCPs are described in detail in Chapter 3.
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 efforts are considered an incremental effect of designation. No specific plans to prepare new HCPs for the salamanders in response to this proposed designation were identified. However, one existing plan, the Barton Springs Pool HCP, is currently in the process of adding the Austin blind salamander as a covered species. Incremental impacts associated with this change are discussed in Section 4.7.

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. As a result of the widespread awareness of the species and their habitats resulting from existing baseline protections, the designation of critical habitat for the salamanders is not anticipated to trigger State and local laws.

Additional Indirect Impacts

69. 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 re-initiate 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 or Stigma.** 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 alternatives 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 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 conservation efforts 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. As the public becomes aware of the true regulatory burden imposed by critical habitat, the impact of the designation on property markets may decrease. Data allowing for the quantification of such effects are generally unavailable.

Approach to Identifying Incremental Impacts

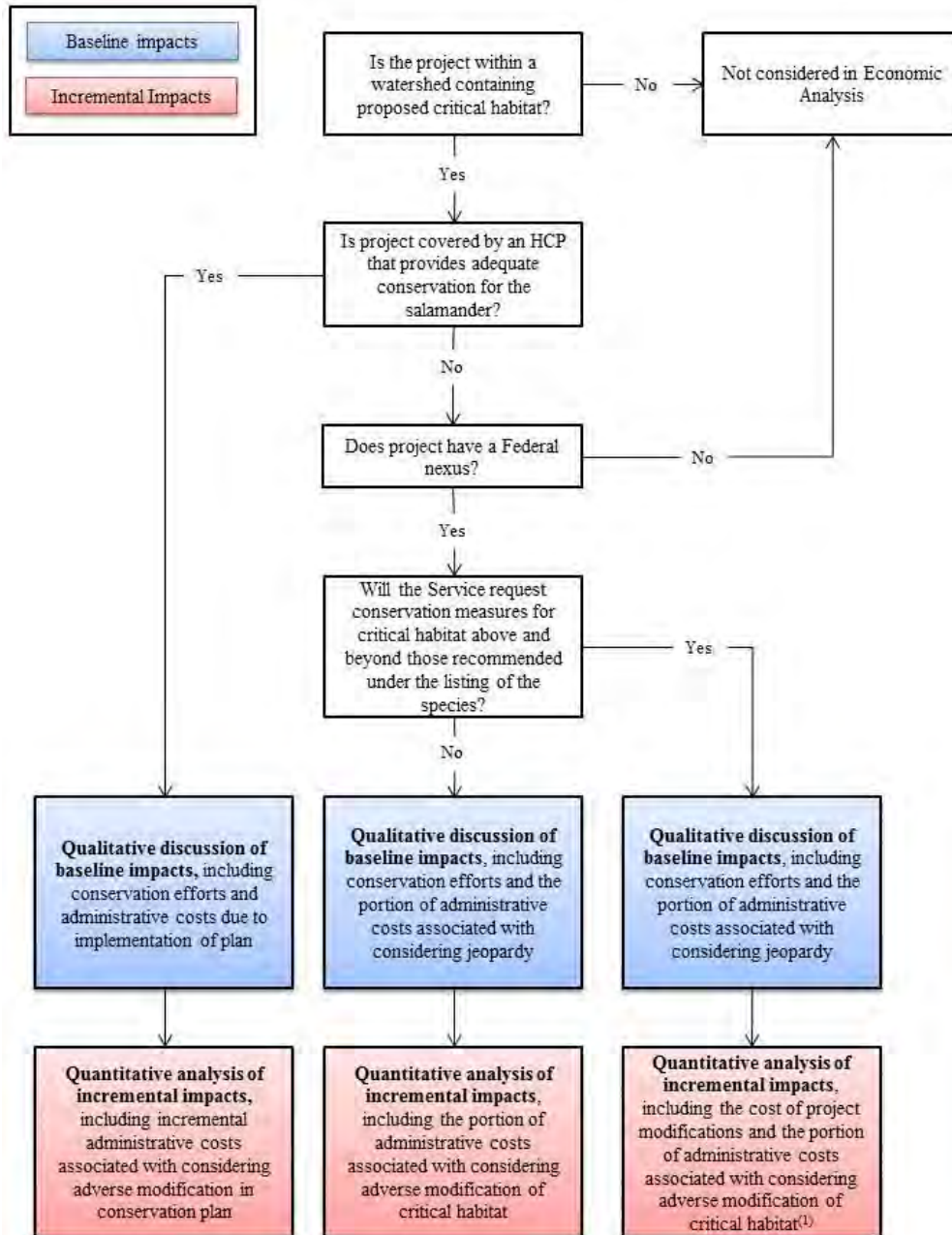
70. To inform the economic analysis, the Service provided a memorandum describing its expected approach to conservation for the salamanders following critical habitat designation. Specifically, the Service’s memorandum provides information on how the Service intends to address projects during section 7 consultation that might lead to adverse modification of critical habitat as distinct from projects that may jeopardize the species. The Service’s memorandum is provided in Appendix C. Exhibit 2-2 illustrates the process used to isolate incremental impacts.
71. Direct incremental impacts of critical habitat designation stem from the additional consideration of the potential for destruction or adverse modification of critical habitat during section 7 consultations. In the case of the salamanders, the Service uses habitat as a proxy for the number of species taken because it is not possible to determine the population size at a particular location. Jeopardy may therefore occur where habitat is destroyed or water quality or quantity is substantially reduced.³⁵ Similarly, adverse modification may occur if the quality, quantity, or configuration of habitat is impacted to a point that would appreciably reduce its ability to meet recovery.³⁶ Because the conditions under which jeopardy and adverse modification may occur are so closely related, the Service believes that they are unlikely to recommend additional project modifications due to the designation of critical habitat. In addition, because all of the proposed critical habitat units are occupied by the species, any activities that are likely to adversely modify critical habitat are also likely to jeopardize the species and thus any conservation efforts that are requested during consultation would occur in the baseline. Therefore, the incremental costs are likely to be limited to the administrative cost of the

³⁵ U.S. Fish and Wildlife Service, “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Four Central Texas Salamanders,” August 22, 2012. (p. 2-3).

³⁶ U.S. Fish and Wildlife Service, “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Four Central Texas Salamanders,” August 22, 2012. (p. 6).

additional effort to address adverse modification during consultation. The Service has stated that the additional effort necessary to consider adverse modification during consultation will be approximately four hours per week for both a GS-12 and GS-9 biologist over the course of a consultation (up to 135 days for a formal consultation).³⁷ These costs are incorporated into Exhibit 2-1 above.

EXHIBIT 2-2. FRAMEWORK FOR DETERMINING BASELINE AND INCREMENTAL IMPACTS



(1) The Service has suggested that project modifications may occasionally differ from those required in a jeopardy analysis in occupied analysis, but is unable to predict or quantify those differences at this time.

³⁷ U.S. Fish and Wildlife Service, “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Four Central Texas Salamanders,” August 22, 2012. (p. 7).

2.3.3 BENEFITS

72. Under Executive Order 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
73. 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 Executive Order 12866, OMB acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency's part to conduct new research.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.*
74. Critical habitat designation may also generate ancillary benefits. Critical habitat aids in the conservation of species specifically by protecting the primary constituent elements (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.

2.3.4 GEOGRAPHIC SCOPE OF THE ANALYSIS

75. As described in Chapter 1, this analysis evaluates impacts of critical habitat designation on activities within or affecting the proposed critical habitat area. In order to capture the land and water use threats occurring outside of the proposed critical habitat that may affect the physical and biological features of critical habitat, we identify a broader study area for the analysis including all watersheds containing proposed critical habitat. Economic impacts will be presented by proposed critical habitat unit. Impacts associated with projects outside of proposed critical habitat, but within the watersheds containing the habitat will be spread evenly over the units within a given watershed.

³⁸ Executive Order 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/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf>

⁴⁰ *Ibid.*

2.3.5 ANALYTIC TIME FRAME

76. Ideally, the time frame of this analysis would be based on the time period over which the critical habitat regulations are expected to be in place. Specifically, the analysis would forecast impacts of implementing this rule through species recovery (i.e., when the rule is no longer required). Recent guidance from OMB indicates that “if a regulation has no predetermined sunset provision, the agency will need to choose the endpoint of its analysis on the basis of a judgment about the foreseeable future.”⁴¹ The “foreseeable future” for this analysis includes, but is not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public. Forecasted impacts will be based on the planning periods for potentially affected projects and will look out over a 23-year time horizon for most activities (2013 through 2035). We use this timeframe because development projections and information on planned transportation projects are available through 2035.

2.4 INFORMATION SOURCES

77. The primary sources of information for this report are communications with, and data provided by, personnel from the Service and other stakeholders. In particular, this analysis relies upon the Incremental Effects Memorandum provided by the Service (see Appendix C). In addition, this analysis relies upon existing habitat management and conservation plans that consider the salamanders. A complete list of references is provided at the end of this document.

2.5 PRESENTATION OF RESULTS

78. Impacts are described in present value and annualized terms applying discount rates of seven percent throughout the body of the report. Additionally, Appendix B provides the present and annualized value of impacts in each unit applying a three percent discount rate for comparison with values calculated at seven percent.⁴² Appendix B also presents undiscounted annual impact values by activity and subunit. Present value and annualized impacts are calculated according to the methods described in Exhibit 2-3.

⁴¹ The U.S. Office of Management and Budget, February 7, 2011. “Regulatory Impact Analysis: Frequently Asked Questions (FAQs).” Accessed on May 3, 2011 by http://www.whitehouse.gov/sites/default/files/omb/circulars/a004/a-4_FAQ.pdf.

⁴² The U.S. Office of Management and Budget (OMB) requires Federal agencies to report results using discount rates of three and seven percent (see OMB, Circular A-4, 2003).

EXHIBIT 2-3. CALCULATING PRESENT VALUE AND ANNUALIZED IMPACTS

This analysis compares economic impacts incurred in different time periods in present value terms. The present value represents the value of a payment or stream of payments in common dollar terms. That is, it is the sum of a series of past or future cash flows expressed in today's dollars. Translation of economic impacts of past or future costs to present value terms requires the following: a) past or projected future costs of critical habitat designation; and b) the specific years in which these impacts have been or are expected to be incurred. With these data, the present value of the past or future stream of impacts (PV_c) from year t to T is measured in 2012 dollars according to the following standard formula:^a

$$PV_c = \sum_t^T \frac{C_t}{(1+r)^{t-2012}}$$

C_t = cost of salamander critical habitat conservation efforts in year t

r = discount rate^b

Impacts for each activity in each unit are also expressed as annualized values. Annualized values are calculated to provide comparison of impacts across activities with varying forecast periods (T). For this analysis, development activities employ a forecast period of 23 years, 2013 through 2035. Annualized future impacts (APV_c) are calculated by the following standard formula:

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

N = number of years in the forecast period (in this analysis, 23 years)

^a To derive the present value of future impacts to development activities, t is 2013 and T is 2035.

^b To discount and annualize costs, guidance provided by the OMB specifies the use of a real rate of seven percent. In addition, OMB recommends sensitivity analysis using other discount rates such as three percent, which some economists believe better reflects the social rate of time preference. (U.S. Office of Management and Budget, Circular A-4, September 17, 2003 and U.S. Office of Management and Budget, "Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations; Notice," 68 *Federal Register* 5492, February 3, 2003.)

CHAPTER 3 | BASELINE PROTECTIONS

79. This chapter discusses the activities likely to be undertaken to protect the salamanders absent the designation of critical habitat. These species and habitat protections result from implementation of the Act, as well as other State and local regulations and conservation plans. Any impacts resulting from the protections described in this chapter are considered baseline and thus are not quantified. The qualitative discussion in this chapter provides the context for the incremental analysis in Chapter 4.
80. The four salamanders are found in springs and subterranean aquatic habitat throughout the Edwards Aquifer in Bell, Williamson, and Travis Counties, Texas. These habitats have historically benefitted from extensive efforts to protect surface water and groundwater quality. All areas within the proposed designation are subject to protection from multiple Federal regulations. In addition, the salamanders and their habitat receive protection from local conservation plans in many areas. These baseline protections are summarized below and described in detail in the following sections.
81. As described in Chapter 1, approximately 152 acres of proposed critical habitat for the Jollyville Plateau salamander and 22 acres of proposed critical habitat for the Austin blind salamander are presently being considered for exclusion based on the level of baseline protection afforded the salamanders and their habitat by existing conservation plans. This chapter will proceed as follows: Section 3.1 begins by describing the baseline protection afforded the species by Federal regulations, including section 7 of the Act; Section 3.2 then describes State protections that may benefit the species and their habitat; finally, Section 3.3 describes local protections, including HCPs and other management strategies.

KEY ISSUES AND CONCLUSIONS OF THE BASELINE ANALYSIS

- A number of regulations and management plans currently exist that may provide limited protection to the salamanders and their habitat absent the designation of critical habitat. The key factors contributing to the baseline are: section 7 of the Act, the Clean Water Act, the Sole Source Aquifer (SSA) Protection Program, voluntary standards and Texas Pollution Discharge Elimination System (TPDES) regulations as implemented by the Texas Commission on Environmental Quality, existing HCPs developed under section 10 of the Act, and other local ordinances and management strategies.
- Protections due to the Listing of the Species. Conservation efforts for the salamanders that may be required to avoid jeopardy of the species, even absent the designation of critical habitat, may include: project relocation; isolating activities to avoid water quality impacts; species monitoring; erosion and runoff controls; and establishing protected areas as offsets for water quality impacts.
- Other Federal and State Protections. Numerous Federal and State regulations and initiatives, including the Clean Water Act, Sole Source Aquifer Protection Program, and programs of the Texas Commission on Environmental Quality (TCEQ), may benefit the species and their habitat through groundwater and surface water quality protections.
- Local Protections. The salamanders and their habitat may benefit from many local ordinances, management strategies, and HCPs within the study area. In particular, 16 HCPs offer baseline protection to one or more of the salamanders through conservation efforts for co-occurring species. Additionally, the Lower Colorado River Authority (LCRA) has developed watershed ordinances that may protect the Jollyville Plateau salamander and its habitat. Groundwater resources in Bell County, where the Salado salamander occurs, are managed by the Clearwater Underground Water Conservation District (Clearwater). Finally, the City of Austin, as well as other municipalities, has developed water quality ordinances that may afford some protection to the species and their habitat.

3.1 FEDERAL PROTECTIONS

82. The primary protection for the salamanders absent the designation of critical habitat is the listing of the species under the Act. In addition, the salamanders and their habitat receive protection from other Federal regulations, including the CWA and the Sole Source Aquifer Protection Program. These baseline protections are described below.

ENDANGERED SPECIES ACT

83. Chapter 2 of this report describes the protections afforded the salamanders as a result of listing under the Act. Section 7 of the Act requires that activities with a Federal nexus that may affect the salamanders be subject to section 7 consultation to ensure that they are not likely to jeopardize the species. Conservation efforts implemented as a result of these consultations offer baseline protection for the species within the proposed critical habitat areas. Below we describe the baseline conservation efforts likely to be implemented for the various activities that are considered threats to the salamanders. Importantly, these are the conservation efforts most likely to result from section 7 consultation on future activities within the study area regardless of whether critical habitat is designated. These conservation efforts may include:

- Relocating projects to another site—in particular, downstream of salamander habitat;
- Isolating activities to avoid impacts to water quality;

- Monitoring for the species during projects occurring within or near surface habitat;
- Implementing erosion and runoff control mechanisms; and
- Establishing protected preserves as offsets for water quality impacts.⁴³

CLEAN WATER ACT

84. Section 404 of the CWA requires parties to obtain a permit from the Corps prior to discharging dredge or fill material into “waters of the United States.”⁴⁴ Jurisdictional waters of the United States are determined by: (1) in the absence of adjacent wetlands, jurisdiction extends to the ordinary high water mark; or (2) when adjacent wetlands are present, jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands; or (3) when the water of the United States consists only of wetlands, jurisdiction extends to the limit of the wetland. Because the salamanders inhabit aquatic environments, the Corps may have jurisdiction over areas proposed as critical habitat.
85. Corps review of projects for the issuance of section 404 permits requires section 7 consultation with the Service to the extent that the project may affect listed species or critical habitat. As part of the section 404 permitting process, the Corps reviews the potential effects of the proposed action on plant and animal populations and recommends efforts to avoid adverse effects to these populations, in addition to the wetlands themselves. In general, conservation efforts include:
- Selecting sites or managing discharges to ensure that habitat remains suitable for indigenous species.
 - Avoiding sites having unique habitat or other value, including habitat of threatened or endangered species.
 - Utilizing habitat development and restoration techniques to minimize adverse impacts and compensate for destroyed habitat.
 - Timing discharge to avoid biologically critical time periods.
 - Avoiding the destruction of remnant natural sites within areas already affected by development.⁴⁵
86. To the extent that these efforts would be undertaken absent the designation of critical habitat as part of the section 404 permitting process, they are considered baseline impacts.

SOLE SOURCE AQUIFER PROTECTION PROGRAM

87. The SSA Protection Program is authorized by section 1424(e) the Safe Drinking Water Act of 1974.⁴⁶ The Edwards Aquifer was designated as a SSA in 1975.⁴⁷ As part of the

⁴³ U.S. Fish and Wildlife Service, “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Four Central Texas Salamanders,” August 22, 2012. See Appendix C.

⁴⁴ U.S. Code. Title 33, 1344.

⁴⁵ 40 CFR Part 230.75.

program, the EPA reviews proposed federally funded projects that may constitute a threat to the Aquifer. The projects must lie in the Aquifer's recharge zone, the surface area connected to the recharge zone, or the watershed area which contributes to the surface water flowing across the Aquifer. Although the SSA Protection Program does not offer provisions that specifically target endangered species, by minimizing the flow of contaminants through the Aquifer, the program may offer protection to the salamanders and their habitat.

3.2 STATE PROTECTIONS

88. Although the salamanders are not listed on the Texas State List of Endangered or Threatened Species, several State programs afford protection to the species and their habitat. These programs generally offer protection to the species indirectly through groundwater conservation efforts. These protections are described below.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

89. The TCEQ regulates activities that may pollute the Edwards Aquifer and hydrologically connected surface streams. In particular, TCEQ has established voluntary water quality protection measures for development projects occurring above the Edwards Aquifer. These conservation measures are intended to streamline compliance with the Act and occur as a voluntary part of the Edwards Aquifer Protection Program.⁴⁸ The Edwards Aquifer Protection Program requires TCEQ to approve any plans to build on the recharge, transition, or contributing zones of the Edward Aquifer.⁴⁹ The voluntary measures may then be implemented by development projects that disturb more than five acres of land to avoid take of species listed under the Act. These conservation measures may provide water quality benefits to the salamanders – particularly the Georgetown and Jollyville Plateau salamanders – and their habitat.
90. Another regulatory program implemented through TCEQ – the Texas Pollution Discharge Elimination System (TPDES) – minimizes sedimentation and contamination of surface waters by controlling pollutant discharge. In 1998, the State of Texas assumed the authority to administer this program as part of the National Pollutant Discharge Elimination System in place of the Federal government.⁵⁰ As discussed in a public

⁴⁶ U.S. Environmental Protection Agency, "Sole Source Aquifer Protection Program." Accessed at:

<http://water.epa.gov/infrastructure/drinkingwater/sourcewater/protection/solesourceaquifer.cfm>, September 11, 2012.

⁴⁷ U.S. Environmental Protection Agency, "Sole Source Aquifer Protection Program." Accessed at:

<http://www.epa.gov/region6/water/swp/ssa/descit.htm>, September 11, 2012.

⁴⁸ Texas Commission on Environmental Quality. "Optional Enhanced Measures." Accessed at:

<http://www.tceq.texas.gov/field/eapp/OEM.html>, September 11, 2012.

⁴⁹ Texas Commission on Environmental Quality. "Edwards Aquifer Protection Program." Accessed at:

<http://www.tceq.texas.gov/field/eapp>, September 11, 2012.

⁵⁰ "What is the 'Texas Pollutant Discharge Elimination System (TPDES)'?" Accessed at:

http://www.tceq.texas.gov/permitting/wastewater/pretreatment/tpdes_definition.html, November 13, 2012.

comment submitted on behalf of the Williamson County Conservation Foundation in response to the Proposed Rule, developments of one acre or more are required to implement Stormwater Pollution Prevention Plans in order to be covered under the TPDES Construction General Permit. Municipal stormwater systems are also permitted and subject to pollution control measures under TPDES.⁵¹

91. Of particular relevance to the salamanders, quarry operations, including limestone quarries that exist in or near proposed critical habitat, are required to produce a Stormwater Pollution Prevention Plan (SWPPP). Other best management practices recommended by TCEQ for quarry operations include a minimum separation distance of 25 feet between the quarry-pit floor and the groundwater level; buffer zones around sensitive features, such as caves and karst features, and along stream channels; and berms surrounding quarry pits.⁵²

3.3 LOCAL PROTECTIONS

92. There are currently no known local statutes or regulations that directly protect the species. However, many HCPs may provide protection to the salamanders and their habitat. Although these plans generally do not include the salamanders as covered species, the protections that they provide for co-occurring species will also benefit the salamanders and their habitat. Additionally, many local ordinances and management strategies may afford protection to the species and their habitat.

BALCONES CANYONLANDS PRESERVE

93. The Balcones Canyonlands Preserve is managed as mitigation lands for the protection of endangered birds and karst invertebrates. The Preserve is located within the range of habitat for the Jollyville Plateau salamander, although the salamander is not covered under the associated HCP. However, land management strategies at the Preserve are expected to provide some baseline protection to the salamander. In particular, the salamander is expected to benefit from the preservation of open space and resulting water quality conservation in portions of the Bull Creek, Brushy Creek, Cypress Creek, and Long Hollow Creek drainages.⁵³

BARTON CREEK HABITAT CONSERVATION PLAN

94. The Barton Creek Habitat Conservation Plan donates approximately 4,000 acres to the Nature Conservancy as mitigation for the development of the Barton Creek community, a 4,648-acre commercial and residential development. The HCP was implemented in conjunction with FM Properties' application for an incidental take permit for the federally listed golden-cheeked warbler. The mitigation lands do not overlap proposed critical

⁵¹ SWCA Environmental Consultants. "Technical Response to USFWS Proposed Rule for Endangered Status for Four Central Texas Salamanders and Designation of Critical Habitat (77 FR 50768)." Prepared for Williamson County Conservation Foundation. October 22, 2012. (Page 39.)

⁵² TCEQ Best Management Practices for Quarry Operations. Accessed at: <http://www.tceq.texas.gov/publications/rg/rg-500.html>, November 12, 2012.

⁵³ 2012 Proposed Rule, 77 FR 50776.

habitat, but do intersect the Lake Austin watershed, home to the single proposed critical habitat unit for the Austin blind salamander. While the salamander is not directly considered in the HCP, the HCP includes conservation measures that may benefit the salamander, such as the preservation of open space through the land donation, water quality objectives, and periodic environmental monitoring.⁵⁴

BARTON SPRINGS POOL HABITAT CONSERVATION PLAN

95. The City of Austin is implementing the Barton Springs Pool HCP for the protection of the Barton Springs salamander (*Eurycea sosorum*). The HCP covers continued operation and maintenance of the Barton Springs Pool and adjacent springs. Although the Austin blind salamander is not currently covered under the HCP, the species occupies three of the four spring sites known to be occupied by the Barton Springs salamander, and is therefore expected to benefit from the conservation efforts established by the HCP. In addition, this HCP is currently being renewed, and the Austin blind salamander is being added as a covered species.⁵⁵ Conservation efforts benefitting the species include: training lifeguard and maintenance staff to protect salamander habitat; controlling erosion and preventing surface runoff from entering the springs; ecological restoration; monthly salamander monitoring; public outreach and education; and establishment of a captive breeding program for both the Barton Springs and Austin blind salamanders.⁵⁶ The area covered by the HCP within proposed Austin blind salamander Unit 1 is being considered for exclusion from critical habitat due to the protections provided by the HCP.

BEE CAVE OAKS HABITAT CONSERVATION PLAN

96. In 1996, Bee Cave Oaks Development established the Bee Cave Oaks HCP on the 347-acre Seven Oaks Ranch, six miles from downtown Austin, to conserve several species. Conservation efforts that may benefit the salamander include the maintenance of “green belts” as well as efforts to minimize clearing of native vegetation.⁵⁷ These efforts should benefit water quality in the watershed as a whole as well. Although the property does not intersect any of the proposed critical habitat units, it does intersect with the Lake Austin watershed containing the single proposed critical habitat unit for the Austin blind salamander.

BUTTERCUP CREEK HABITAT CONSERVATION PLAN

97. The Buttercup Creek HCP establishes as mitigation property a preserve covering TWASA Cave, Godzilla Cave, Hideaway Cave, Salamander Squeeze Cave, Treehouse Cave, Whitewater Cave, Illex Cave, Buttercup Creek Cave, and Nelson Ranch Cave in

⁵⁴ U.S. Fish and Wildlife Service. Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) permit for the incidental take of the golden-cheeked warbler (*Dendroica chrysoparia*) during the construction and operation of a 4684-acre residential resort development for the Barton Creek Community, Austin, Texas. 1994.

⁵⁵ U.S. Fish and Wildlife Service. Email communication on December 14, 2012.

⁵⁶ 2012 Proposed Rule, 77 FR 50790.

⁵⁷ U.S. Fish and Wildlife Service. Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for the Incidental Take of the Golden-cheeked Warbler During Construction and Operation of Approximately 289 acres of Residential Development for the Approximately 347-acre Seven Oaks Ranch Property, Austin, Travis County, Texas. 1996.

Williamson County. All of these caves – located in proposed Unit 3 for the Jollyville Plateau salamander – are occupied by the Jollyville Plateau salamander. Although the salamander is not a covered species under the HCP, the salamander and its habitat are expected to receive baseline protection from the water quality benefits of the preserve.⁵⁸

CANYON CREEK PRESERVE

98. In addition to benefitting from the formal HCPs described in this section, a portion of Jollyville Plateau salamander habitat falls within the privately managed Canyon Creek Preserve. This area is preserved in perpetuity as a conservation area, and the salamander may benefit from the protection of this preserve.⁵⁹

CITY OF AUSTIN WATER QUALITY ORDINANCES

99. The Austin blind and Jollyville Plateau salamanders may benefit from water quality protections within the City of Austin. In order to protect local surface water from contamination related to urbanization and runoff, the City of Austin Water Quality Ordinances require various conservation efforts including riparian buffers, limits on impervious cover, and wastewater system restrictions. However, the impact of these controls on groundwater quality remains uncertain.⁶⁰
100. Similarly, other municipalities within the study area implement water quality management strategies. These municipalities include the Cities of Cedar Park, Georgetown, Leander, Liberty Hill, and Round Rock.⁶¹ Although these water quality management strategies may provide some benefit to the salamanders and their habitat, the extent of the protection is uncertain.

CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT

101. The Clearwater Underground Water Conservation District (Clearwater) is obligated, under the constitutional authority of the Conservation Amendment to the Texas Constitution and statutory authority of the enabling act and Texas Water Code, to regulate spring flows and groundwater withdrawals from the northern Edwards Aquifer in Bell County.⁶² Actions taken by Clearwater may therefore afford protection to the Salado salamander and its habitat. In particular, Clearwater issues permits and restrictions for groundwater wells in Bell County. Approximately 89 percent of groundwater from permitted wells is used for public water supply, 10 percent for livestock and poultry operations, and the remaining one percent for a combination of commercial, domestic,

⁵⁸ 2012 Proposed Rule, 77 FR 50813.

⁵⁹ 2012 Proposed Rule, 77 FR 50815.

⁶⁰ 2012 Proposed Rule, 77 FR 50792.

⁶¹ SWCA Environmental Consultants. "Technical Response to USFWS Proposed Rule for Endangered Status for Four Central Texas Salamanders and Designation of Critical Habitat (77 FR 50768)." Prepared for Williamson County Conservation Foundation. October 22, 2012.

⁶² Aaron, Dirk. General Manager, Clearwater Underground Water Conservation District. "Public Comment on Proposed Rule Recommending Listing of Salado Salamander as Endangered Species." October 19, 2012.

irrigation, industrial, and agricultural uses.⁶³ All actions taken by Clearwater are funded through local taxes.⁶⁴

102. As part of its statutory obligations, Clearwater has established Desired Future Conditions for the northern portion of the Edwards Aquifer. These Desired Future Conditions span a 50-year planning period, from 2010 through 2060. Clearwater originally adopted these conditions in 2007. The Texas Water Code requires that Desired Future Conditions be readopted at least every five years and be approved by the Texas Water Development Board. Most recently, Clearwater re-evaluated and readopted its Desired Future Conditions in April 2011. In addition, Clearwater has adopted a management plan, rules, and permitting and enforcement programs in support of these conditions. TCEQ has the authority to enforce Clearwater's adoption and implementation of these Desired Future Conditions and associated management plan.⁶⁵ Furthermore, the Desired Future Conditions adopted by Clearwater have been "implicitly incorporated into Texas's 2012 State Water Plan."⁶⁶
103. As adopted, the Desired Future Conditions ensure continuous flow at Salado Springs of at least 100 acre-feet per month. This value is developed based on conservative groundwater modeling assumptions meant to replicate the Drought of Record. Notably, conditions during 2011 were drier than those of the Drought of Record, and through implementation of its Drought Management Plan, Clearwater was able to maintain desired flow rates within Salado Springs.⁶⁷
104. Conservation efforts undertaken as part of Clearwater's management plan include controlling and preventing waste of groundwater, implementing drought restrictions, and promoting recharge enhancement, rainwater harvesting, and brush control through educational materials.⁶⁸ In addition, Clearwater has entered into an agreement with Bell County and the Village of Salado to fund ongoing studies of the local Edwards Aquifer and Salado salamander habitat.⁶⁹ Clearwater is also actively involved in public outreach and water conservation education. For example, Clearwater routinely provides educational materials to local schools, participates in public presentations, and publishes information on current drought conditions and recommended reductions both online and in print media.⁷⁰ Clearwater's actions are expected to benefit the Salado salamander and

⁶³ Clearwater Underground Water Conservation District. Annual Report, Fiscal Year 2011. (Page 21.)

⁶⁴ Aaron, Dirk. General Manager, Clearwater Underground Water Conservation District. Telephone communication on November 8, 2012.

⁶⁵ Aaron, Dirk. General Manager, Clearwater Underground Water Conservation District. "Public Comment on Proposed Rule Recommending Listing of Salado Salamander as Endangered Species." October 19, 2012.

⁶⁶ *Ibid.* Page 8.

⁶⁷ Aaron, Dirk. General Manager, Clearwater Underground Water Conservation District. Telephone communication on November 8, 2012.

⁶⁸ Clearwater Underground Water Conservation District. Annual Report, Fiscal Year 2011. (Page 16.)

⁶⁹ Aaron, Dirk. General Manager, Clearwater Underground Water Conservation District. "Public Comment on Proposed Rule Recommending Listing of Salado Salamander as Endangered Species." October 19, 2012.

⁷⁰ Clearwater Underground Water Conservation District. Annual Report, Fiscal Year 2011.

its habitat by ensuring adequate flow rates and the protection of subterranean habitat from excessive groundwater withdrawals.

CONCORDIA HABITAT CONSERVATION PLAN

105. In 1995, the Schlumberger Technology Corporation developed the Schlumberger HCP - now the Concordia HCP - on 143.6 acres of the 440-acre Schlumberger property, northwest of downtown Austin, to protect the golden-cheeked warbler and other species, including the Jollyville Plateau salamander. The plan was amended in 2005 and 2006.^{71,72} The HCP recognizes that runoff from light industrial development could have adverse effects on the salamander. As a result, conservation measures include maintenance of vegetated buffers between developments, an approach to construction that minimizes disturbances to vegetation, and low levels of development within salamander spring recharge zones.⁷³ The property covered by the HCP intersects with proposed Unit 18 for the Jollyville Plateau salamander.

DISCOVERY WELL PRESERVE

106. The Discovery Well Preserve contains Hunter's Lane Cave in proposed Unit 3 for the Jollyville Plateau salamander. This preserve was purchased by the Texas Department of Transportation as mitigation for impacts to the Tooth Cave ground beetle from U.S. Highway 183 construction. Preservation of this area is expected to also benefit the Jollyville Plateau salamander and its habitat.⁷⁴

FLEUR (LEANDER REHABILITATION) HABITAT CONSERVATION PLAN

107. In 2003, Fleur Land LTD developed an HCP on its 209-acre Leander Rehabilitation Planned Unit Development (PUD) in the City of Cedar Park, Williamson County. The HCP focuses on the conservation of the golden-cheeked warbler. The plan provides for the purchase of approximately 93 acres of mitigation land. Furthermore, while the development would increase runoff due to an increase in impervious cover, the HCP calls for treatment of runoff.⁷⁵ While the plan does not directly cover proposed critical habitat, it is located in the Brushy Creek watershed, which contains Jollyville Plateau salamander proposed critical habitat.

⁷¹ U.S. Fish and Wildlife Service. Endangered Species Incidental Take Permit. September 6, 2005. Issued to Gary M. Cozart, Schlumberger Technology Corporation. 2005.

⁷² U.S. Fish and Wildlife Service. Letter to Dan Dubroski from Susan Jacobson Re: Request for Amendment to Schlumberger HCP. 2006.

⁷³ U.S. Fish and Wildlife Service. Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for Incidental Take of the Golden-cheeked Warbler (*Dendroica chrysoparia*) During Construction and Operation of Light Industrial Development on the Portions of 440-acres Schlumberger Property, Austin, Texas. 1997.

⁷⁴ U.S. Fish and Wildlife Service. Email communication on December 14, 2012.

⁷⁵ U.S. Fish and Wildlife Service. Draft Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for the Incidental Take of the golden-cheeked Warbler (*Dendroica chrysoparia*) During the Construction and Operation of Multi-family Residential and Commercial/Light Industrial Development on an Approximately 209-acre Portion of the Leander Rehabilitation PUD, City of Cedar Park, Williamson County, Texas. 2003.

FOUR POINTS HABITAT CONSERVATION PLAN

108. The Jollyville Plateau salamander is a covered species under the Four Points HCP, implemented by TPG Four Points Land, L.P. on a 333-acre property approximately 11 miles northwest of the City of Austin. Conservation efforts undertaken on this property are expected to benefit the salamander and three down-gradient streams through improved water quality. Additionally, runoff from residential areas and the hotel on the Four Points property are routed to avoid springs supporting the Jollyville Plateau salamander.⁷⁶ The area within proposed Jollyville Plateau salamander Unit 19 covered by the HCP is being considered for exclusion from the designation.

GDF HABITAT CONSERVATION PLAN

109. In 2008, GDF Realty Investments and Parke Properties developed an HCP on a 70-acre property in northwest Austin, Travis County. This HCP considers several listed species and other sensitive species, including the Jollyville Plateau salamander. The property does not encompass any springs known to contain the salamander, but the property is located in both the Cypress Creek and Bull Creek watersheds. The plan establishes land preserves both on the property and off the property as mitigation.⁷⁷

GRANDVIEW HILLS HABITAT CONSERVATION PLAN

110. In 1999, Tomen-Parke Associates and Pulte Homes developed the Grandview Hills HCP on a 550-acre property in the northwest region of the City of Austin. This HCP conserves several endangered species and other species of concern, including the Jollyville Plateau salamander. Conservation efforts that may benefit the salamander include ensuring that surface water runoffs enter drainages downstream from springs known to contain the salamander, the establishment of buffer zones of 50-100 feet of vegetation, and landscaping with native plants that do not require additional irrigation on commercial properties.⁷⁸ This plan covers some of the subsurface habitat in proposed Unit 14. Development on the property is presumed to be nearly complete, so re-initiation of the plan following the listing of the Jollyville Plateau salamander is not anticipated.

⁷⁶ 2012 Proposed Rule, 77 FR 50825.

⁷⁷ U.S. Fish and Wildlife Service. Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for Incidental Take of Golden-cheeked Warbler (*Dendroica chrysoparia*), Tooth Cave Pseudoscorpion (*Tartarocreagris texana*), Kretschmarr Cave Mold Beetle (*Texamaurops reddelli*), Bone Cave Harvestman (*Texella reyesi*), Tooth Cave Spider (*Neoleptoneta myopica*), and Tooth Cave Ground Beetle (*Rhadine persephone*) During the Construction and Operation of a Residential, Commercial, and/or Retail Development on Portions of the Approximately 70-acre GDF Property, Austin, Travis County, Texas. 2008.

⁷⁸ U.S. Fish and Wildlife Service. Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Permit for Incidental Take of Golden-cheeked Warbler (*Dendroica chrysoparia*), Black-capped Vireo (*Vireo atricapillus*), Tooth Cave Pseudoscorpion (*Tartarocreagris texana*), Kretschmarr Cave Mold Beetle (*Rhadine Persephone*) and Species of Concern, Jollyville Plateau Salamander (*Eurycea* sp.) and Bifurcated Cave Amphipod (*Stygobromus bifurcates*) During the Construction and Operation of Residential and Commercial Development on Portions of the Approximately 550.3-acre Grandview Hills Property, Austin, Travis County, Texas. 1999.

LAKELINE MALL HABITAT CONSERVATION PLAN

111. Mitigation efforts required by the Lakeline Mall HCP include management, in perpetuity, of the Testudo Tube Cave and surrounding areas for water quality protection. The Jollyville Plateau salamander inhabits the Testudo Tube Cave. Both the species and its habitat are expected to benefit from the water quality protections.⁷⁹

LOWER COLORADO RIVER AUTHORITY HIGHLAND LAKES WATERSHED ORDINANCE

112. The Lower Colorado River Authority (LCRA), which distributes water and power throughout the study area for this analysis, implemented the Highland Lakes Watershed Ordinance in 2005 to protect local water quality from stormwater runoff. This ordinance may provide some protection to the Jollyville Plateau salamander and its habitat.
113. Conservation efforts required by this ordinance for development and utility activities include:
- Erosion and sedimentation control;
 - Water quality education, to be conducted by recipients of development permits;
 - Establishment of buffer zones along waterways to prohibit construction, development, or any alterations other than stream crossings; and
 - Performance monitoring for projects choosing alternative best management practices.

In addition, LCRA provides technical guidance for minimizing allowable stream crossings. In 2007, LCRA amended the ordinance to also specify performance standards and conservation efforts for quarries and mines. These conservation efforts include meeting water quality volume requirements and implementing buffer zones, erosion and sedimentation controls, and groundwater quality protections and monitoring.⁸⁰

RIBELIN HABITAT CONSERVATION PLAN

114. In 2001, Ribelin Partners developed an HCP on its 740-acre property outside of the City of Austin to conserve the golden-cheeked warbler. This plan covers the Bull Creek drainage, which includes habitat for the Jollyville Plateau salamander. While the plan recognizes that water quality degradation may occur, the plan may ultimately benefit the salamander by establishing preserve lands.^{81,82} This plan covers a portion of sub-surface habitat in proposed Unit 17 for the Jollyville Plateau salamander.

⁷⁹ 2012 Proposed Rule, 77 FR 50813.

⁸⁰ Lower Colorado River Authority Highland Lakes Watershed Ordinance. Approved November 16, 2005; amended February 21, 2007. Accessed at: <http://www.lcra.org/water/quality/watershed/index.html>, November 13, 2012.

⁸¹ U.S. Fish and Wildlife Service. Environmental Assessment and Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for the Incidental Take of the Golden-cheeked Warbler (*Dendroica chrysoparia*) During Construction, Operation, and Occupation of a Residential and Commercial Development on Approximately 160 acres of the 740-acre Ribelin Tract, Travis County, Texas. 2001.

⁸² U.S. Fish and Wildlife Service. Endangered Species Incidental Take Permit. September 6, 2005. Issued to Frank K. Ribelin, Ribelin Partners. 2002.

RUSSELL PARK ESTATES HABITAT CONSERVATION PLAN

115. In 2002, Rockledge Inc. developed an HCP for their Russell Park Estates property northwest of the City of Georgetown. This plan affects proposed Unit 5 for the Georgetown salamander. The plan establishes a nearly 140-acre conservation area with restrictions on construction and land use that may benefit the salamander.⁸³

SHADOW CANYON HABITAT CONSERVATION PLAN

116. In 2007, San Gabriel Harvard Limited Partnership developed the Shadow Canyon HCP for the 308-acre Shadow Canyon property located three miles west of the City of Georgetown in Williamson County. The primary focus of this HCP is conservation of the golden-cheeked warbler, but the HCP also considers the Georgetown salamander. This HCP establishes a preserve that may potentially benefit the salamander.⁸⁴ Subsurface habitat of proposed Unit 13 for the Georgetown salamander is located beneath the property.

SILVERADO HABITAT CONSERVATION PLAN

117. The 2006 Silverado HCP considers a 176-acre tract of the Silverado property owned by CA 1100, Ltd. This HCP focuses on conservation of the golden-cheeked warbler; however, since the property exists upstream of habitat for the Jollyville Plateau salamander, conservation measures related to runoff may benefit the salamander. The plan also calls for the purchase of nearly 100 acres of mitigation land.⁸⁵

WILLIAMSON COUNTY REGIONAL HABITAT CONSERVATION PLAN

118. The Williamson County Regional HCP was developed by the Williamson County Conservation Foundation to conserve endangered species and other unlisted species of concern in Williamson County. The HCP was finalized in October 2008. Although the Georgetown salamander is not a covered species under the Williamson County Regional HCP, the salamander and its habitat are expected to benefit from water quality protections in the HCP. In particular, the HCP seeks to preserve an easement on the Lyda Tract (Cobbs Cavern), including a portion of the contributing watershed for a spring occupied by the Georgetown salamander, and the 145-acre Twin Springs Preserve, also occupied by the salamander. The HCP also allocates funding for research and monitoring regarding the Georgetown salamander. Although the Jollyville Plateau salamander also occurs in

⁸³ U.S. Fish and Wildlife Service. Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for the Incidental Take of the Golden-cheeked Warbler (*Dendroica chrysoparia*) During the Construction and Occupation of a Residential Development on Portions of the 193-acre Russell Park Estates, Williamson County, Texas. 2002.

⁸⁴ U.S. Fish and Wildlife Service. Final Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit (TE-116313-0) for Incidental Take of the Golden-cheeked warbler (*Dendroica chrysoparia*) During the Construction and Operation of Development on the Shadow Canyon Property, Williamson County, Texas. 2007.

⁸⁵ U.S. Fish and Wildlife Service. Draft Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for the Incidental Take of the Golden-cheeked Warbler (*Dendroica chrysoparia*) During the Construction and Operation of Development on Tract 2 of the Silverado Property, Williamson County, Texas. 2006.

Williamson County, the HCP does not include direct considerations for this species and its habitat, and as a result, the Jollyville Plateau salamander is expected to receive minimal benefit from this HCP.⁸⁶

⁸⁶ 2012 Proposed Rule, 77 FR 50789-50790.

CHAPTER 4 | INCREMENTAL IMPACTS OF CRITICAL HABITAT DESIGNATION FOR THE SALAMANDERS

119. In this chapter, we estimate the incremental costs of designating critical habitat for the salamanders. Specifically, as a result of the substantial baseline protections already afforded the salamanders, as described in Chapter 3, forecast incremental impacts are limited to the administrative cost of considering adverse modification in the context of section 7 consultations. First, we summarize the results of this analysis and our approach to isolating the expected incremental impacts. We then discuss the potential incremental impacts by activity. We conclude this chapter with a discussion of the key assumptions regarding the estimated incremental impacts.

KEY ISSUES AND CONCLUSIONS OF THE INCREMENTAL ANALYSIS

Incremental Impacts of Critical Habitat Designation

- The incremental impacts of the proposed critical habitat designation are limited to the administrative cost of considering adverse modification in the context of section 7 consultations.
- The present value impacts in areas proposed for designation over the 23-year timeframe of this analysis are \$29 million, or \$2.4 million on an annualized basis, assuming a seven percent discount rate. These impacts include administrative costs associated with section 7 consultations occurring on projects located within the proposed critical habitat units and the surrounding watersheds.
- The present value impacts in areas considered for exclusion are \$55,000, or \$4,500 on an annualized basis, assuming a seven percent discount rate.

Incremental Impacts by Activity

- Impacts to development activities represent approximately 97.7 percent of the overall incremental impacts within the study area. Habitat and species management activities represent 1.9 percent of the incremental impacts, transportation activities represent 0.4 percent, and surface mining represents 0.1 percent.
- No incremental impacts are forecast for water management activities, utility projects, and livestock grazing activities. For these activities, no projects with a Federal nexus were identified within the study area and thus future section 7 consultations are not expected.

Incremental Impacts by Unit

- Unit 1 for Austin blind salamander and Unit 32 for the Jollyville Plateau salamander are forecast to experience the greatest incremental impacts over the 23-year timeframe of this analysis (13.0 and 10.1 percent of overall incremental impacts, respectively). This finding is driven by the impacts to development activities. In particular both units are the sole units located within watersheds that are expected to experience significant growth over the next 23 years.

4.1 SUMMARY OF INCREMENTAL COSTS ASSOCIATED WITH DESIGNATION OF CRITICAL HABITAT

120. As described in Section 1.5 of this analysis, we assess the potential for critical habitat designation for the salamanders to affect development, water management, transportation and utility projects, mining, livestock grazing, and habitat and species management. These are the key activities occurring within the critical habitat region for which section 7 consultation regarding critical habitat may generate incremental economic impacts.
121. Direct incremental impacts of critical habitat designation can stem from consideration of the potential for destruction or adverse modification of critical habitat during section 7 consultations. In the case of the salamanders, the Service uses habitat as a proxy for the number of animals taken because it is not possible to determine the population size at a particular location. Jeopardy may therefore occur where habitat is destroyed or water quality or quantity is substantially reduced.⁸⁷ Similarly, adverse modification may occur if the quality, quantity, or configuration of habitat is impacted to a point that would appreciably reduce its ability to meet recovery.⁸⁸ Because the conditions under which jeopardy and adverse modification may occur are so closely related, the Service believes that they are unlikely to recommend additional project modifications due to the designation of critical habitat. In addition, because all of the proposed critical habitat units are occupied by the species, any activities that are likely to adversely modify critical habitat are also likely to jeopardize the species and thus any conservation efforts that are requested during consultation would occur in the baseline. Therefore, future incremental costs of designation are likely to be limited to the administrative cost of the additional effort to address adverse modification during consultation.
122. Exhibit 4-1 describes incremental impacts of critical habitat designation, by critical habitat unit, in areas proposed for designation and considered for exclusion. The study area for this analysis includes all areas within watersheds containing proposed critical habitat. For purposes of this analysis, forecast impacts associated with projects outside of proposed critical habitat have been spread evenly over the units within a given watershed.⁸⁹ Over the 23-year timeframe of this analysis, the present value of total forecast incremental costs in the areas proposed for designation is \$29 million, or \$2.4 million on an annualized basis, assuming a seven percent discount rate. Impacts to areas considered for exclusion are \$55,000, or \$4,500 on an annualized basis, assuming a seven percent discount rate. These costs consist entirely of administrative impacts, including re-initiations of consultations and the additional effort required to address adverse modification as part of future section 7 consultations. The majority of these costs are

⁸⁷ U.S. Fish and Wildlife Service, "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Four Central Texas Salamanders," August 22, 2012. (p. 2-3).

⁸⁸ U.S. Fish and Wildlife Service, "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Four Central Texas Salamanders," August 22, 2012. (p. 6).

⁸⁹ Without a better understanding of the hydrology of the region, it is difficult to attribute impacts associated with the projects located outside of the proposed critical habitat to a particular critical habitat unit. Impacts should be attributed to the unit(s) with a direct hydrologic link to area affected by the project. Lacking the necessary information we assume that projects will equally impact all units located within a given watershed.

related to high levels of development activity within the proposed critical habitat and the surrounding watersheds leading to a substantial number of consultations over the next 23 years.

EXHIBIT 4-1. TOTAL FORECAST INCREMENTAL IMPACTS, BY UNIT (2012\$), DISCOUNTED AT SEVEN PERCENT)

UNIT	PRESENT VALUE INCREMENTAL IMPACT	ANNUALIZED INCREMENTAL IMPACT
AREAS PROPOSED FOR DESIGNATION		
AUSTIN BLIND SALAMANDER		
1	\$3,700,000	\$310,000
<i>Subtotal</i>	<i>\$3,700,000</i>	<i>\$310,000</i>
JOLLYVILLE PLATEAU SALAMANDER		
1	\$850,000	\$71,000
2	\$850,000	\$71,000
3	\$2,300,000	\$190,000
6	\$2,100,000	\$170,000
7	\$850,000	\$70,000
8	\$79,000	\$6,500
9	\$79,000	\$6,500
10	\$75,000	\$6,200
11	\$78,000	\$6,500
12	\$74,000	\$6,200
13	\$82,000	\$6,800
14	\$79,000	\$6,500
15	\$120,000	\$9,700
16	\$120,000	\$10,000
17	\$170,000	\$14,000
18	\$160,000	\$13,000
19	\$130,000	\$11,000
20	\$120,000	\$9,900
21	\$120,000	\$9,900
22	\$160,000	\$13,000
24	\$120,000	\$9,600
25	\$120,000	\$9,600
26	\$130,000	\$11,000
27	\$130,000	\$11,000
28	\$1,300,000	\$100,000
29	\$1,100,000	\$94,000
30	\$1,100,000	\$94,000
31	\$1,100,000	\$94,000
32	\$2,900,000	\$240,000
33	\$120,000	\$9,800
<i>Subtotal</i>	<i>\$17,000,000</i>	<i>\$1,400,000</i>

UNIT	PRESENT VALUE INCREMENTAL IMPACT	ANNUALIZED INCREMENTAL IMPACT
GEORGETOWN SALAMANDER		
1	\$290,000	\$24,000
2	\$1,000,000	\$84,000
3	\$1,000,000	\$83,000
4	\$400,000	\$33,000
5	\$430,000	\$36,000
6	\$390,000	\$32,000
7	\$400,000	\$33,000
8	\$390,000	\$32,000
9	\$250,000	\$20,000
10	\$250,000	\$20,000
11	\$250,000	\$20,000
12	\$250,000	\$21,000
13	\$1,900,000	\$160,000
14	\$1,000,000	\$87,000
<i>Subtotal</i>	<i>\$8,200,000</i>	<i>\$680,000</i>
SALADO SALAMANDER		
1	\$3,900	\$320
2	\$3,900	\$320
3	\$3,900	\$320
4	\$18,000	\$1,500
<i>Subtotal</i>	<i>\$30,000</i>	<i>\$2,500</i>
TOTAL	\$29,000,000	\$2,400,000
AREAS CONSIDERED FOR EXCLUSION		
AUSTIN BLIND SALAMANDER		
1	\$43,000	\$3,500
<i>Subtotal</i>	<i>\$43,000</i>	<i>\$3,500</i>
JOLLYVILLE PLATEAU SALAMANDER		
19	\$12,000	\$1,000
<i>Subtotal</i>	<i>\$12,000</i>	<i>\$1,000</i>
TOTAL	\$55,000	\$4,500
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

4.2 DEVELOPMENT

123. Proposed critical habitat for the salamanders occurs within the increasingly urbanized areas of Travis, Williamson, and Bell Counties. Between 2000 and 2010 the population of Travis County rose by 26 percent (from 812,280 to 1,024,266), the population of Williamson County rose by 69 percent (from 249,967 to 422,679), and the population of Bell County rose by 30 percent (from 237,974 to 310,235).⁹⁰ In particular, the study area for the Georgetown, Jollyville Plateau, and Austin blind salamanders includes fast growing cities such as Austin (20 percent growth between 2000 and 2010), Cedar Park (88 percent growth between 2000 and 2010), Georgetown (67 percent growth between 2000 and 2010), and Round Rock (63 percent growth between 2000 and 2010).⁹¹ The study area for the Salado salamander within Bell County remains relatively undeveloped and rapid population growth is not expected within the coming decades.⁹² For this reason, we assume that development primarily impacts Williamson and Travis Counties.
124. The potential for future residential and commercial development within Williamson and Travis Counties constitutes a threat to salamander habitat. Therefore, the Service expects to recommend conservation efforts to protect the salamanders and their habitat as part of future section 7 consultations on development projects. Below we quantitatively estimate the incremental impacts of the proposed critical habitat designation in the context of the expected baseline impacts described in detail in Chapter 3.

4.2.1 DEVELOPMENT ANALYSIS METHODOLOGY OVERVIEW

125. Potential modifications to development projects stemming from salamander protection can affect landowners, consumers, and real estate markets in general. The total economic impact will depend on the scope of salamander conservation activities, pre-existing land use and regulatory controls in the region, and the nature of regional land and real estate markets. In order to account for all of these factors, and to estimate the corresponding economic impacts, this analysis employs a series of methodological steps. These steps are introduced briefly below and, as necessary, described in detail in the subsequent subsections.

- **Determine Overlap between Proposed Revised Critical Habitat and Projected Land Development**

The first step in evaluating the effect of salamander protection on private land development is to identify the amount, type, and location of land within the study area of Williamson and Travis Counties that would likely be developed by 2035 absent salamanders or their critical habitat. To isolate potentially affected areas, the analysis

⁹⁰ U.S. Census Bureau, 2010 Demographic Profile Data and 2000 Demographic Profile Data, accessed by <http://factfinder2.census.gov> on November 14, 2010.

⁹¹ CAMPO, "About Campo: Jurisdiction," accessed by http://www.campotexas.org/about_jurisdiction.php on November 14, 2010.

⁹² Personal Communication with T. Brown, Bell County Commissioner and D. Aaron, Clearwater General Manager on November 8, 2012.

excludes from the development analysis non-developable areas such as publicly-owned land and privately-owned preserve land. All remaining acres that are currently vacant are considered potentially developable. Publicly available development projections are then used to estimate the amount of future growth expected to occur on developable lands within the study area boundaries.

- **Distinguish between Baseline and Incremental Impacts**

Chapter 2 describes the approach applied to identify impacts occurring under the baseline and incremental scenarios. In general, the Service believes all conservation efforts recommended as part of section 7 consultation would be recommended absent critical habitat designation. These baseline conservation efforts may include restricting future development within certain areas and establishing protected preserves to offset water quality impacts.⁹³ The economic impact of precluding development within a certain area can be assumed to equal the value of the land (i.e., absent an alternative land use, the value of the land, in the worst case, is reduced to zero). The baseline economic impact associated with establishing protected preserves is the price of the land purchased as an off-set, as well as the cost of managing that land. As noted above, while these impacts may result from the listing, the incremental impacts of critical habitat designation quantified in this section are limited to the administrative cost of section 7 consultation, since the listing impacts will occur with or without critical habitat designation.

- **Estimate Incremental Economic Impacts of Critical Habitat Designation**

As noted above, the incremental impacts of the Proposed Rule are expected to be limited to administrative consultation costs. This analysis assumes that all future projects overlapping the study area are likely to have a Federal nexus through the U.S. Army Corps and thus will require consultation with the Service under section 7 of the Act. Whether an Army Corps permit is required depends on the amount of water or wetlands within the project area.⁹⁴ Therefore, this assumption may lead to an overstatement of the incremental economic impacts. Data on development project sites from the City of Austin is used to estimate typical project size and this information is combined with the administrative costs presented in Chapter 2 to estimate consultation costs.

- **Evaluate Effects on Regional Real Estate Market and Associated Cost**

The fourth step is to determine the significance of salamander-related land use project modifications relative to regional real estate demand and supply dynamics. The economic impacts are likely to extend beyond the regulated landowners and affect the real estate market, real estate consumers, and the regional economy if (1) the amount of land not developed as a result of salamander protection is high relative to the total developable land in the region (i.e., the listing and designation are expected to produce scarcity in developable land), or (2) other project modification costs are high relative to real estate development value and will impact a significant proportion of developable

⁹³ U.S. Fish and Wildlife Service, "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Four Central Texas Salamanders," August 22, 2012. (p. 3)

⁹⁴ Personal Communication with H. Markway, U.S. Army Corps of Engineers on November 13, 2012.

land. In these cases, landowners and developers may pass-on the costs of species protection to real estate consumers in the form of high prices. Conversely, if project modification costs are low or if salamander protection only affects a small fraction of the total developable land supply in a region, then economic effects are likely to be limited to that subset of individual landowners or projects.

All conservation efforts recommended by the Service are assumed to occur in the baseline – i.e., in the absence of designation – therefore any effects on the regional real estate market would also be considered baseline impacts.

4.2.2 ESTIMATE OF AFFECTED ACREAGE

126. In order to estimate the acreage potentially affected by the proposed critical habitat designation, the analysis first removes portions of land identified as undevelopable. All remaining acres that are currently vacant are considered potentially developable. A series of Geographic Information Systems (GIS) analyses is applied to these developable areas to estimate the number of potentially developable acres expected to be developed within the timeframe of this analysis. The number of acres expected to be developed is estimated throughout the study area.
127. Specifically, spatial data of the proposed critical habitat provided by the Service is used in conjunction with land use data to identify developable and undevelopable areas within the proposed critical habitat. For the purpose of this analysis, areas considered undevelopable include public lands (e.g. U.S. Army Corps and Bureau of Reclamation lands), land within private preserves including those set up by existing HCPs, and water. Exhibit 4-2 details the acreage removed from the analysis. Of the remaining acres where development is not prohibited, the analysis identifies currently vacant parcels as those with the potential to be developed over the next 23 years.⁹⁵

⁹⁵ Vacant parcels are identified as those with a State land use code of C1, C2, or C7 in the Land Fragmentation Analysis 2010 dataset published by CAPCOG (Capital Area Council of Governments, Land Fragmentation Analysis 2010, accessed by <http://www.capcog.org/data-maps-and-reports/geospatial-data/> on November 26, 2012).

EXHIBIT 4-2. AREAS REMOVED FROM DEVELOPMENT ANALYSIS

WATERSHED NAME	ACRES REMOVED	REASON FOR REMOVAL
AUSTIN BLIND SALAMANDER		
Lake Austin	7,349 (of 34,117)	DOD lands ¹ , Preserves ^{1,2} , Water ³
JOLLYVILLE PLATEAU SALAMANDER		
South Brushy Creek	555 (of 39,311)	Preserves ⁴ , Water ³
Lake Creek	201 (of 28,978)	Preserves ^{2,4} , Water ³
Cypress Creek	10,520 (of 15,901)	Bureau of Reclamation lands, Preserves ^{2,4} , Water ³
Bull Creek	7,374 (of 24,331)	Preserves ² , Water ³
Town Lake	560 (of 32,037)	Preserves ² , Water ³
Walnut Creek	217 (of 36,493)	Water ³
GEORGETOWN SALAMANDER		
Lake Georgetown	4,992 (of 40,367)	U.S. Army Corps lands ⁵ , Preserves ⁴ , Water ³
Middle Fork San Gabriel River	519 (of 13,770)	U.S. Army Corps lands, Water ³
Lower South Fork San Gabriel River	85 (of 31,012)	Preserves ⁴ , Water ³
Dry Berry Creek	82 (of 24,218)	Preserves ⁴ , Water ³
Lower Berry Creek	86 (of 31,761)	Preserves ⁴ , Water ³
Sources:		
(1) USGS, Protected Areas Database of the United States (PAD-US), accessed by http://gapanalysis.usgs.gov/padus/data/download/ on October 22, 2012.		
(2) City of Austin, GIS Data Sets, 2006 Land Use, accessed by ftp://ftp.ci.austin.tx.us/GIS-Data/Regional/coa_gis.html on October 12, 2012.		
(3) Environmental Systems Research Institute, Inc. (ESRI), U.S. Water Bodies		
(4) Williamson County, GIS Data Catalog, Parks and Open Space, accessed by http://www.wilco.org/CountyDepartments/GIS/Data/tabid/532/language/en-US/Default.aspx on September 11, 2012.		
(5) Williamson Central Appraisal District, GIS Resources, Parcels and Ownership Info, accessed by http://www.wcad.org/index.php/gis-and-mapping-home/92-gis on November 14, 2012.		

128. To estimate the proportion of developable land within Williamson and Travis Counties that is likely to be developed over the next 23 years, the analysis relies on development projections by traffic analysis zone (TAZ) available from the Capital Area Metropolitan Planning Organization (CAMPO).⁹⁶ These development projections represent the finest resolution data that cover the study area threatened by development. CAMPO provides

⁹⁶ Capital Area Metropolitan Planning Organization, Regional Data, 2005 to 2035 Demographics, accessed by http://www.campotexas.org/programs_gis.php on November 14, 2012.

population forecasts, which are converted to expected acres subject to development based on assumptions regarding household density.⁹⁷ The expected acres subject to development are limited to the acres of developable land within a given unit or watershed. In other words, we do not allow more land to develop than we estimate is available for development.

129. To translate TAZ-level development projections into projections within the study area, the analysis uses GIS to identify TAZs that intersect each unit as well as the surrounding watershed. This analysis found that not all habitat units are entirely contained within an individual TAZ. Similarly, watersheds are often made up of a number of whole TAZs as well as a number of partial TAZs. For critical habitat units and watersheds that are made up of partial TAZs, the percentage of overlap is calculated. Then, under the assumption that projected development is evenly distributed throughout all land available for development within each TAZ, the amount of growth projected within each critical habitat unit and the surrounding watershed is estimated by applying the percentage of overlap between the area of interest and TAZ to projected development within those tracts.
130. Exhibits 4-3 and 4-4 present the acres of projected development within the study area for this analysis. We present projected development acres both within the proposed critical habitat units and outside of the critical habitat units, but within the watersheds of concern. We limit the projected acres of development to the acres of developable land within a given area.

EXHIBIT 4-3. PROJECTED ACRES OF DEVELOPMENT WITHIN PROPOSED CRITICAL HABITAT UNITS (2013 - 2035)

UNIT NUMBER	TOTAL ACRES	ACRES OF DEVELOPABLE LAND ¹	PROJECTED POPULATION GROWTH (2013-2035) ²	PROJECTED ACRES OF DEVELOPMENT (2013-2035) ^{2,3}
AUSTIN BLIND SALAMANDER				
1	98	3	12	3
Subtotal ⁴	98	3	12	3 (100%)
JOLLYVILLE PLATEAU SALAMANDER				
1	68	6	12	6
2	68	8	77	8
3	699	94	833	94
6	237	35	180	35
7	68	0	182	N/A

⁹⁷ Average density calculated by county using 2035 population projection from CAMPO. Population density in Travis County assumed to be 2.45 per acre and population density in Williamson County assumed to be 1.43 per acre (Capital Area Metropolitan Planning Organization, Regional Data, 2005 to 2035 Demographics, accessed by http://www.campotexas.org/programs_gis.php on November 14, 2012.).

UNIT NUMBER	TOTAL ACRES	ACRES OF DEVELOPABLE LAND ¹	PROJECTED POPULATION GROWTH (2013-2035) ²	PROJECTED ACRES OF DEVELOPMENT (2013-2035) ^{2,3}
8	110	0	N/A	N/A
9	145	0	N/A	N/A
10	88	1	18	1
11	68	4	14	4
12	68	0	44	N/A
13	68	3	59	3
14	112	0	185	N/A
15	68	2	166	2
16	68	2	223	2
17	1,198	7	1313	7
18	237	0	33	N/A
19	102*	8	304	8
20	68	0	10	N/A
21	68	0	N/A	N/A
22	238	52	107	44
24	68	0	6	N/A
25	68	1	181	1
26	68	15	233	15
27	98	13	432	13
28	203	22	100	22
29	68	2	12	2
30	68	4	14	4
31	68	2	12	2
32	68	0	137	N/A
33	159	3	37	3
Subtotal⁴	4,782	281	4,926	273 (97%)
GEORGETOWN SALAMANDER				
1	83	0	1	N/A
2	68	15	90	15
3	68	0	122	N/A
4	68	8	27	8
5	68	0	27	N/A
6	68	0	59	N/A
7	68	14	69	14

UNIT NUMBER	TOTAL ACRES	ACRES OF DEVELOPABLE LAND ¹	PROJECTED POPULATION GROWTH (2013-2035) ²	PROJECTED ACRES OF DEVELOPMENT (2013-2035) ^{2,3}
8	132	0	136	N/A
9	68	0	58	N/A
10	68	0	69	N/A
11	68	0	386	N/A
12	68	3	276	3
13	68	0	81	N/A
14	68	0	246	N/A
Subtotal⁴	1,031	40	1,645	40 (100%)
TOTAL⁴	5,911	324	6,583	316 (97%)
AREAS CONSIDERED FOR EXCLUSION				
AUSTIN BLIND SALAMANDER				
1	22	1	3	1
JOLLYVILLE PLATEAU SALAMANDER				
19	152	12	454	12
TOTAL⁴	174	12	456	12 (100%)
Notes:				
<ol style="list-style-type: none"> 1. Acres of developable land represent vacant areas not currently preserved in perpetuity (see Exhibit 4-2). 2. Estimated using GIS data and population projections from CAMPO. Average population density calculated at the county-level as of 2035 using population projections from CAMPO. 3. Projected acres of development limited to the acres of developable land. 4. Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits. 				
Sources: Capital Area Metropolitan Planning Organization, Regional Data, 2005 to 2035 Demographics, accessed by http://www.campotexas.org/programs_gis.php on November 14, 2012.				

EXHIBIT 4-4. PROJECTED ACRES OF DEVELOPMENT WITHIN WATERSHEDS OUTSIDE OF PROPOSED CRITICAL HABITAT UNITS (2013 - 2035)

WATERSHED	TOTAL ACRES	ACRES OF DEVELOPABLE LAND ¹	PROJECTED POPULATION GROWTH (2013-2035) ²	PROJECTED ACRES OF DEVELOPMENT (2013-2035) ^{2,3}
AUSTIN BLIND SALAMANDER				
Lake Austin	34,117	3,468	13,440	3,468
Subtotal⁴	34,117	3,468	13,440	3,468 (100%)
JOLLYVILLE PLATEAU SALAMANDER				
South Brushy Creek	39,311	3,834	66,352	3,834
Lake Creek	28,978	2,419	105,374	2,419
Cypress Creek	15,901	543	9,484	543
Bull Creek	24,331	1,510	24,893	1,510
Town Lake	32,037	4,277	84,763	4,277
Walnut Creek	36,493	2,804	81,907	2,804
Subtotal⁴	177,051	15,387	372,773	15,387 (100%)
GEORGETOWN SALAMANDER				
Lake Georgetown	40,367	39,961	10,960	1,836
Middle Fork San Gabriel River	13,770	13,498	21,453	930
Lower South Fork San Gabriel River	31,012	30,944	32,495	1,758
Dry Berry Creek	24,218	24,135	3,476	271
Lower Berry Creek	31,761	31,625	26,425	1,898
Smith Branch San Gabriel River	13,854	13,786	69,230	997
Subtotal⁴	154,982	153,950	164,039	7,689 (5%)
TOTAL⁴	366,150	172,805	550,252	26,544 (15%)
Notes:				
1. Acres of developable land represent areas not currently preserved in perpetuity (see Exhibit 4-2).				
2. Estimated using GIS data and population projections from CAMPO. Average population density calculated at the county-level as of 2035 using population projections from CAMPO.				
3. Projected acres of development limited to the acres of developable land.				
4. Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.				
Sources: Capital Area Metropolitan Planning Organization, Regional Data, 2005 to 2035 Demographics, accessed by http://www.campotexas.org/programs_gis.php on November 14, 2012.				

4.2.3 INCREMENTAL ECONOMIC IMPACTS OF CRITICAL HABITAT DESIGNATION ON DEVELOPMENT ACTIVITIES

131. As described in Chapter 3, the Service believes that nearly all conservation efforts implemented as a result of section 7 consultation will occur in the baseline (i.e., absent critical habitat designation). Therefore, the incremental economic impacts are forecast to be limited to the administrative cost of considering adverse modification during future section 7 consultations. Estimates of the administrative costs associated with section 7 consultations with the Service are driven by the number of projects requiring consultation. This analysis makes the simplifying assumption that all future development projects overlapping the study area will require Federal permitting from the U.S. Army Corps, and the Federal Action agency will consult the Service. In this region, a permit from Army Corps may not always be required and therefore this assumption may lead to an overstatement of the economic impacts.⁹⁸
132. To estimate the number of projects affected, information about typical project size within the study area is also required. To estimate the typical project size within the study area, we use data on development site plan cases available from the City of Austin Planning and Development Review Department.⁹⁹ This data includes development site plan boundaries from April 2000 through August 2012. We select those sites that fall within the study area and then calculated the average size. On average, proposed development projects are 7.16 acres in size. This data covers the study area in Travis County and continues into Southern Williamson County. We assume that these data are also representative of development project sites in Northern Williamson County.
133. To calculate the number of consultations over the timeframe of the analysis, we combine the data on the projected acres of development in Exhibits 4-3 and 4-4 with the average project size of 7.16 acres. We assume that one formal consultation will occur per project. We assume the rate of consultation will be constant over the timeframe of the analysis (2013 through 2035). Costs associated with consultations occurring in the areas outside of the proposed critical habitat units, but within the watersheds of interest, are divided evenly over the proposed units within a given watershed.

4.2.4 RESULTS

134. Exhibit 4-5 presents total incremental impacts to development by unit. The present value total forecast incremental impacts to development within areas proposed for designation are estimated to be \$28 million, assuming a seven percent discount rate. On an annualized basis, administrative impacts in the areas proposed for designation are estimated to be \$2.3 million. In the areas considered for exclusion, the present value total incremental impacts are estimated to be \$620 to \$12,000, assuming a seven percent discount rate. These incremental impacts are associated with the administrative cost of consultation.

⁹⁸ Personal Communication with H. Markway, U.S. Army Corps of Engineers on November 13, 2012.

⁹⁹ City of Austin, GIS Data Sets, Site Plan Cases accessed by ftp://ftp.ci.austin.tx.us/GIS-Data/Regional/coa_gis.html on October 12, 2012.

EXHIBIT 4-5. FORECAST INCREMENTAL IMPACTS TO DEVELOPMENT ACTIVITIES BY UNIT (2012\$, DISCOUNTED AT SEVEN PERCENT)

UNIT	PRESENT VALUE INCREMENTAL IMPACT	ANNUALIZED INCREMENTAL IMPACT
AREAS PROPOSED FOR DESIGNATION		
AUSTIN BLIND SALAMANDER		
1	\$3,600,000	\$300,000
<i>Subtotal</i>	<i>\$3,600,000</i>	<i>\$300,000</i>
JOLLYVILLE PLATEAU SALAMANDER		
1	\$850,000	\$70,000
2	\$850,000	\$71,000
3	\$2,200,000	\$180,000
6	\$2,000,000	\$170,000
7	\$840,000	\$70,000
8	\$71,000	\$5,900
9	\$71,000	\$5,900
10	\$72,000	\$6,000
11	\$75,000	\$6,200
12	\$71,000	\$5,900
13	\$74,000	\$6,100
14	\$71,000	\$5,900
15	\$110,000	\$9,500
16	\$110,000	\$9,500
17	\$120,000	\$9,900
18	\$110,000	\$9,400
19	\$120,000	\$10,000
20	\$110,000	\$9,400
21	\$110,000	\$9,400
22	\$160,000	\$13,000
24	\$110,000	\$9,400
25	\$110,000	\$9,500
26	\$130,000	\$11,000
27	\$130,000	\$10,000
28	\$1,300,000	\$100,000
29	\$1,100,000	\$93,000
30	\$1,100,000	\$93,000
31	\$1,100,000	\$93,000
32	\$2,900,000	\$240,000
33	\$120,000	\$9,600
<i>Subtotal</i>	<i>\$16,000,000</i>	<i>\$1,400,000</i>
GEORGETOWN SALAMANDER		
1	\$280,000	\$24,000
2	\$1,000,000	\$84,000
3	\$990,000	\$82,000

UNIT	PRESENT VALUE INCREMENTAL IMPACT	ANNUALIZED INCREMENTAL IMPACT
4	\$390,000	\$33,000
5	\$380,000	\$32,000
6	\$380,000	\$32,000
7	\$400,000	\$33,000
8	\$380,000	\$32,000
9	\$240,000	\$20,000
10	\$240,000	\$20,000
11	\$240,000	\$20,000
12	\$250,000	\$20,000
13	\$1,800,000	\$150,000
14	\$1,000,000	\$86,000
<i>Subtotal</i>	<i>\$8,100,000</i>	<i>\$670,000</i>
TOTAL	\$28,000,000	\$2,300,000
AREAS CONSIDERED FOR EXCLUSION		
AUSTIN BLIND SALAMANDER		
1	\$620	\$51
<i>Subtotal</i>	<i>\$620</i>	<i>\$51</i>
JOLLYVILLE PLATEAU SALAMANDER		
19	\$12,000	\$1,000
<i>Subtotal</i>	<i>\$12,000</i>	<i>\$1,000</i>
TOTAL	\$13,000	\$1,100
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

4.3 WATER MANAGEMENT ACTIVITIES

135. Although numerous regulations, plans, and ordinances exist to protect water quality within the study area (as described in Chapter 3), the primary threat to the four salamanders remains the reduction of water quality or quantity.¹⁰⁰ Dams, impoundments, and other water management projects may threaten the species and their habitat by contributing to both of these factors. In this section, we forecast the number of future section 7 consultations associated with water management activities.
136. To develop a forecast of Future Section 7 consultations, we first identify facilities within the study area that may have a Federal nexus for section 7 consultation. This analysis considers the following four categories of activities:
- Hydropower facilities licensed by the Federal Energy Regulatory Commission (FERC);
 - Newly constructed dams requiring Corps permits;

¹⁰⁰ 2012 Proposed Rule, 77 FR 50792.

- Routine operations or maintenance requiring Corps permits; and
- Dams under Federal ownership.

137. The Corps' National Inventory of Dams identifies 67 dams located in Bell County, 59 in Travis County, and 69 in Williamson County.¹⁰¹ Spatial analysis further refined this list to include only those dams within the study area for this analysis. Two of these are identified as producing hydroelectricity. A third is owned by a Federal agency. Exhibit 4-6 summarizes information on the three dams that are within the study area and could be subject to Federal regulation. These dams are discussed in more detail in the following sections.

EXHIBIT 4-6. DAMS IN STUDY AREA WITH POTENTIAL FEDERAL NEXUS

REGULATORY AGENCY	DAM NAME	OWNER/OPERATOR	LOCATION (COUNTY)
FERC ¹	Tom Miller Dam	City of Austin ²	Travis County
FERC ¹	Mansfield/Marshall Ford Dam	LCRA	Travis County
Corps	North San Gabriel Dam/ Lake Georgetown	Corps	Williamson County
Notes:			
1. LCRA dams were exempted from licensing by FERC in 1927 and 1949, and this decision was reaffirmed by FERC in 1989. Mansfield Dam is exempt by an act of Congress.			
2. The Tom Miller Dam is leased to LCRA. The current lease extends through 2020. See http://www.lcra.org/water/dams/miller.html , accessed on November 14, 2012.			

4.3.1 HYDROPOWER FACILITIES

138. Under the Federal Power Act, FERC issues licenses for privately owned hydropower facilities.¹⁰² As a Federal agency, FERC undertakes section 7 consultation with the Service to consider the potential effects of the licensed projects on listed species and critical habitats. FERC hydropower licenses are valid for 30, 40, or 50 years, depending on the extent of proposed new development or environmental mitigation and enhancement measures. Consequently, FERC undertakes consultation with the Service upon initially permitting a project, and every subsequent 30, 40, or 50 years, as long as the permit is re-issued throughout the life of the project. FERC may also issue exemptions from licensing. Two types of small hydroelectric projects are eligible for exemptions from licensing: (1) small conduit hydroelectric facilities up to 15 MW (up to 40 MW for certain projects) may be eligible for a Conduit Exemption; and (2) small

¹⁰¹ CorpsMap, National Inventory of Dams. NID Interactive Report. Accessed at: <http://geo.usace.army.mil/pgis/f?p=397:12> on November 14, 2012.

¹⁰² United States Code: Title 16, Chapter 12. "Federal Regulation and Development of Power."

hydroelectric projects of 5 MW or less may be eligible for a 5 MW exemption.¹⁰³ FERC maintains up-to-date records of dam licenses and exemptions.¹⁰⁴

139. In addition, certain hydroelectric dams may not require FERC licenses due to a lack of jurisdiction. This is the case with the two hydroelectric dams within the study area for the salamanders. These two dams, Tom Miller Dam and Mansfield/Marshall Ford Dam, are both operated by LCRA on the Lower Colorado River. Mansfield Dam was exempted from FERC licensing by a 1956 Act of Congress.¹⁰⁵ All other LCRA dams were exempted by FERC's predecessor agencies in 1927 and 1949. Since 1989, FERC has reaffirmed that the Lower Colorado River is not a navigable waterway and these facilities do not affect the interests of interstate commerce; as such, LCRA dams are not subject to FERC permits.¹⁰⁶ Therefore, this analysis does not estimate any future section 7 consultations associated with FERC licensing for these dams.

4.3.2 NEW CONSTRUCTION AND ONGOING OPERATIONS AND MAINTENANCE

140. Dams that do not produce power (and are therefore not licensed by FERC) and are located in navigable waters of the U.S. are regulated by the Corps pursuant to Section 10 of the Rivers and Harbors Act (RHA) of 1899 and Section 404 of the Clean Water Act. Section 10 of the RHA requires authorization from the Corps for the construction of any structure in or over navigable waters of the U.S., as well as the excavation/dredging or deposition of material in these waters or any obstruction or alteration in navigable water.¹⁰⁷ The Corps permits the construction and maintenance of dams; once this work is complete, however, dams are not required to be re-permitted. Consultation with the Service is therefore typically only undertaken upon the development of a new dam project.
141. The Corps acknowledged that it can be difficult to forecast new construction that may occur over a 23-year period. However, the Corps is not aware of any proposed dams within Bell, Travis, or Williamson Counties at this time, and does not anticipate any new construction for at least 10-15 years.¹⁰⁸ Communication with LCRA, which operates many dams and is a significant provider of water and power throughout the study area,

¹⁰³ Federal Energy Regulatory Commission. (2004). "Handbook for Hydroelectric Project Licensing and 5 MW Exemptions from Licensing." Accessed at: http://www.ferc.gov/industries/hydropower/gen-info/handbooks/licensing_handbook.pdf, on November 14, 2012.

¹⁰⁴ Federal Energy Regulatory Commission. (2011). "FERC: Hydropower." Accessed at: <http://www.ferc.gov/industries/hydropower.asp>, on November 14, 2012.

¹⁰⁵ 33 CFR §208.19. Accessed at: http://cfr.regstoday.com/33cfr208.aspx#33_CFR_208p19, on November 14, 2012

¹⁰⁶ "Federal Energy Regulatory Commission Regulation." Lower Colorado River Authority Refunding Revenue Bonds, Series 2008A, Official Statement. December 2008. (Page 60); and Huebner, Erik. Senior Environmental Coordinator, Lower Colorado River Authority Environmental Field Services Division. Telephone communication on November 2, 2012.

¹⁰⁷ U.S. Army Corps of Engineers. (2007). "Practices for Documenting Jurisdiction under Section 404 of the Clean Water Act (CWA) and Sections 9 & 10 of the Rivers & Harbors Act (RHA) of 1899." Accessed at: http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/juris_info.aspx, on November 14, 2012.

¹⁰⁸ Brooks, Stephen. Head of Regulatory Division, U.S. Army Corps of Engineers Fort Worth District. Telephone communication on October 5, 2012.

also indicated that they have no short- or long-term intentions to build additional dams on the Colorado River.¹⁰⁹ As a result, this analysis does not estimate any future section 7 consultations for dam construction.

142. Routine activities, including operations and maintenance, may in some cases also require Corps review. LCRA estimates that these activities – in particular, maintenance, dewatering, and removing sediment – occur approximately every 10 years at each dam, on an as-needed basis.¹¹⁰ Importantly, however, the Corps’ Fort Worth District issues Regional General Permits for routine activities that could otherwise trigger Corps review. In particular, a Regional General Permit exists for modification and alteration of existing Corps projects.¹¹¹ It is expected that this permit will cover routine operations and maintenance activities at existing dams and reservoirs and eliminate the potential Federal nexus for section 7 consultation.¹¹²
143. More significant construction projects that may require Corps review typically involve emergency maintenance, according to LCRA.¹¹³ Because dam operators are unable to predict these types of activities, this analysis does not estimate any section 7 consultations associated with operations and maintenance at existing dams.

4.3.3 FEDERAL OWNERSHIP

144. Activities occurring at federally owned dams may trigger section 7 consultation through a nexus with the dam owner. The study area for the four salamanders includes one federally owned dam. The North San Gabriel Dam, which forms Lake Georgetown in Williamson County, is owned by the Corps. Communication with the Lake Georgetown Manager indicated that although the area is occupied by other species listed under the Act, the Corps has not consulted with the Service in the past for routine operations and maintenance. Significant construction projects, such as the construction of a new gate house that occurred at the North San Gabriel Dam several years ago, do require consultation with the Service. At this time, there are no plans to expand or undertake new construction for at least 10-20 years. According to the Lake Georgetown Manager, the only forecast water management activities involve routine maintenance of the type that has not required section 7 consultation in the past.¹¹⁴

¹⁰⁹ Huebner, Erik. Senior Environmental Coordinator, Lower Colorado River Authority Environmental Field Services Division. Telephone communication on November 2, 2012.

¹¹⁰ Huebner, Erik. Senior Environmental Coordinator, Lower Colorado River Authority Environmental Field Services Division. Telephone communication on November 2, 2012.

¹¹¹ “General Permits.” U.S. Army Corps of Engineers Fort Worth District. Accessed at: <http://www.swf.usace.army.mil/pubdata/enviro/regulatory/permitting/gp.asp>, on November 14, 2012.

¹¹² Huebner, Erik. Senior Environmental Coordinator, Lower Colorado River Authority Environmental Field Services Division. Telephone communication on November 2, 2012.

¹¹³ *Ibid.*

¹¹⁴ Blank, Scott. Manager, U.S. Army Corps of Engineers Lake Georgetown Office. Telephone communication on October 15, 2012.

145. In conclusion, this analysis does not forecast any section 7 consultations over the next 20 years associated with water management activities. Although some activities, such as emergency repairs, are likely to result in section 7 consultation, these activities are generally rare and difficult to predict. Similarly, to the extent that new construction occurs over the next 20 years that has not currently been proposed, this analysis may underestimate costs associated with section 7 consultations.

4.4 TRANSPORTATION AND UTILITY PROJECTS

146. Transportation and utility projects can negatively affect water quality thus presenting a threat to the salamanders. Major utilities projects with a Federal nexus are not expected to occur within or affect the proposed designation. The majority of the utility activities carried out within the study area include minor projects such as rerouting transmission lines and maintenance activities. These activities generally do not have a Federal nexus necessitating consultation with the Service.¹¹⁵ No major utility projects that may have a Federal nexus were identified within the timeframe of this analysis.¹¹⁶ Therefore, the effect of the critical habitat designation on transmission projects is expected to be negligible.
147. On the other hand, a number of transportation projects with a Federal nexus within and affecting the proposed critical habitat are expected to occur over the next 33 years. This analysis considers all projects included in the Texas State Transportation Improvement Plans (STIPs), as well as information in the 25 year plans of the Capital Area Metropolitan Planning Organization and the Killeen-Temple Planning Organization.¹¹⁷ We used the location descriptions provided in these plans to determine which projects would intersect the study area. We also used information on funding sources available in the STIPs to determine if a project would receive Federal funding and require consultation with the Service. Routine maintenance does not receive Federal funding and thus is not subject to consultation.¹¹⁸ The transportation projects expected to be affected by the proposed designation are described in detail in the sections below.¹¹⁹
148. As described in Chapter 2, the Service believes that they are unlikely to recommend additional project modifications due to the designation of critical habitat. As a result, the incremental affect of critical habitat designation for the salamanders is expected to be limited to the administrative consultation cost of addressing the adverse modification standard during consultation. Consultation costs are assumed to occur during the first year of construction on a given project. Many of the transportation projects described

¹¹⁵ Personal communication with E. Huebner, LCRA, October 18, 2012.; Personal communication with B. Hunt, LCRA, October 16, 2012.

¹¹⁶ Email communication with E. Stager, Austin Energy, October 10, 2012.; Personal communication with Oncor Energy, October 11, 2012.; Personal communication with E. Huebner, LCRA, October 18, 2012.

¹¹⁷ Capital Area Metropolitan Planning Organization. 2010. CAMPO 2035 Regional Transportation Plan. May 24, 2010.; Killeen-Temple Metropolitan Planning Organization (KTMPO). 2010. Transportation Improvement Program Fiscal Years 2011-2014.

¹¹⁸ Personal Communication with L. Choate, Texas Department of Transportation, November 19, 2012.

¹¹⁹ Personal Communication with S. Robertson, Texas Department of Transportation, October 10, 2012.

below are not expected to occur within a specific proposed critical habitat unit (or units), but rather within a watershed(s) where the project may affect multiple units located within the watershed(s). In these circumstances, we divided costs evenly over the proposed critical habitat units located within the relevant watershed(s). Unless otherwise indicated, the consultations described below should be considered formal.

4.4.1 MOPAC EXPRESSWAY (LOOP 1)

149. To improve mobility and reduce congestion on the Mopac Expressway (Loop 1) in Austin, a project is planned to add an express lane in each direction. Work is expected to begin in mid or late 2013, and continue until 2017. Jollyville Plateau salamander proposed critical habitat Unit 31 directly abuts Loop 1 within the range of the project. In addition to containing Unit 31, the Town Lake watershed includes Jollyville Plateau proposed critical habitat Units 29 and 30. The project extends into the Lake Austin watershed, which contains proposed critical habitat Unit 1 for the Austin blind salamander, and the Walnut Creek watershed, which contains Jollyville Plateau salamander proposed critical habitat Unit 32. This project will receive Federal funding and therefore section 7 consultation with the Service will be required.¹²⁰

4.4.2 MANOR EXPRESSWAY (US-290)

150. The Manor Expressway project includes a series of improvements to US-290. The main component of the improvements is the expansion of the highway to six lanes. Construction for the project has begun and is expected to continue until 2015. The project is receiving Federal funding.¹²¹ While the project does not occur directly adjacent to any critical habitat units, it does intersect the Town Lake watershed containing Jollyville Plateau salamander proposed critical habitat Units 29, 30, and 31; and the Walnut Creek watershed, which contains Jollyville Plateau salamander critical habitat Unit 32. We expect that this ongoing project will require consultation with the Service in 2013.

4.4.3 BERGSTROM EXPRESSWAY (US 183)

151. The Bergstrom Expressway project is an effort to improve mobility along US 183, involving expansion of the road to a six-lane highway. The project is in the environmental assessment stage, which is expected to last until 2014. Construction on the project is expected to occur between 2015 and 2020. The project is receiving Federal funding.¹²² While the project does not intersect any of the proposed critical habitat units, it does cross the Walnut Creek watershed, which contains Jollyville Plateau salamander

¹²⁰ Capital Area Metropolitan Planning Organization. 2010. CAMPO 2035 Regional Transportation Plan. May 24, 2010.; Texas Department of Transportation. 2012. FY 2013-2016 State Transportation Improvement Program: Austin District Highway. August.; MoPac Improvement Project website, accessed by <http://www.mopacexpress.com/> on November 15, 2012.

¹²¹ *Ibid.*

¹²² Capital Area Metropolitan Planning Organization. 2010. CAMPO 2035 Regional Transportation Plan. May 24, 2010.; Texas Department of Transportation. 2012. FY 2013-2016 State Transportation Improvement Program: Austin District Highway. August.; The Bergstrom Expressway website, accessed by <http://www.bergstromexpressway.com/> on November 15, 2012.

proposed critical habitat Unit 32 and the Town Lake watershed, which contains Jollyville Plateau salamander proposed critical habitat Units 29, 30, and 31.

4.4.4 RANCH-TO-MARKET ROAD (RM) 2243 EXPANSION

152. A project is planned to expand RM 2243 between US 183 and Ronald Reagan Boulevard to four lanes within the City of Leander. This project is expected to occur between 2012 and 2014.¹²³ While the project does not directly intersect the proposed critical habitat, it does occur within the South Brushy Creek watershed, which contains Jollyville Plateau salamander proposed critical habitat Units 3 and 6.

4.4.5 SH-195 EXPANSION

153. State Highway 195 is the main road connecting northwest Williamson County to IH-35. It is currently a two-lane undivided road, but a project is underway to expand it into a 4-lane divided roadway from SH-138 southward to IH-35. This project began in 2010 and is expected to progress in stages until 2018.¹²⁴ Although the road does not directly transect any proposed critical habitat, it does pass through the Lower Berry Creek watershed containing Georgetown salamander proposed critical habitat Units 2 and 3; and the Dry Berry Creek watershed, which contains Georgetown salamander proposed critical habitat Unit 1. The project is partially funded through Federal funding and will therefore require consultation with the Service. We expect that this consultation will occur in 2013.

4.4.6 SH 45 EXPANSION

154. The CAMPO 2035 plan also includes a project for the expansion of State Highway 45 eventually resulting in the construction of a 4 lane toll freeway. Construction for the project will occur between 2020 and 2025.¹²⁵ The project will potentially affect several proposed critical habitat units, including Jollyville Plateau salamander proposed critical habitat Unit 7 which includes the intersection between SH 45 and Ranch Road (RR) 620. Currently, SH 45's western limit is US 183 where the road becomes RR 620. Expansion to the southwest of SH 45 along RR 620 will potentially affect several units of Jollyville plateau salamander proposed critical habitat in the Cypress Creek and Bull Creek watersheds, located close to RR 620's current path. In total, the project is expected to affect 25 Jollyville Plateau salamander proposed critical habitat units in the following watersheds Lake Creek (Units 1, 2, 7), Bull Creek (Units 15-22, 24-28, 33), and Cypress Creek (Units 3, 8-14). Although a funding source is not listed for this project, we conservatively assume that consultation with the Service will be necessary.

¹²³ Capital Area Metropolitan Planning Organization. 2010. CAMPO 2035 Regional Transportation Plan. May 24, 2010.

¹²⁴ Capital Area Metropolitan Planning Organization. 2010. CAMPO 2035 Regional Transportation Plan. May 24, 2010.; Texas Department of Transportation. 2012. FY 2013-2016 State Transportation Improvement Program: Austin District Highway. August.

¹²⁵ Capital Area Metropolitan Planning Organization. 2010. CAMPO 2035 Regional Transportation Plan. May 24, 2010.

4.4.7 ANDERSON MILL ROAD (FM 2769) RECONSTRUCTION

155. Anderson Mill Road runs near the Travis-Williamson county-line northwest of the City of Austin. A project is planned to expand the arterial roadway to a four-lane divided major arterial roadway. The project will impact a 0.8 mile stretch of road just north of RR 620, which intersects with proposed critical habitat Unit 12 for the Jollyville Plateau salamander in the Cypress Creek watershed. Also in the Cypress Creek watershed are proposed critical habitat Units 3, 8, 9, 10, 11, 13, and 14 for the Jollyville Plateau salamander. Construction for the project is expected to begin at some point between the years of 2020 and 2025.¹²⁶ Although a funding source is not listed for this project, we conservatively assume that consultation with the Service will be necessary.

4.4.8 US-79 BUS LANE

156. Included in CAMPO's 2035 plan is a project to improve mobility along US-79 through the creation of a bus lane between IH-35 and SH-130. Within the extent of the project, US-79 transects the proposed Jollyville Plateau salamander proposed critical habitat Unit 2 in the Lake Creek watershed. The Lake Creek watershed also includes proposed critical habitat Units 1 and 7 for the Jollyville Plateau salamander. This project is not expected to occur until sometime between 2026 and 2035 and the funding sources for the project are currently unknown.¹²⁷ However, if Federal funding is awarded for this project, consultation with the Service will be necessary.

4.4.9 IH-35 EXPANSION

157. A large-scale project to expand IH-35 in Bell County and farther north is currently underway. This project includes work to expand a segment of the road between FM 2843 and 2484 to a six lane highway. IH-35 crosses through the middle of Salado salamander proposed critical habitat Unit 4. The project is being funded through Texas Proposition 12 and Proposition 14 bonds.¹²⁸ Although this project is being funded using State funds, we would expect a Federal nexus since the project is occurring along an interstate highway. Therefore, we assume that consultation on this project will occur in 2013.

4.4.10 RESULTS

158. Exhibit 4-7 presents the total incremental impacts to transportation projects of the proposed designation of critical habitat for the salamanders. These impacts are limited to the administrative cost of consultation. Total present value incremental impacts discounted at seven percent is estimated to be \$2,900 for the Austin blind salamander, \$76,000 for the Jollyville Plateau salamander, \$14,000 for the Georgetown salamander, and \$14,000 for the Salado salamander. Total present value forecast costs for all four all species combined is estimated to be \$110,000. Annualized incremental costs discounted at seven percent are \$240 for the Austin blind salamander, \$6,300 for the Jollyville

¹²⁶ Capital Area Metropolitan Planning Organization. 2010. CAMPO 2035 Regional Transportation Plan. May 24, 2010.

¹²⁷ Capital Area Metropolitan Planning Organization. 2010. CAMPO 2035 Regional Transportation Plan. May 24, 2010.

¹²⁸ Killeen-Temple Metropolitan Planning Organization (KTMP). 2010. Transportation Improvement Program Fiscal Years 2011-2014.

Plateau salamander, \$1,200 for the Georgetown salamander, and \$1,200 for the Salado salamander. Utility projects were not expected to result in consultation with the Service and therefore no incremental impacts to utility projects are anticipated.

**EXHIBIT 4-7. FORECAST INCREMENTAL IMPACTS TO TRANSPORTATION ACTIVITIES BY UNIT
(2012\$, DISCOUNTED AT SEVEN PERCENT)**

UNIT	PRESENT VALUE INCREMENTAL IMPACT	ANNUALIZED INCREMENTAL IMPACT
AREAS PROPOSED FOR DESIGNATION		
AUSTIN BLIND SALAMANDER		
1	\$2,900	\$240
<i>Subtotal</i>	<i>\$2,900</i>	<i>\$240</i>
JOLLYVILLE PLATEAU SALAMANDER		
1	\$2,300	\$190
2	\$2,300	\$190
3	\$8,600	\$710
6	\$7,100	\$590
7	\$2,300	\$190
8	\$1,500	\$120
9	\$1,500	\$120
10	\$1,500	\$120
11	\$1,500	\$120
12	\$1,500	\$120
13	\$1,500	\$120
14	\$1,500	\$120
15	\$360	\$30
16	\$360	\$30
17	\$360	\$30
18	\$360	\$30
19	\$360	\$30
20	\$360	\$30
21	\$360	\$30
22	\$360	\$30
24	\$360	\$30
25	\$360	\$30
26	\$360	\$30
27	\$360	\$30
28	\$360	\$30

UNIT	PRESENT VALUE INCREMENTAL IMPACT	ANNUALIZED INCREMENTAL IMPACT
29	\$9,500	\$790
30	\$9,500	\$790
31	\$9,500	\$790
32	\$9,500	\$790
33	\$360	\$30
<i>Subtotal</i>	<i>\$76,000</i>	<i>\$6,300</i>
GEORGETOWN SALAMANDER		
1	\$4,800	\$390
2	\$4,800	\$390
3	\$4,800	\$390
4	\$0	\$0
5	\$0	\$0
6	\$0	\$0
7	\$0	\$0
8	\$0	\$0
9	\$0	\$0
10	\$0	\$0
11	\$0	\$0
12	\$0	\$0
13	\$0	\$0
14	\$0	\$0
<i>Subtotal</i>	<i>\$14,000</i>	<i>\$1,200</i>
SALADO SALAMANDER		
4	\$14,000	\$1,200
<i>Subtotal</i>	<i>\$14,000</i>	<i>\$1,200</i>
TOTAL	\$110,000	\$8,900
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

4.5 SURFACE MINING OPERATIONS

159. Surface mining operations threaten the salamanders and their habitat due to sedimentation, direct substrate disturbance, and potential water diversions.¹²⁹ Limestone quarries are known to occur throughout the Edwards Aquifer. In particular, existing quarries are located in the watersheds encompassing Units 8, 10, and 13 for the Georgetown salamander and Unit 1 for the Jollyville Plateau salamander, all in

¹²⁹ 2012 Proposed Rule, 77 FR 50785.

Williamson County. As described in Chapter 3, TCEQ recommends best management practices for quarries and mining operations; however, impacts to the salamanders and their habitat may still occur. Surface mining may have a Federal nexus for section 7 consultation through the Corps permitting process.

160. Communication with the Corps indicated that a limited number of surface mining permits exist within Bell, Travis, and Williamson Counties. Some coal mining occurs in eastern Williamson County, beyond the boundaries of the study area for this analysis.¹³⁰ The Corps did not have information on the specific limestone quarries described above. According to the Corps, this could mean that permits are not required in these areas due to a lack of water features that define the Corps' jurisdiction. Additionally, these quarries could be older, inactive sites.¹³¹ According to Corps records, three mining projects have initiated the Corps permitting process between 2002 and 2012 within the region surrounding the study area for this analysis.¹³² Only one of these, a 2008 inquiry for quarry operations on Salado Creek, is likely to have occurred within the study area for this analysis.¹³³ As a result, we assume that this historical rate (one mining project requiring a Corps permit over eleven years) will continue into the future. This analysis therefore forecasts approximately two future section 7 consultations associated with mining activities. Without knowing the exact location of the one historical project or future mining activity, we distribute impacts from these consultations equally between the four proposed critical habitat units for the Salado salamander.
161. The incremental administrative costs associated with these consultations are presented in Exhibit 4-8. All forecast incremental impacts to mining activities are within the proposed critical habitat for the Salado salamander. Total present value incremental impacts discounted at seven percent are estimated to be \$16,000, or \$1,300 on an annualized basis.

¹³⁰ Brooks, Stephen. Head of Regulatory Division, U.S. Army Corps of Engineers Fort Worth District. Telephone communication on October 5, 2012.

¹³¹ Markway, Heather. Regulatory Division, U.S. Army Corps of Engineers Fort Worth District. Telephone communication on November 13, 2012.

¹³² The study area for this analysis is based on hydrologic unit code (HUC) 12 watersheds. The Corps database is organized around HUC-8 watersheds. As a result, the information on permitting rates provided by the Corps spans a significantly larger geographic area than the study area for this analysis.

¹³³ Markway, Heather. Regulatory Division, U.S. Army Corps of Engineers Fort Worth District. Email communication on November 16, 2012.

**EXHIBIT 4-8. FORECAST INCREMENTAL IMPACTS TO SURFACE MINING ACTIVITIES BY UNIT
(2012\$, DISCOUNTED AT SEVEN PERCENT)**

UNIT	PRESENT VALUE INCREMENTAL IMPACT	ANNUALIZED INCREMENTAL IMPACT
AREAS PROPOSED FOR DESIGNATION		
SALADO SALAMANDER		
1	\$3,900	\$320
2	\$3,900	\$320
3	\$3,900	\$320
4	\$3,900	\$320
<i>Subtotal</i>	<i>\$16,000</i>	<i>\$1,300</i>
TOTAL	\$16,000	\$1,300
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

4.6 LIVESTOCK GRAZING ACTIVITIES

162. Livestock grazing operations threaten the salamanders and their habitat due to sedimentation and direct substrate disturbance from trampling.¹³⁴ Throughout the study area, grazing occurs primarily near habitat of the Georgetown and Salado salamanders. The Austin blind salamander occurs only in a park in the City of Austin where grazing is not allowed, and the Jollyville Plateau salamander occurs primarily in suburban areas where livestock are uncommon.¹³⁵ Grazing within the study area typically occurs on private lands.
163. Although grazing operations on private lands are not normally federally regulated or permitted, these operations may receive Federal funding. In particular, grazing operations may receive funding through Natural Resource Conservation Service (NRCS) programs, such as the Environmental Quality Incentive Program (EQIP) and Wildlife Habitat Incentive Program (WHIP). In these cases, grazing activities may be subject to section 7 consultation regarding potential effects on listed species and habitats.
164. Through its financial assistance programs, the NRCS provides funds for private ranchers to implement conservation-focused practices, such as erosion control, introduction of animal trails and walkways to avoid sensitive areas, and channel stabilization, among many others, all aimed at improving the natural environment for both ranching operations and wildlife habitat.¹³⁶ Both EQIP and WHIP are popular programs nationwide. In the

¹³⁴ 2012 Proposed Rule, 77 FR 50787.

¹³⁵ 2012 Proposed Rule, 77 FR 50787.

¹³⁶ Field Office Technical Guides (FOTG) for Bell, Travis, and Williamson Counties, Texas. USDA Natural Resources Conservation Service. Accessed at: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg/>, on November 14, 2012.

State of Texas, EQIP and WHIP provided nearly 4,500 contracts to farmers in 2011.¹³⁷ Within the study area, the NRCS has previously funded contracts to implement conservation practices. However, the NRCS does not currently have any funding for this area, and the likelihood of future contracts will depend on the allocation of funding in future national legislation (i.e., the Farm Bill).¹³⁸

165. If additional funding is allocated to projects within the study area in the future, these projects could be affected by the designation of critical habitat for the salamanders. However, because of the conservation-oriented nature of NRCS projects, the NRCS typically does not consult with the Service on individual contracts, and landowners are not involved. Instead, the NRCS minimizes the number of section 7 consultations that must occur by working with the Service at a programmatic level. These programmatic consultations provide guidance for the types of practices that may affect listed species and habitats. Following consultation, the NRCS, together with landowners, pursues those practices that are unlikely to adversely affect listed species and habitats.¹³⁹
166. In the event that the NRCS receives additional funding for contracts in Bell, Travis, or Williamson Counties, administrative impacts associated with the consideration of adverse modification of salamander critical habitat are likely. Because each Farm Bill spans approximately five years, the NRCS could need to re-initiate approximately four programmatic section 7 consultations over the 23-year study period. However, given the significant uncertainty of potential funding allocations in future Farm Bills, this analysis does not estimate any section 7 consultations associated with NRCS funding for grazing operations.

4.7 HABITAT AND SPECIES MANAGEMENT

167. As described in Chapter 3, many local HCPs exist in watersheds containing proposed salamander critical habitat. The designation of critical habitat may trigger re-initiation of the section 7 consultations associated with these plans. The 16 HCPs that may be affected by the designation are:

- (1) Balcones Canyonlands Preserve;
- (2) Barton Creek HCP;
- (3) Barton Springs Pool HCP;
- (4) Bee Cave Oaks HCP;
- (5) Buttercup Creek HCP;

¹³⁷ Environmental Quality Incentives Program. USDA Natural Resources Conservation Service. Program Information by Fiscal Year. Accessed at: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/>, on November 14, 2012; and Wildlife Habitat Incentive Program. USDA Natural Resources Conservation Service. Program Information by Fiscal Year. Accessed at: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/whip/>, on November 14, 2012.

¹³⁸ Ziehr, Robert. Ecological Scientist, Natural Resources Conservation Service Texas State Office.

¹³⁹ *Ibid.*

- (6) Concordia HCP;
- (7) Fleur HCP;
- (8) Four Points HCP;
- (9) GDF HCP;
- (10) Grandview Hills HCP;
- (11) Lakeline Mall HCP;
- (12) Ribelin Ranch HCP;
- (13) Russell Park Estates HCP;
- (14) Shadow Canyon HCP;
- (15) Silverado HCP; and
- (16) Williamson County Regional HCP.

168. Communication with the Service indicated that three of these plans – Buttercup Creek HCP, Four Points HCP, and Grandview Hills HCP – are unlikely to require re-initiation of section 7 consultation. The Service believes that these three plans already address the species in a satisfactory manner.¹⁴⁰ In addition, the Barton Springs Pool HCP is currently undergoing renewal, and the Austin blind salamander is being added as a covered species.¹⁴¹ This analysis conservatively includes incremental administrative costs of a programmatic re-initiation of consultation on the Barton Springs Pool HCP even though these costs may occur prior to publication of the Final Rule. We assume that the conservation measures outlined in this plan will not change due to the addition of the Austin blind salamander. As described in Section 3.3, this plan already includes conservation measures specific to the Austin blind salamander.
169. The remaining 12 HCPs will require re-initiation of section 7 consultation in 2013, following the designation of critical habitat.¹⁴² Although re-initiation of consultation for some of the smaller HCPs may involve less administrative effort, the Service believes that at least some of the plans will require the level of effort associated with re-initiation of a programmatic consultation.¹⁴³ Therefore, to avoid understating costs, we conservatively assume that each HCP will require re-initiation of programmatic section 7 consultation. Incremental administrative impacts associated with these re-initiations are assigned to the proposed critical habitat units covered by these plans. In cases where the

¹⁴⁰ U.S. Fish and Wildlife Service, Biologist, Austin Ecological Services Field Office. Email communication on December 18, 2012.

¹⁴¹ U.S. Fish and Wildlife Service. Email communication on December 14, 2012.

¹⁴² U.S. Fish and Wildlife Service, Biologist, Austin Ecological Services Field Office. Email communication on December 18, 2012.

¹⁴³ U.S. Fish and Wildlife Service, Consultations and Habitat Conservation Plans Branch Chief, Austin Ecological Services Field Office. Telephone communication on November 13, 2012.

plan areas fall outside of proposed critical habitat, we assign impacts to each unit within the watershed(s) overlapping the plan area. For plans that may affect more than one unit, such as the Williamson County Regional HCP, the impacts of the re-initiated consultation are divided equally among individual units. Exhibit 4-9 lists the plans expected to be re-initiated. The only impacts attributed to areas considered for exclusion are those resulting from the renewal of the Barton Springs Pool HCP in Unit 1 for the Austin blind salamander.

170. The administrative consultation costs associated with these re-initiations are presented in Exhibit 4-10. Overall the present value of the incremental impacts to habitat and species management activities are estimated to be \$550,000, or \$45,000 on an annualized basis, assuming a seven percent discount rate.

EXHIBIT 4-9. RE-INITIATIONS OF SECTION 7 CONSULTATION FOR EXISTING HABITAT CONSERVATION PLANS

EXISTING HABITAT CONSERVATION PLAN	BENEFITTING SPECIES	ASSOCIATED UNITS
Balcones Canyonlands Preserve	Jollyville Plateau salamander	8, 9, 13, 14, 16, 17, 18, 19, 20, 21
Barton Creek	Austin blind salamander	1
Barton Springs Pool	Austin blind salamander	1
Bee Cave Oaks	Austin blind salamander	1
Concordia	Jollyville Plateau salamander	18
Fleur	Jollyville Plateau salamander	3, 6
GDF	Jollyville Plateau salamander	3, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 33
Lakeline Mall HCP	Jollyville Plateau salamander	3
Ribelin Ranch	Jollyville Plateau salamander	17
Russell Park Estates	Georgetown salamander	5
Shadow Canyon	Georgetown salamander	13
Silverado	Jollyville Plateau salamander	3, 6
Williamson County Regional HCP	Georgetown salamander	1-14
Source: 2012 Proposed Rule, 77 FR 50768 - 50854; and U.S. Fish and Wildlife Service, Biologist, Austin Ecological Services Field Office. Email communication on December 18, 2012.		

EXHIBIT 4-10. FORECAST INCREMENTAL IMPACTS TO HABITAT AND SPECIES MANAGEMENT ACTIVITIES BY UNIT (2012\$, DISCOUNTED AT SEVEN PERCENT)

UNIT	PRESENT VALUE INCREMENTAL IMPACT	ANNUALIZED INCREMENTAL IMPACT
AREAS PROPOSED FOR DESIGNATION		
AUSTIN BLIND SALAMANDER		
1	\$84,000	\$7,000
<i>Subtotal</i>	\$84,000	\$7,000
JOLLYVILLE PLATEAU SALAMANDER		
3	\$86,000	\$7,100
6	\$42,000	\$3,500
8	\$6,100	\$510
9	\$6,100	\$510
10	\$1,900	\$160
11	\$1,900	\$160
12	\$1,900	\$160
13	\$6,100	\$510
14	\$6,100	\$510
15	\$1,900	\$160
16	\$6,100	\$510
17	\$48,000	\$4,000
18	\$48,000	\$4,000
19	\$6,100	\$510
20	\$6,100	\$510
21	\$6,100	\$510
22	\$1,900	\$160
24	\$1,900	\$160
25	\$1,900	\$160
26	\$1,900	\$160
27	\$1,900	\$160
28	\$1,900	\$160
33	\$1,900	\$160
<i>Subtotal</i>	\$290,000	\$24,000
GEORGETOWN SALAMANDER		
1	\$3,000	\$250
2	\$3,000	\$250
3	\$3,000	\$250

UNIT	PRESENT VALUE INCREMENTAL IMPACT	ANNUALIZED INCREMENTAL IMPACT
4	\$3,000	\$250
5	\$45,000	\$3,700
6	\$3,000	\$250
7	\$3,000	\$250
8	\$3,000	\$250
9	\$3,000	\$250
10	\$3,000	\$250
11	\$3,000	\$250
12	\$3,000	\$250
13	\$45,000	\$3,700
14	\$3,000	\$250
<i>Subtotal</i>	<i>\$130,000</i>	<i>\$10,000</i>
TOTAL	\$500,000	\$42,000
AREAS CONSIDERED FOR EXCLUSION		
AUSTIN BLIND SALAMANDER		
1	\$42,000	\$3,500
<i>Subtotal</i>	<i>\$42,000</i>	<i>\$3,500</i>
TOTAL	\$42,000	\$3,500
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

4.8 KEY ASSUMPTIONS

171. Exhibit 4-11 describes some of the key assumptions used in this analysis and the extent to which they may lead to under- or over-estimates of the potential incremental impacts of the proposed revised critical habitat designation.

EXHIBIT 4-11. KEY UNCERTAINTIES ASSOCIATED WITH THE ESTIMATED INCREMENTAL IMPACTS OF CRITICAL HABITAT DESIGNATION FOR THE SALAMANDERS

ASSUMPTION/ SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
<p>The Service will not request additional project modifications to address adverse modification beyond what is requested to avoid jeopardy, except in some limited instances that cannot be predicted at this time.</p>	<p>May underestimate incremental impacts.</p>	<p>Possibly major. To the extent that the Service requests additional project modifications to avoid adverse modification, additional incremental impacts may be incurred with each future section 7 consultation.</p>
DEVELOPMENT ACTIVITIES		
<p>All future development projects within the proposed critical habitat study area will be subject to a Federal nexus and therefore section 7 consultation regarding the salamanders.</p>	<p>Likely leads to an overestimate of incremental impacts.</p>	<p>Potentially major. Whether an Army Corps permit will be necessary for development depends upon the amount of water and wetlands in a project area. It is likely that less than 100 percent of future development projects will require such a permit and in these cases consultation would not occur.</p>
<p>The average county population density used to calculate the projected acres of development is applicable to all areas within the county.</p>	<p>May overestimate incremental impacts.</p>	<p>Potentially major. Given the proximity of the study to several cities, including Austin, population density within the study area may be higher than the average for Travis and Williamson Counties. If the population density is higher than the average for the county fewer acres of development will be necessary to accommodate the growing population.</p>
<p>Average development project size of 7.16 acres.</p>	<p>Unknown. May overestimate or underestimate incremental impacts.</p>	<p>Probably minor. It is difficult to determine the average development project size. The variance of the actual average project size from the estimate applied in this analysis could have an effect on the estimated incremental impacts, with the scale of the effect depending upon how much the actual project size varies.</p>
<p>Development projects are spread evenly over 23-year period of this analysis.</p>	<p>Unknown. May overestimate or underestimate incremental impacts.</p>	<p>Probably minor. The timing of development affects the present value costs through the discount rate applied. A more near-term build-out of the study area would lead the analysis to underestimate the incremental impacts, while a longer timeframe on build-out of the study area would lead the analysis to overestimate incremental impacts. The significance of this over- or underestimate depends upon how uneven the pace of development is.</p>

ASSUMPTION/ SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
WATER MANAGEMENT ACTIVITIES		
New dam construction will not occur over the next 23 years.	May underestimate incremental impacts.	Minor. This assumption affects only the estimated administrative consultation costs. Land managers indicated that it is difficult to predict construction projects over long time periods; however, no planned projects currently exist.
Routine dam operations and maintenance will not require Corps permits beyond existing Regional General Permits.	May underestimate incremental impacts.	Minor. This assumption affects only the estimated administrative consultation costs. To the extent that routine operations and maintenance require Corps permits, these activities may undergo section 7 consultation with the Service. Land managers indicate that this has historically not been required.
The North San Gabriel Dam at Lake Georgetown will not undertake additional construction activities during the next 23 years.	May underestimate incremental impacts.	Minor. This assumption affects only the estimated administrative consultation costs. The lake manager indicated that it is difficult to predict construction projects over long time periods; however, no planned projects currently exist.
LIVESTOCK GRAZING		
Future legislation is unlikely to allocate NRCS funding to the study area.	May underestimate incremental impacts.	Minor. This assumption affects only the estimated administrative consultation costs. The NRCS does not typically consult with the Service on individual projects. As a result, any future incremental impacts are likely to be minor.
TRANSPORTATION ACTIVITIES		
The SH 45 Expansion, Anderson Mill Road Reconstruction, and US 79 Bus Lane projects will receive Federal funding.	May overestimate incremental impacts.	Minor. This assumption affects only the estimated administrative consultation costs. If these projects do not receive Federal funding, section 7 consultation may not be necessary.
The IH-35 project will have a Federal nexus because it occurs on an interstate highway.	May overestimate incremental impacts.	Minor. This assumption affects only the estimated administrative consultation costs. If the project ends up not having a Federal nexus, section 7 consultation may not be necessary.
All transportation projects that will occur in the analytic time frame are included in the STIPs.	May underestimate incremental impacts.	Minor. This assumption affects only the estimated administrative consultation costs. There is the possibility that additional projects with a Federal nexus will be planned in the future that are not included in the existing STIPs.

ASSUMPTION/ SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
SURFACE MINING ACTIVITIES		
<p>The historical rate of mining activity reflects the future rate of mining activity. Additionally, future mining projects will occur in the same geographic areas as they have in the past.</p>	<p>Unknown. May overestimate or underestimate incremental impacts.</p>	<p>Minor. This assumption affects only the estimated administrative consultation costs. Forecast mining activities are based on the locations of existing Corps permits. Quarries known to occur in other areas are not represented in Corps records; as a result, it is unlikely that the Corps would have jurisdiction over future activities in these areas.</p>
HABITAT AND SPECIES MANAGEMENT		
<p>The Buttercup Creek HCP, Four Points HCP, and Grandview Hills HCP will not require re-initiation of section 7 consultation following the designation of critical habitat</p>	<p>May underestimate incremental impacts.</p>	<p>Minor. This assumption affects only the estimated administrative consultation costs. Because these plans already address the Jollyville Plateau salamander, re-initiation of these consultations would likely require minimal administrative effort.</p>
<p>Renewal of the Barton Springs Pool HCP and the addition of the Austin blind salamander as a covered species will not be finalized before the publication of the Final Rule.</p>	<p>May overestimate incremental impacts.</p>	<p>Minor. This assumption affects only the estimated administrative consultation costs. If this plan is finalized before the publication of the Final Rule then these minor administrative costs will be borne prior to the analytic time frame of this analysis.</p>
<p>All other existing HCPs that provide some benefit to the salamanders will require programmatic re-initiation of section 7 consultation in 2013.</p>	<p>May overestimate incremental impacts.</p>	<p>Minor. This assumption affects only the estimated administrative consultation costs. This analysis conservatively assumes that each re-initiation of section 7 consultation will incur costs at a programmatic level. To the extent that some plans may not require re-initiation, or may require less administrative effort, this assumption may overestimate incremental impacts.</p>

CHAPTER 5 | ECONOMIC BENEFITS OF CRITICAL HABITAT DESIGNATION FOR THE SALAMANDERS

172. As discussed in the previous chapters, this analysis does not anticipate that the designation of critical habitat will result in additional conservation for the salamanders, except in limited instances that the Service is unable to predict at this time. As a result, no changes in economic activity or land or water management are expected to result from critical habitat designation. Absent changes in land or water management, incremental economic benefits to the salamanders are likely to be minimal. The information in this section is provided to offer context for the analysis.
173. The primary intended benefit of critical habitat is to support the conservation of threatened and endangered species, such as the salamanders. Thus, attempts to develop monetary estimates of the benefits of this proposed critical habitat designation would focus on the public's willingness to pay to achieve the conservation benefits to salamanders resulting from this designation. The published economics literature provides multiple examples of species and habitat valuation studies.¹⁴⁴ No studies were identified, however, that evaluated conservation of any of the four Texas salamander species.
174. Quantification and monetization of species conservation benefits requires information on the incremental change in the probability of salamander conservation that is expected to result from the designation. In this case, we refer to the change in conservation probability that is distinct and separate from the change in conservation probability associated with the listing (i.e., the change that results from the specific conservation efforts that would not be undertaken absent the designation). As described in this report, modifications to future projects are unlikely beyond the baseline given the extensive baseline protections already provided to the species and the characteristics of the specific projects projected to occur over the 23-year timeframe of the analysis.
175. As a result of actions taken to preserve endangered and threatened species, such as habitat management, various other benefits may accrue to the public. Species conservation efforts may result in improved environmental quality, which in turn may have collateral

¹⁴⁴ See, for example: Giraud, Kelly, Branka Turcin, John Loomis, and Joseph Cooper. 2002. Economic Benefit of the Protection Program for the Stellar Sea Lion. *Marine Policy* 26: 451-458; Jakobsson, Kristin M. and Andrew K. Dragun. 2001. The Worth of a Possum: Valuing Species with the Contingent Valuation Method. *Environmental and Resource Economics* 19:211-227; Kotchen, Matthew J. and Stephen D. Reiling. 2000. Environmental Attitudes, Motivations, and Contingent Valuation of Nonuse Values: A Case Study Involving Endangered Species. *Ecological Economics* 32: 93-107; Loomis, John and Earl Ekstrand. 1997. Economic Benefits of Critical Habitat for the Mexican Spotted Owl: A Scope Test Using a Multiple-Bounded Contingent Valuation Survey. *Journal of Agricultural and Resource Economics* 22(2): 356-366; Richardson, Leslie and John Loomis. 2009. The Total Economic Value of Threatened, Endangered and Rare Species: An Updated Meta-Analysis. *Ecological Economics* 68: 1535-1548; Stanley, Denise L. 2005. Local Perception of Public Goods: Recent Assessments of Willingness-to-Pay for Endangered Species. *Contemporary Economic Policy* 23(2): 165-179.

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 result from modifications to projects, or may be collateral to such actions. For example, critical habitat designation may change water quality standards in a habitat area. This in turn may generate improvements in human or ecological health. In the case of critical habitat designation for the salamanders, however, changes in species and habitat conservation efforts are not expected, except in limited instances that the Service is unable to predict at this time. Ancillary benefits are therefore unlikely given that changes in behavior to protect such resources are not anticipated to result from the designation.

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APPENDIX A | SMALL BUSINESS AND ENERGY IMPACTS ANALYSES

176. This appendix considers the extent to which incremental impacts from 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 Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996. The energy analysis in Section A.2 is conducted pursuant to Executive Order No. 13211.
177. 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.

A.1 SBREFA ANALYSIS

178. 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 as defined by the RFA).¹⁴⁵ No initial regulatory flexibility analysis is required if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the RFA to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have significant economic impact on a substantial number of small entities.
179. In the Proposed Rule, the Service states that "...only Federal action agencies will be directly regulated by this designation. Therefore, because Federal agencies are not small entities, the Service may certify that the proposed critical habitat rule will not have a significant economic impact on a substantial number of small entities."¹⁴⁶ The Services goes on to acknowledge that "in some cases, third-party proponents of the action subject to permitting or funding may participate in section 7 consultation, and thus may be indirectly affected."¹⁴⁷ This analysis is meant to assess the indirect impacts to third-party proponents in order to ensure a more complete examination of the incremental effects of this Proposed Rule in the context of the RFA.

¹⁴⁵ 5 U.S.C. § 601 et seq.

¹⁴⁶ 2012 Proposed Rule. 77 FR 50826.

¹⁴⁷ *Ibid.*

A.1.1 BACKGROUND AND FRAMEWORK FOR THE THRESHOLD ANALYSIS

180. This analysis is intended to improve the Service's understanding of the potential effects of the Proposed Rule on small entities and to identify opportunities to minimize these impacts in the Final Rule. The Act requires the Service to designate critical habitat for threatened and endangered species to the maximum extent prudent and determinable. 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 the 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." However, the Secretary may not exclude an area if it "will result in the extinction of the species."
181. 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 Small Business Administration (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.
182. The courts have held that the RFA/SBREFEA 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 impacted within the definition of the RFA.¹⁴⁸

183. 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.¹⁴⁹ The basis of EPA's RFA/SBFEFA 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 impacted within the definition of the RFA.
184. 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.¹⁵⁰ "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."¹⁵¹
185. The regulatory mechanism through which critical habitat protections are realized 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 Federal agency. However, while it considers businesses that may be affected indirectly, it forecasts impacts only to those entities for which the regulatory link would not be measurably diluted.

¹⁴⁸ 773 F. 2d 327 (D.C. Cir. 1985).

¹⁴⁹ 175 F. 3d 1027, 1044 (D.C. Cir. 1999).

¹⁵⁰ Small Business Administration, Office of Advocacy. May 2003. *A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act*, pg. 20.

¹⁵¹ *Ibid.*, pg. 21.

A.1.2 RESULTS OF THE THRESHOLD ANALYSIS

186. This analysis focuses on small entities that may bear the incremental impacts of this rulemaking quantified in Chapter 4 of this economic analysis. Critical habitat designation for the salamanders is not expected to generate recommendations for additional conservation for the salamanders or their habitat. However, third parties that participate in section 7 consultation (the primary consulting parties being the Service and the Federal action agency) may be small entities. It is therefore possible that small entities bear incremental impacts associated with spending additional time considering critical habitat during section 7 consultation for the salamanders. Additional incremental costs of consultation that would be borne by the Federal action agency and the Service are not relevant to this screening analysis as these entities (Federal agencies) are not small.
187. As described in Chapter 4, incremental administrative costs are estimated for section 7 consultations to review projects associated with development, transportation, and mining activities, as well as re-initiated programmatic consultations for 13 existing conservation plans.¹⁵² The following activities are not expected to affect small entities as described below:
- **Transportation projects.** Impacts to transportation activities are expected to be incurred largely by Federal and State agencies. These entities are not considered small. Additionally, transportation projects may be managed by county departments. As of 2011, Bell County had a population of 315,000; Travis County had a population of 1.06 million; and Williamson County had a population of 443,000.¹⁵³ Therefore, none of these three counties are considered small governmental jurisdictions.
 - **Re-initiations of six existing conservation plans.** Re-initiations of consultations regarding the Balcones Canyonlands Preserve, Barton Creek HCP, Barton Springs Pool HCP, Concordia HCP, Lakeline Mall HCP, and Williamson County Regional HCP are not anticipated to involve small entities. The Balcones Canyonlands Preserve is associated with incidental take permits for the City of Austin and Travis County. The Barton Springs Pool HCP is also implemented by the City of Austin. Travis County has a population of 1.06 million, and the City of Austin has a population of 821,000; therefore, neither is considered a small governmental jurisdiction.¹⁵⁴ The Barton Creek HCP provides an incidental take permit to FM Properties, which was a subsidiary of Freeport-McMoRan and is now an independent entity, Stratus Properties, Inc. During 2011, Stratus reported

¹⁵² Water management activities, utilities projects, and grazing operations are also considered in the analysis. However, no section 7 consultations regarding these activities are forecast over the analysis period.

¹⁵³ US Census Bureau, *State and County Quickfacts*, accessed at: <http://quickfacts.census.gov/qfd/index.html> on November 19, 2012.

¹⁵⁴ US Census Bureau, *State and County Quickfacts*, accessed at: <http://quickfacts.census.gov/qfd/index.html> on November 19, 2012.

\$137 million in revenues.¹⁵⁵ To be considered a small entity as a real estate lessor, companies must earn less than \$25.5 million in annual revenues. Stratus is therefore not considered a small entity. The Concordia HCP is implemented by the Schlumberger Technology Corporation, which is part of the larger Schlumberger Limited, a company that provides information and management services to the oil and gas industry. Schlumberger reported revenues of \$37 billion in 2011.¹⁵⁶ To be considered a small entity in the oil and gas support section, revenues must be less than \$7.0 million per year. Schlumberger is therefore not a small entity. Additionally, the Lakeline Mall HCP issued an incidental take permit to Melvin Simon & Associates, a real estate company that became the Simon Property Group. The Simon Property Group reported annual revenues of \$4.31 billion for 2011.¹⁵⁷ Therefore, the Simon Properties Group is not a small entity. Finally, the Williamson County Regional HCP issued an incidental take permit to Williamson County, which has a population of 443,000 and is therefore not considered small.¹⁵⁸ Thus, the re-initiated section 7 consultations for these six plans are unlikely to affect small entities.

188. Incremental impacts associated with residential and commercial development, surface mining, and re-initiation of section 7 consultation for the remaining seven HCPs may be borne by small entities, and thus are the focus of this threshold analysis. Following RFA and SBREFA, the purpose of this threshold analysis is to determine if the critical habitat designation will have a significant economic impact on a substantial number of small entities. Importantly, the impacts of the rule must be *both* significant *and* substantial to prevent certification of the rule. If a substantial number of small entities are affected by the critical habitat designation, but the per-entity economic impact is not significant, the Service may certify. Likewise, if the per-entity economic impact is likely to be significant, but the number of affected entities is not substantial, the Service may also certify. To assist the Service in making this determination, this analysis presents information on both the number of small entities that may be affected and the magnitude of the expected impacts.

¹⁵⁵ Stratus Properties, Inc. Form 10-K. 2011.

¹⁵⁶ Schlumberger. About Schlumberger, accessed at <http://www.slb.com/about.aspx> on December 22, 2012.

¹⁵⁷ Simon Properties Group 2011 Form 10-K. Accessed at <http://phx.corporate-ir.net/phoenix.zhtml?c=113968&p=irol-IRHome&m=1&s=0> on November 19, 2012.

¹⁵⁸ US Census Bureau, *State and County Quickfacts*, accessed at: <http://quickfacts.census.gov/qfd/index.html> on November 19, 2012.

Residential and Commercial Development

189. Across the study area, 5,702 businesses are engaged in residential and commercial development.¹⁵⁹ Of these, 5,534 (97 percent) have annual revenues at or below the relevant small business thresholds for their respective NAICS codes, and thus are considered small (see Exhibit A-1).
190. To determine how many entities may be affected by the designation, we do a bounding analysis.
- On the low-end, we assume that a single developer bears all costs associated with all forecast consultations.
 - On the high-end, we assume that one small entity is affected per forecast consultation. This assumption may overestimate the number of affected entities because a small developer may own multiple projects that each undergo separate section 7 consultations.

The analysis forecasts a total of approximately 3,754 formal section 7 consultations. Therefore, on the low-end we assume that one small developer incurs all administrative costs associated with the proposed critical habitat designation for the salamanders and on the high-end we assume that 3,754 small developers are affected. These small developers represent 68 percent of small developers across the study area (see Exhibit A-2).

191. We assume that third parties incur approximately \$880 in administrative costs per consultation (see Exhibit 2-1). Assuming the average small entity has annual revenues of approximately \$4.6 million, the per-entity cost to participate in a consultation represents approximately 0.02 percent of annual revenues if each consultation is undertaken by a different small entity.¹⁶⁰ If all consultations occurring in a given year (approximately 163) are undertaken by the same developer, then the cost to participate in these consultations represents approximately 3.1 percent of annual revenues. The assumption that all costs accrue to one developer likely overstates the impact significantly; thus, we estimate incremental impacts to small developers of less than 3.1 percent of annual revenues.
192. For development activities, potential impacts to small development firms may also be overstated because much or all of the costs of salamander conservation efforts may ultimately be borne by current landowners. 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.

¹⁵⁹ To estimate the number of businesses in this industry, the analysis relies on five separate NAICS codes: New Single Family Housing Construction (NAICS 236115), New Multifamily Housing Construction (NAICS 236116), New Housing Operative Builders (236117), Land Subdivision (NAICS 237210), and Commercial and Institutional Building (NAICS 236220).

¹⁶⁰ Annual revenues are estimated by averaging revenue data for the five development NAICS codes obtained from Risk Management Association (RMA), *Annual Statement Studies: Financial Ratio Benchmarks 2011 to 2012*, 2011.

Surface Mining

193. Across the study area, eight businesses are engaged in limestone mining.¹⁶¹ Of these, four (50 percent) have annual revenues at or below the relevant small business thresholds for their NAICS code, and thus are considered small (see Exhibit A-1).
194. This analysis forecasts two formal section 7 consultations regarding limestone mining between 2013 and 2035. To determine how many small entities may be affected by the designation, this screening analysis assumes that one small entity is affected by each forecast consultation. This assumption may be conservative because one mining business may manage both forecast projects. However, for purposes of this analysis, we assume that two small entities incur incremental administrative costs as a result of critical habitat designation for the salamanders. These small entities represent 50 percent of small entities across the study area (see Exhibit A-2).
195. We assume that third parties incur approximately \$880 in administrative costs per consultation (see Exhibit 2-1). Assuming the average small entity has annual revenues of approximately \$10 million, the per-entity cost to participate in a consultation represents approximately less than 0.01 percent of annual revenues.¹⁶² Even in the event that a single small entity bears third-party costs for both consultations in a single year, the total impact represents less than 0.02 percent of annual revenues.

Habitat and Species Management

196. Overall, 13 section 7 consultations associated with HCPs will likely be re-initiated following the designation of critical habitat. As discussed above, six of these are associated with entities that are not small. The remaining seven may affect small entities. These HCPs are: Bee Cave Oaks HCP, Fleur HCP, GDF HCP, Ribelin Ranch HCP, Russell Park Estates HCP, Shadow Canyon HCP, and Silverado HCP. The permittees associated with these plans are as follows:
- Bee Cave Oaks HCP – Bee Cave Oaks Development, Inc.
 - Fleur HCP – Fleur Land, Ltd.
 - GDF HCP – GDF Realty Investments, Parke Properties I, L.P., and Parke Properties II, L.P.
 - Ribelin Ranch HCP – Ribelin Partners, Ltd.
 - Russell Park Estates – Rockledge, Inc.
 - Shadow Canyon – San Gabriel Harvard, L.P.
 - Silverado – CA 1100, Ltd.

¹⁶¹ To estimate the number of businesses in this industry, the analysis relies on five separate NAICS codes: New Single Family Housing Construction (NAICS 236115), New Multifamily Housing Construction (NAICS 236116), New Housing Operative Builders (236117), Land Subdivision (NAICS 237210), and Commercial and Institutional Building (NAICS 236220).

¹⁶² Annual revenues are estimated by averaging revenue data for the five development NAICS codes obtained from Risk Management Association (RMA), *Annual Statement Studies: Financial Ratio Benchmarks 2011 to 2012*, 2011.

197. We were unable to find revenue or employment information for these nine entities. As a result, we make the conservative assumption that all nine are small. Because each of these HCPs is associated with the construction and operation of new residential or commercial developments, we assume that the associated permittees are real estate lessors.
198. Across the study area, 3,828 businesses are real estate lessors for residential or commercial properties. Of these, 3,632 (95 percent) have annual revenues at or below the relevant small business thresholds for their NAICS code, and thus are considered small (see Exhibit A-1). The nine small entities that may be affected by the designation of critical habitat for the salamanders represent 0.25 percent of small entities across the study area (see Exhibit A-2).
199. This analysis forecasts one re-initiation of programmatic section 7 consultation for each HCP. Each of these re-initiations is expected to occur in 2013, following the designation of critical habitat. We assume that, as third parties to the consultations, the HCP permittees will incur approximately \$6,925 in administrative costs per consultation (see Exhibit 2-1). For the GDF HCP, which has three permittees, we assume that each permittee would incur an equal portion of third-party costs, or approximately \$2,300. Assuming the average small entity has annual revenues of approximately \$1.1 million, the per-entity cost to participate in a consultation represents less than one percent of annual revenues.¹⁶³ Exhibit A-3 presents these results.

¹⁶³ Annual revenues are estimated by averaging revenue data for the two real estate lessor NAICS codes obtained from Risk Management Association (RMA), *Annual Statement Studies: Financial Ratio Benchmarks 2011 to 2012*, 2011.

EXHIBIT A-1. OVERVIEW OF NUMBER OF SMALL ENTITIES WITHIN STUDY AREA

ACTIVITY	INDUSTRY (NAICS CODES)	SMALL ENTITY SIZE STANDARD	TOTAL NUMBER OF ENTITIES IN STUDY AREA ¹	NUMBER OF SMALL ENTITIES IN STUDY AREA ²
[A]	[B]	[C]	[D]	[E]
Residential and Commercial Development	New Single-Family Housing Construction (236115)	\$33.5 million	4,218	4,161
	New Multifamily Housing Construction (236116)		344	330
	New Housing Operative Builders (236117)		109	82
	Commercial and Institutional Building (236220)		531	481
	Land Subdivision (237210)	\$7.0 million	500	480
	Development Total			5,702
Surface Mining	Crushed and Broken Limestone Mining and Quarrying (212312)	500 employees	8	4
Habitat and Species Management	Lessors of Residential Buildings and Dwellings (531110)	\$25.0 million	1,378	1,210
	Lessors of Nonresidential Buildings (except Miniwarehouses) (531120)	\$25.5 million	2,450	2,422
	Habitat and Species Management Total			3,828

Source: Dialog search of File 516, Dun and Bradstreet, "Duns Market Identifier," on November 20, 2012, and December 22, 2012.

Notes:

1. The total number of entities in the study area was calculated by querying the Dun and Bradstreet database to identify the number of entities in the relevant NAICS codes for each industry (as shown in Column [B]) across the three counties with areas proposed as critical habitat.
2. The total number of small entities in the study area was calculated by querying the Dun and Bradstreet database to identify the number of entities falling under the small entity size standard for the relevant NAICS code as developed by the Small Business Administration (see Column [C]).

EXHIBIT A-2. PERCENTAGE OF SMALL ENTITIES AFFECTED BY CRITICAL HABITAT DESIGNATION

ACTIVITY	TYPE OF IMPACTS	NUMBER OF SMALL ENTITIES AFFECTED ¹	NUMBER OF SMALL ENTITIES IN STUDY AREA ²	PERCENTAGE OF SMALL ENTITIES AFFECTED
[A]	[B]	[C]	[D]	[E] = [C] / [D]
Residential and Commercial Development	Administrative costs only	1 to 3,754	5,534	0.02% to 68%
Surface Mining	Administrative costs only	1 to 2	4	25% to 50%
Habitat and Species Management	Administrative costs only	9	3,632	0.25%

Source: Dialog search of File 516, Dun and Bradstreet, "Duns Market Identifier," on November 20, 2012, and December 22, 2012.

Notes:

1. Bounding analysis applied to estimate the number of small entities affected. On the low-end one small entity will undertake all future consultations and on the high-end a different small entity will undertake each forecast section 7 consultation.
2. As shown in Column [E] of Exhibit A-1. For development and habitat and species management, it sums the number of small entities in each of the relevant NAICS codes.

EXHIBIT A-3. RFA/SBREF A THRESHOLD ANALYSIS RESULTS SUMMARY

ACTIVITY	TYPE OF IMPACT	AFFECTED ENTITIES	SMALL ENTITIES AFFECTED	% OF SMALL ENTITIES	ANNUALIZED IMPACTS EXCLUDING FEDERAL COSTS (7% DISCOUNT RATE)	IMPACTS PER ENTITY	ANNUAL REVENUES PER SMALL ENTITY	IMPACTS AS % OF ANNUAL REVENUES
Transportation	Admin. costs only	Federal, State, and County agencies	None	n/a	n/a	n/a	n/a	n/a
Habitat and Species Management	Admin. costs only	City of Austin; Travis and Williamson Counties; Simon Properties Group; Stratus Properties, Inc; Schlumberger, Ltd.; Lessors of Residential Buildings and Dwellings (531110); Lessors of Nonresidential Buildings (except Miniwarehouses) (531120)	9	0.25%	\$48,000	\$2,300 - \$6,900	\$1.1 million	0.21% - 0.63%
Residential and Commercial Development	Admin. costs only	New Single-Family Housing Construction (236115); New Multifamily Housing Construction (236116); New Housing Operative Builders (236117); Land Subdivision (237210); Commercial and Institutional Building (236220)	1 to 3,754	0.02% to 68%	\$140,000	\$880	\$4.6 million	0.02% to 3.1%
Surface Mining	Admin. costs only	Crushed and Broken Limestone Mining and Quarrying (212312)	1 to 2	25% to 50%	\$960	\$880	\$10 million	0.01% to 0.02%
<p>Note: This estimate excludes the additional incremental costs of consultation that would be borne by the Federal action agency and the Service. These costs are not relevant to this screening analysis as these entities (Federal agencies) are not small. Costs are estimated as described in Chapter 4.</p>								

A.2 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY

200. Pursuant to Executive Order 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.”¹⁶⁴
201. The Office of Management and Budget provides guidance for implementing this Executive Order, 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 (bbls);
 - 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.¹⁶⁵
202. As presented in Chapter 4, the designation of critical habitat for the four salamanders is not anticipated to result in any impacts to the energy or utilities industry.

¹⁶⁴ 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>.

¹⁶⁵ *Ibid.*

APPENDIX B | SENSITIVITY OF RESULTS TO DISCOUNT RATE

203. This appendix summarizes the costs of salamander conservation quantified in Chapter 4 of this report. It presents impacts assuming an alternative real discount rate of three percent (the main text of the report assumes a real discount rate of seven percent). These results are presented in Exhibits B-1 through B-5.
204. This appendix also summarizes undiscounted impacts by year for each economic 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.”¹⁶⁶ These results are presented in Exhibits B-6 through B-8.

EXHIBIT B-1. TOTAL ESTIMATED INCREMENTAL IMPACTS BY SUBUNIT (2013-2035, 2012\$, DISCOUNTED AT THREE PERCENT)

UNIT	PRESENT VALUE INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
AREAS PROPOSED FOR DESIGNATION		
AUSTIN BLIND SALAMANDER		
1	\$5,200,000	\$310,000
<i>Subtotal</i>	<i>\$5,200,000</i>	<i>\$310,000</i>
JOLLYVILLE PLATEAU SALAMANDER		
1	\$1,200,000	\$71,000
2	\$1,200,000	\$71,000
3	\$3,200,000	\$190,000
6	\$2,900,000	\$170,000
7	\$1,200,000	\$70,000
8	\$110,000	\$6,400
9	\$110,000	\$6,400
10	\$100,000	\$6,200

¹⁶⁶ 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.

UNIT	PRESENT VALUE INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
11	\$110,000	\$6,400
12	\$100,000	\$6,100
13	\$110,000	\$6,600
14	\$110,000	\$6,400
15	\$160,000	\$9,700
16	\$170,000	\$9,900
17	\$220,000	\$13,000
18	\$210,000	\$12,000
19	\$180,000	\$10,000
20	\$170,000	\$9,700
21	\$170,000	\$9,700
22	\$230,000	\$13,000
24	\$160,000	\$9,500
25	\$160,000	\$9,600
26	\$180,000	\$11,000
27	\$180,000	\$11,000
28	\$1,800,000	\$100,000
29	\$1,600,000	\$94,000
30	\$1,600,000	\$94,000
31	\$1,600,000	\$94,000
32	\$4,100,000	\$240,000
33	\$170,000	\$9,800
<i>Subtotal</i>	<i>\$23,000,000</i>	<i>\$1,400,000</i>
GEORGETOWN SALAMANDER		
1	\$410,000	\$24,000
2	\$1,400,000	\$84,000
3	\$1,400,000	\$83,000
4	\$550,000	\$33,000
5	\$580,000	\$35,000
6	\$540,000	\$32,000
7	\$560,000	\$33,000
8	\$540,000	\$32,000
9	\$340,000	\$20,000

UNIT	PRESENT VALUE INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
10	\$340,000	\$20,000
11	\$340,000	\$20,000
12	\$350,000	\$21,000
13	\$2,600,000	\$160,000
14	\$1,500,000	\$87,000
<i>Subtotal</i>	<i>\$11,000,000</i>	<i>\$680,000</i>
SALADO SALAMANDER		
1	\$5,500	\$320
2	\$5,500	\$320
3	\$5,500	\$320
4	\$20,000	\$1,200
<i>Subtotal</i>	<i>\$36,000</i>	<i>\$2,100</i>
TOTAL	\$40,000,000	\$2,400,000
AREAS CONSIDERED FOR EXCLUSION		
AUSTIN BLIND SALAMANDER		
1	\$43,000	\$2,500
<i>Subtotal</i>	<i>\$43,000</i>	<i>\$2,500</i>
JOLLYVILLE PLATEAU SALAMANDER		
19	\$17,000	\$1,000
<i>Subtotal</i>	<i>\$17,000</i>	<i>\$1,000</i>
TOTAL	\$60,000	\$3,500
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

EXHIBIT B-2. ESTIMATED INCREMENTAL IMPACTS TO DEVELOPMENT BY SUBUNIT (2012-2035, 2012\$, DISCOUNTED AT THREE PERCENT)

UNIT	PRESENT VALUE INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
AREAS PROPOSED FOR DESIGNATION		
AUSTIN BLIND SALAMANDER		
1	\$5,100,000	\$300,000
<i>Subtotal</i>	<i>\$5,100,000</i>	<i>\$300,000</i>
JOLLYVILLE PLATEAU SALAMANDER		
1	\$1,200,000	\$70,000
2	\$1,200,000	\$71,000
3	\$3,100,000	\$180,000
6	\$2,900,000	\$170,000
7	\$1,200,000	\$70,000
8	\$100,000	\$5,900
9	\$100,000	\$5,900
10	\$100,000	\$6,000
11	\$110,000	\$6,200
12	\$100,000	\$5,900
13	\$100,000	\$6,100
14	\$100,000	\$5,900
15	\$160,000	\$9,500
16	\$160,000	\$9,500
17	\$170,000	\$9,900
18	\$160,000	\$9,400
19	\$170,000	\$10,000
20	\$160,000	\$9,400
21	\$160,000	\$9,400
22	\$220,000	\$13,000
24	\$160,000	\$9,400
25	\$160,000	\$9,500
26	\$180,000	\$11,000
27	\$180,000	\$10,000
28	\$1,800,000	\$100,000

UNIT	PRESENT VALUE INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
29	\$1,600,000	\$93,000
30	\$1,600,000	\$93,000
31	\$1,600,000	\$93,000
32	\$4,100,000	\$240,000
33	\$160,000	\$9,600
<i>Subtotal</i>	<i>\$23,000,000</i>	<i>\$1,400,000</i>
GEORGETOWN SALAMANDER		
1	\$400,000	\$24,000
2	\$1,400,000	\$84,000
3	\$1,400,000	\$82,000
4	\$550,000	\$33,000
5	\$540,000	\$32,000
6	\$540,000	\$32,000
7	\$560,000	\$33,000
8	\$540,000	\$32,000
9	\$340,000	\$20,000
10	\$340,000	\$20,000
11	\$340,000	\$20,000
12	\$350,000	\$20,000
13	\$2,600,000	\$150,000
14	\$1,500,000	\$86,000
<i>Subtotal</i>	<i>\$11,000,000</i>	<i>\$670,000</i>
TOTAL	\$39,000,000	\$2,300,000
AREAS CONSIDERED FOR EXCLUSION		
AUSTIN BLIND SALAMANDER		
1	\$870	\$51
<i>Subtotal</i>	<i>\$870</i>	<i>\$51</i>
JOLLYVILLE PLATEAU SALAMANDER		
19	\$17,000	\$1,000
<i>Subtotal</i>	<i>\$17,000</i>	<i>\$1,000</i>
TOTAL	\$18,000	\$1,100
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

EXHIBIT B-3. ESTIMATED INCREMENTAL IMPACTS TO TRANSPORTATION BY SUBUNIT (2012-2035, 2012\$, DISCOUNTED AT THREE PERCENT)

UNIT	PRESENT VALUE INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
AREAS PROPOSED FOR DESIGNATION		
AUSTIN BLIND SALAMANDER		
1	\$2,900	\$170
<i>Subtotal</i>	\$2,900	\$170
JOLLYVILLE PLATEAU SALAMANDER		
1	\$3,700	\$220
2	\$3,700	\$220
3	\$9,100	\$530
6	\$7,100	\$420
7	\$3,700	\$220
8	\$1,900	\$110
9	\$1,900	\$110
10	\$1,900	\$110
11	\$1,900	\$110
12	\$1,900	\$110
13	\$1,900	\$110
14	\$1,900	\$110
15	\$460	\$27
16	\$460	\$27
17	\$460	\$27
18	\$460	\$27
19	\$460	\$27
20	\$460	\$27
21	\$460	\$27
22	\$460	\$27
24	\$460	\$27
25	\$460	\$27
26	\$460	\$27
27	\$460	\$27
28	\$460	\$27
29	\$9,800	\$580

UNIT	PRESENT VALUE INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
30	\$9,800	\$580
31	\$9,800	\$580
32	\$9,800	\$580
33	\$460	\$27
<i>Subtotal</i>	<i>\$86,000</i>	<i>\$5,100</i>
GEORGETOWN SALAMANDER		
1	\$4,800	\$280
2	\$4,800	\$280
3	\$4,800	\$280
<i>Subtotal</i>	<i>\$14,000</i>	<i>\$840</i>
SALADO SALAMANDER		
4	\$14,000	\$840
<i>Subtotal</i>	<i>\$14,000</i>	<i>\$840</i>
TOTAL	\$120,000	\$7,000
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

EXHIBIT B-4. ESTIMATED INCREMENTAL IMPACTS TO MINING BY SUBUNIT (2012-2035, 2012\$, DISCOUNTED AT THREE PERCENT)

UNIT	PRESENT VALUE INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
AREAS PROPOSED FOR DESIGNATION		
SALADO SALAMANDER		
1	\$5,500	\$320
2	\$5,500	\$320
3	\$5,500	\$320
4	\$5,500	\$320
<i>Subtotal</i>	<i>\$22,000</i>	<i>\$1,300</i>
TOTAL	\$22,000	\$1,300
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

EXHIBIT B-5. ESTIMATED INCREMENTAL IMPACTS TO HABITAT AND SPECIES MANAGEMENT BY SUBUNIT (2012-2035, 2012\$, DISCOUNTED AT THREE PERCENT)

UNIT	PRESENT VALUE INCREMENTAL IMPACT	ANNUALIZED INCREMENTAL IMPACT
AREAS PROPOSED FOR DESIGNATION		
AUSTIN BLIND SALAMANDER		
1	\$84,000	\$5,000
<i>Subtotal</i>	<i>\$84,000</i>	<i>\$5,000</i>
JOLLYVILLE PLATEAU SALAMANDER		
3	\$86,000	\$5,100
6	\$42,000	\$2,500
8	\$6,100	\$360
9	\$6,100	\$360
10	\$1,900	\$110
11	\$1,900	\$110
12	\$1,900	\$110
13	\$6,100	\$360
14	\$6,100	\$360
15	\$1,900	\$110
16	\$6,100	\$360
17	\$48,000	\$2,800
18	\$48,000	\$2,800
19	\$6,100	\$360
20	\$6,100	\$360
21	\$6,100	\$360
22	\$1,900	\$110
24	\$1,900	\$110
25	\$1,900	\$110
26	\$1,900	\$110
27	\$1,900	\$110
28	\$1,900	\$110
33	\$1,900	\$110
<i>Subtotal</i>	<i>\$290,000</i>	<i>\$17,000</i>
GEORGETOWN SALAMANDER		
1	\$3,000	\$180
2	\$3,000	\$180

UNIT	PRESENT VALUE INCREMENTAL IMPACT	ANNUALIZED INCREMENTAL IMPACT
3	\$3,000	\$180
4	\$3,000	\$180
5	\$45,000	\$2,700
6	\$3,000	\$180
7	\$3,000	\$180
8	\$3,000	\$180
9	\$3,000	\$180
10	\$3,000	\$180
11	\$3,000	\$180
12	\$3,000	\$180
13	\$45,000	\$2,700
14	\$3,000	\$180
<i>Subtotal</i>	<i>\$130,000</i>	<i>\$7,400</i>
TOTAL	\$550,000	\$32,000
AREAS CONSIDERED FOR EXCLUSION		
AUSTIN BLIND SALAMANDER		
1	\$42,000	\$2,500
<i>Subtotal</i>	<i>\$42,000</i>	<i>\$2,500</i>
TOTAL	\$42,000	\$2,500
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

EXHIBIT B-6. UNDISCOUNTED ESTIMATED INCREMENTAL IMPACTS TO DEVELOPMENT BY UNIT AND YEAR (2013-2035, 2012\$)

UNIT	YEAR(S)	COST	DESCRIPTION
AUSTIN BLIND SALAMANDER			
1	2013-2035	\$300,000	Annual forecasted development admin costs
JOLLYVILLE PLATEAU SALAMANDER			
1	2013-2035	\$70,000	Annual forecasted development admin costs
2	2013-2035	\$71,000	Annual forecasted development admin costs
3	2013-2035	\$180,000	Annual forecasted development admin costs
6	2013-2035	\$170,000	Annual forecasted development admin costs
7	2013-2035	\$70,000	Annual forecasted development admin costs
8	2013-2035	\$5,900	Annual forecasted development admin costs
9	2013-2035	\$5,900	Annual forecasted development admin costs

UNIT	YEAR(S)	COST	DESCRIPTION
10	2013-2035	\$6,000	Annual forecasted development admin costs
11	2013-2035	\$6,200	Annual forecasted development admin costs
12	2013-2035	\$5,900	Annual forecasted development admin costs
13	2013-2035	\$6,100	Annual forecasted development admin costs
14	2013-2035	\$5,900	Annual forecasted development admin costs
15	2013-2035	\$9,500	Annual forecasted development admin costs
16	2013-2035	\$9,500	Annual forecasted development admin costs
17	2013-2035	\$9,900	Annual forecasted development admin costs
18	2013-2035	\$9,400	Annual forecasted development admin costs
19	2013-2035	\$10,000	Annual forecasted development admin costs
20	2013-2035	\$9,400	Annual forecasted development admin costs
21	2013-2035	\$9,400	Annual forecasted development admin costs
22	2013-2035	\$13,000	Annual forecasted development admin costs
24	2013-2035	\$9,400	Annual forecasted development admin costs
25	2013-2035	\$9,500	Annual forecasted development admin costs
26	2013-2035	\$11,000	Annual forecasted development admin costs
27	2013-2035	\$10,000	Annual forecasted development admin costs
28	2013-2035	\$100,000	Annual forecasted development admin costs
29	2013-2035	\$93,000	Annual forecasted development admin costs
30	2013-2035	\$93,000	Annual forecasted development admin costs
31	2013-2035	\$93,000	Annual forecasted development admin costs
32	2013-2035	\$240,000	Annual forecasted development admin costs
33	2013-2035	\$9,600	Annual forecasted development admin costs
GEORGETOWN SALAMANDER			
1	2013-2035	\$24,000	Annual forecasted development admin costs
2	2013-2035	\$84,000	Annual forecasted development admin costs
3	2013-2035	\$82,000	Annual forecasted development admin costs
4	2013-2035	\$33,000	Annual forecasted development admin costs
5	2013-2035	\$32,000	Annual forecasted development admin costs
6	2013-2035	\$32,000	Annual forecasted development admin costs
7	2013-2035	\$33,000	Annual forecasted development admin costs
8	2013-2035	\$32,000	Annual forecasted development admin costs
9	2013-2035	\$20,000	Annual forecasted development admin costs
10	2013-2035	\$20,000	Annual forecasted development admin costs
11	2013-2035	\$20,000	Annual forecasted development admin costs
12	2013-2035	\$20,000	Annual forecasted development admin costs

UNIT	YEAR(S)	COST	DESCRIPTION
13	2013-2035	\$150,000	Annual forecasted development admin costs
14	2013-2035	\$86,000	Annual forecasted development admin costs
AREAS CONSIDERED FOR EXCLUSION			
AUSTIN BLIND SALAMANDER			
1	2013-2035	\$51	Annual forecasted development admin costs
JOLLYVILLE PLATEAU SALAMANDER			
19	2013-2035	\$1,000	Annual forecasted development admin costs

EXHIBIT B-7. UNDISCOUNTED ESTIMATED INCREMENTAL IMPACTS TO TRANSPORTATION BY UNIT AND YEAR (2013-2035, 2012\$)

UNIT	YEAR(S)	COST	DESCRIPTION
AUSTIN BLIND SALAMANDER			
1	2013	\$2,900	Mopac Expressway project admin costs
JOLLYVILLE PLATEAU SALAMANDER			
1	2020	\$570	SH 45 expansion admin costs
1	2026	\$4,800	US 79 bus lane admin costs
2	2020	\$570	SH 45 expansion admin costs
2	2026	\$4,800	US 79 bus lane admin costs
3	2013	\$7,100	RM 2243 expansion admin costs
3	2020	\$570	SH 45 expansion admin costs
3	2020	\$1,800	FM 2769 reconstruction admin costs
6	2013	\$7,100	RM 2243 expansion admin costs
7	2020	\$570	SH 45 expansion admin costs
7	2026	\$4,800	US 79 bus lane admin costs
8	2020	\$570	SH 45 expansion admin costs
8	2020	\$1,800	FM 2769 reconstruction admin costs
9	2020	\$570	SH 45 expansion admin costs
9	2020	\$1,800	FM 2769 reconstruction admin costs
10	2020	\$570	SH 45 expansion admin costs
10	2020	\$1,800	FM 2769 reconstruction admin costs
11	2020	\$570	SH 45 expansion admin costs
11	2020	\$1,800	FM 2769 reconstruction admin costs
12	2020	\$570	SH 45 expansion admin costs
12	2020	\$1,800	FM 2769 reconstruction admin costs
13	2020	\$570	SH 45 expansion admin costs

UNIT	YEAR(S)	COST	DESCRIPTION
13	2020	\$1,800	FM 2769 reconstruction admin costs
14	2020	\$570	SH 45 expansion admin costs
14	2020	\$1,800	FM 2769 reconstruction admin costs
15	2020	\$570	SH 45 expansion admin costs
16	2020	\$570	SH 45 expansion admin costs
17	2020	\$570	SH 45 expansion admin costs
18	2020	\$570	SH 45 expansion admin costs
19	2020	\$570	SH 45 expansion admin costs
20	2020	\$570	SH 45 expansion admin costs
21	2020	\$570	SH 45 expansion admin costs
22	2020	\$570	SH 45 expansion admin costs
24	2020	\$570	SH 45 expansion admin costs
25	2020	\$570	SH 45 expansion admin costs
26	2020	\$570	SH 45 expansion admin costs
27	2020	\$570	SH 45 expansion admin costs
28	2020	\$570	SH 45 expansion admin costs
29	2013	\$2,900	Mopac Expressway project admin costs
29	2013	\$3,600	Manor Expressway project admin costs
29	2015	\$3,600	Bergstrom Expressway project admin costs
30	2013	\$2,900	Mopac Expressway project admin costs
30	2013	\$3,600	Manor Expressway project admin costs
30	2015	\$3,600	Bergstrom Expressway project admin costs
31	2013	\$2,900	Mopac Expressway project admin costs
31	2013	\$3,600	Manor Expressway project admin costs
31	2015	\$3,600	Bergstrom Expressway project admin costs
32	2013	\$2,900	Mopac Expressway project admin costs
32	2013	\$3,600	Manor Expressway project admin costs
32	2015	\$3,600	Bergstrom Expressway project admin costs
33	2020	\$570	SH 45 expansion admin costs
GEORGETOWN SALAMANDER			
1	2013	\$4,800	SH 195 expansion admin costs
2	2013	\$4,800	SH 195 expansion admin costs
3	2013	\$4,800	SH 195 expansion admin costs
SALADO SALAMANDER			
4	2013	\$14,000	IH 35 expansion admin costs

EXHIBIT B-8. UNDISCOUNTED ESTIMATED INCREMENTAL IMPACTS TO HABITAT AND SPECIES MANAGEMENT BY UNIT AND YEAR (2013-2035, 2012\$)

UNIT	YEAR(S)	COST	DESCRIPTION
AUSTIN BLIND SALAMANDER			
1	2013	\$84,000	Re-initiation of section 7 consultation for Barton Creek HCP and Bee Cave Oaks HCP admin costs
JOLLYVILLE PLATEAU SALAMANDER			
3	2013	\$86,000	Re-initiation of section 7 consultation for Fleur HCP, GDF HCP, Lakeline Mall HCP, and Silverado HCP admin costs
6	2013	\$42,000	Re-initiation of section 7 consultation for Balcones Canyonlands Preserve, Fleur HCP, and Silverado HCP admin costs
8	2013	\$6,100	Re-initiation of section 7 consultation for Balcones Canyonlands Preserve and GDF HCP admin costs
9	2013	\$6,100	Re-initiation of section 7 consultation for Balcones Canyonlands Preserve and GDF HCP admin costs
10	2013	\$1,900	Re-initiation of section 7 consultation for GDF HCP admin costs
11	2013	\$1,900	Re-initiation of section 7 consultation for GDF HCP admin costs
12	2013	\$1,900	Re-initiation of section 7 consultation for GDF HCP admin costs
13	2013	\$6,100	Re-initiation of section 7 consultation for Balcones Canyonlands Preserve and GDF HCP admin costs
14	2013	\$6,100	Re-initiation of section 7 consultation for Balcones Canyonlands Preserve and GDF HCP admin costs
15	2013	\$1,900	Re-initiation of section 7 consultation for GDF HCP admin costs
16	2013	\$6,100	Re-initiation of section 7 consultation for Balcones Canyonlands Preserve and GDF HCP admin costs
17	2013	\$48,000	Re-initiation of section 7 consultation for Balcones Canyonlands Preserve, GDF HCP, and Ribelin Ranch HCP admin costs
18	2013	\$48,000	Re-initiation of section 7 consultation for Balcones Canyonlands Preserve, Concordia HCP, and GDF HCP admin costs
19	2013	\$6,100	Re-initiation of section 7 consultation for Balcones Canyonlands Preserve and GDF HCP admin costs
20	2013	\$6,100	Re-initiation of section 7 consultation for Balcones Canyonlands Preserve and GDF HCP admin costs
21	2013	\$6,100	Re-initiation of section 7 consultation for Balcones Canyonlands Preserve and GDF HCP admin costs
22	2013	\$1,900	Re-initiation of section 7 consultation for GDF HCP admin costs
24	2013	\$1,900	Re-initiation of section 7 consultation for GDF HCP admin costs
25	2013	\$1,900	Re-initiation of section 7 consultation for GDF HCP admin costs
26	2013	\$1,900	Re-initiation of section 7 consultation for GDF HCP admin costs
27	2013	\$1,900	Re-initiation of section 7 consultation for GDF HCP admin costs
28	2013	\$1,900	Re-initiation of section 7 consultation for GDF HCP admin costs
33	2013	\$1,900	Re-initiation of section 7 consultation for GDF HCP admin costs
GEORGETOWN SALAMANDER			
1	2013	\$3,000	Re-initiation of section 7 consultation for Williamson County Regional HCP admin costs

UNIT	YEAR(S)	COST	DESCRIPTION
2	2013	\$3,000	Re-initiation of section 7 consultation for Williamson County Regional HCP admin costs
3	2013	\$3,000	Re-initiation of section 7 consultation for Williamson County Regional HCP admin costs
4	2013	\$3,000	Re-initiation of section 7 consultation for Williamson County Regional HCP admin costs
5	2013	\$45,000	Re-initiation of section 7 consultation for Williamson County Regional HCP and Russell Park Estates HCP admin costs
6	2013	\$3,000	Re-initiation of section 7 consultation for Williamson County Regional HCP admin costs
7	2013	\$3,000	Re-initiation of section 7 consultation for Williamson County Regional HCP admin costs
8	2013	\$3,000	Re-initiation of section 7 consultation for Williamson County Regional HCP admin costs
9	2013	\$3,000	Re-initiation of section 7 consultation for Williamson County Regional HCP admin costs
10	2013	\$3,000	Re-initiation of section 7 consultation for Williamson County Regional HCP admin costs
11	2013	\$3,000	Re-initiation of section 7 consultation for Williamson County Regional HCP admin costs
12	2013	\$3,000	Re-initiation of section 7 consultation for Williamson County Regional HCP admin costs
13	2013	\$45,000	Re-initiation of section 7 consultation for Williamson County Regional HCP and Shadow Canyon HCP admin costs
14	2013	\$3,000	Re-initiation of section 7 consultation for Williamson County Regional HCP admin costs
AREAS CONSIDERED FOR EXCLUSION			
AUSTIN BLIND SALAMANDER			
1	2013	\$42,000	Re-initiation of section 7 consultation for Barton Springs Pool HCP admin costs

EXHIBIT B-9. UNDISCOUNTED ESTIMATED INCREMENTAL IMPACTS TO MINING BY UNIT AND YEAR (2013-2035, 2012\$)

UNIT	YEAR(S)	COST	DESCRIPTION
SALADO SALAMANDER			
1	2013-2035	\$320	Admin costs of two forecasted future mining consultations distributed over Salado salamander units and time
2	2013-2035	\$320	Admin costs of two forecasted future mining consultations distributed over Salado salamander units and time
3	2013-2035	\$320	Admin costs of two forecasted future mining consultations distributed over Salado salamander units and time
4	2013-2035	\$320	Admin costs of two forecasted future mining consultations distributed over Salado salamander units and time

APPENDIX C | INCREMENTAL EFFECTS MEMORANDUM



United States Department of the Interior

FISH AND WILDLIFE SERVICE
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TO: Industrial Economics, Inc.

AUG 22 2012

FROM: ^{Acting} Field Supervisor, Austin Ecological Services Field Office

SUBJECT: Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Four Central Texas Salamanders

Introduction

This document provides information for an economic analysis of the proposed critical habitat designation for four central Texas salamander species – Austin blind salamander (*Eurycea waterlooensis*), Jollyville Plateau salamander (*Eurycea tonkawae*), Georgetown salamander (*Eurycea naufragia*) and Salado salamander (*Eurycea chisholmensis*).

Section 4(b)(2) of the Endangered Species Act (Act) requires the U.S. Fish and Wildlife Service (Service) to consider the economic, national security, and other impacts of designating a particular area as critical habitat. The Service may exclude an area from critical habitat if it determines that the benefits of exclusion outweigh the benefits of including the area as critical habitat, unless the exclusion will result in the extinction of the species. To support its weighing of the benefits of excluding versus including an area as critical habitat, the Service prepares an economic analysis for each proposed critical habitat rule describing and, where possible, estimating the economic impacts (costs and benefits) of the proposed designation.

Determining the economic impacts of critical habitat designation involves evaluating the "without critical habitat" baseline versus the "with critical habitat" scenario. Economic impacts of a critical habitat designation equal the difference, or the increment, between these two scenarios. Measured differences between the baseline (without critical habitat) and the designated critical habitat (with critical habitat) may include, but are not limited to, changes in land or resource use, environmental quality, or time and effort expended on administrative and other activities by Federal landowners or action agencies, and in some instances, State and local governments or private third parties where there is a Federal nexus. These are the "incremental effects" that serve as the basis for the economic analysis.

One of the important functions of this memorandum is to provide detailed information about the differences between actions required to avoid jeopardy, versus actions that may be required to avoid adverse modification. The information provided below is intended to identify the possible differences for the four central Texas salamanders under the different section 7 standards.

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Background

We are proposing to designate approximately 5,983 acres (ac) (2,440 hectares (ha)) of critical habitat in 52 units. These units are all occupied by one of the four central Texas salamander species. The proposed critical habitat designation includes lands owned or managed by State, County, City, and private entities. Parts of these lands are subject to residential and commercial development, recreational use, mining, livestock grazing, and transportation projects. The areas being proposed include both surface and subsurface critical habitat components. The surface critical habitat includes the spring outlets and outflow up to the high water line and 150 ft (50 m) of downstream habitat, but does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas); however, the subterranean aquifer may extend below such structures. The subsurface critical habitat includes underground features in a circle with a radius of 984 ft (300 m) around the springs.

Baseline Analysis (without Critical Habitat)

The following discussion describes the existing regulatory circumstances that are in effect or anticipated without critical habitat. In the baseline scenario, section 7 of the Endangered Species Act requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any of the four central Texas salamander species on the surface.

How is jeopardy defined and determined for these species?

“Jeopardize the continued existence of” means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). Jeopardy requires that both the survival and recovery in the wild be appreciably reduced.

Because of the nature of these species’ habitat, a number of sites known to be occupied by one of the four central Texas salamander species may be located along the same stream drainage. Some activities occurring within the watershed of that creek drainage could impact the quality of habitat and influence the survivability of salamanders at some or all of the sites within that drainage system. Therefore, loss of populations at several or all sites within a single creek drainage could result in some decline in the likelihood of species survival. How significant that loss is overall to the species will depend on such things as the total number, size, and distribution of occupied locations. When enough populations of an adequate size and distribution remain and are protected, then the probability of the species surviving is high. When a location is lost or reduced in size and quality to the point where species survival at that site is low and where that loss occurs in an area where remaining numbers, size, and distribution of protected locations is not enough to provide for recovery, then the action has jeopardized the listed species in the wild.

What types of project impacts could potentially result in jeopardy?

In the case of the four central Texas salamander species, we use habitat as a proxy for the number of species taken because it is not possible to determine the population size at a

particular location. It is difficult to survey for these species because they are small, elusive, and often retreat into underground conduits where they cannot be seen or collected. The concept of using habitat as a proxy for species numbers was upheld in *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service*, 378 F.3d 1059 (9th Cir. 2004). Actions that could potentially result in a jeopardy determination for any of the four central Texas salamanders are those that result in the loss of a cave or spring site or the significant reduction in water quality or quantity at a cave or spring site to the point where species survival at that location is low and where that loss occurs in an area where remaining numbers, size, and distribution of protected locations is not enough to provide for recovery. If this occurs, then the action may very well have jeopardized the species.

What types of project modifications are currently recommended or will likely be recommended by the Service to avoid jeopardy?

Because they are not yet listed under the Endangered Species Act of 1973, as amended, no consultations have been conducted that would have resulted in a determination of jeopardy for any of the four central Texas salamander species. If we encounter such a consultation in the future, we may recommend project modifications to reduce the effect of the proposed action to a level where it would not impact the species' numbers, reproduction, or distribution so that the likelihood of survival and recovery in the wild would not be appreciably reduced. Recommended modifications could include, but are not limited to, the following: (1) moving the project to another area, such as downstream from known salamander sites; (2) isolating construction or other proposed activities so that water quality is not impacted; (3) monitoring for salamanders on site while construction or other activities occur within or near surface habitat areas; (4) implementing erosion and surface runoff control mechanisms; and/or (5) establishing protected preserve lands to offset water quality impacts.

Federal agencies and other project proponents that are likely to consult with the Service under section 7 without Critical Habitat

Federal agencies and projects that would likely go through the section 7 consultation process without critical habitat include Federal Highway Administration for federally funded highway projects, the U.S. Army Corps of Engineers when they issue Section 404 permits for developments (including stream crossings) in wetland areas, and U.S. Fish and Wildlife Service when we consider issuing section 10(a)(1)(B) permit applications.

Service administrative effort for section 7 consultations without critical habitat

We estimate that without critical habitat, we would conduct approximately 43 informal and 3 formal consultations per year.

Conservation plans and regulatory mechanisms that provide protection to the species and its habitat without critical habitat designation

Balcones Canyonlands Preserve - The Balcones Canyonlands Preserve (BCP) is managed as mitigation lands by the City of Austin, Travis County, or others under the authority of an Endangered Species Act Section 10(a)(1)(B) permit and Habitat Conservation Plan for the protection of endangered birds and karst invertebrates within the Jollyville Plateau salamander's range. The permit that created the BCP did not include the Jollyville Plateau

salamander, nor does this species receive any specific protections under the BCP permit, such as mitigation to offset impacts from development. However, the BCP land management strategies provide strong protections for salamander habitats on lands within the preserve, which offer some water quality benefits to the Jollyville Plateau salamander in portions of the Bull Creek, Brushy Creek, Cypress Creek, and Long Hollow Creek drainages through preservation of open space. Water quality in salamander sites located within the BCP, however, is influenced by land use practices upstream and outside the BCP preserves.

Four Points HCP – TPG Four Points Land, L.P. implements an HCP for the golden-cheeked warbler, black-capped vireo, and several endangered karst invertebrate species on the 333-acre (ac) (135-hectare (ha)) Four Points Property, located approximately 11 miles (mi) (18 kilometers (km)) northwest of Austin near the intersection of RM 2222 and RM 620, Travis County, Texas). The HCP also covers the Jollyville Plateau salamander. Protection of this area is expected to contribute to water quality, and, therefore, the quality of Jollyville Plateau salamander habitat at three springs down-gradient of the preserve area. In addition, runoff from multi-family residential areas and the hotel will be routed to avoid drainages which contain springs known to support Jollyville Plateau salamanders.

Lakeline Mall HCP - Testudo Tube Cave is an area occupied by the Jollyville Plateau salamander. The area surrounding the cave is owned by the City of Austin as water quality protection land. The cave is also occupied by two endangered karst invertebrates (Tooth Cave ground beetle [*Rhadine persephone*] and Bee Creek Cave harvestman [*Texella reddelli*]). As part of the mitigation for the Lakeline Mall HCP, the cave must be protected and managed in perpetuity. These actions will provide some water quality benefit to the Jollyville Plateau salamander.

Buttercup Creek HCP - Illex Cave, Buttercup Creek Cave, and Flea Cave are located in Williamson County, Texas and are occupied by the Jollyville Plateau salamander. These caves are located in a preserve established as mitigation property under the Buttercup HCP. The HCP covers adverse impacts to an endangered karst invertebrate (Tooth Cave ground beetle). Although the Jollyville Plateau salamander is not covered under the permit, the protection afforded these caves by the HCP provides some water quality benefit for the species.

Williamson County Regional HCP - The Williamson County Conservation Foundation (Foundation) is a non-profit organization established by Williamson County in 2002. The Foundation is currently working to find ways to conserve endangered species and other unlisted species of concern in Williamson County, Texas. With the help of a Endangered Species Act section 6 grant, the Foundation developed a regional habitat conservation plan (HCP) to obtain a section 10(a)(1)(B) permit for incidental take of federally listed endangered species in Williamson County, Texas. This HCP became final in October 2008. Although the Georgetown salamander is not currently listed and is not a “covered” species, actions found in the HCP are expected to benefit the Georgetown salamander by lessening the potential for water quality degradation within the spring systems it inhabits. As part of this HCP, the Foundation is looking to set aside land that is beneficial to karst invertebrate species, but also provides water quality protection for the Georgetown salamander. For example, the Foundation has purchased an easement on the 64.4 ac (26.1 ha) Lyda tract (Cobbs Cavern) in Williamson County through the section 6 grant program. Although the

spring where salamanders are located was not included in the easement, a portion of the contributing watershed for this spring was included. For this reason, water quality benefits to the salamander are expected. In January 2008, the Foundation also purchased the 145 ac (58.6 ha) Twin Springs preserve area. This tract is one of the sites known to be occupied by Georgetown salamanders.

Barton Springs Pool HCP - The City of Austin is implementing an HCP to avoid, minimize, and mitigate incidental take of the Barton Springs salamander (*Eurycea sosorum*) resulting from the continued operation and maintenance of Barton Springs Pool and adjacent springs. Many of the provisions of the plan also benefit the Austin blind salamander, since it is known to occur within three of the four spring sites known to be occupied by the Barton Springs salamander. Such provisions include: (1) training lifeguard and maintenance staff to protect salamander habitat, (2) controlling erosion and preventing surface runoff from entering the springs, (3) ecological enhancement and restoration, (4) monthly monitoring of salamander numbers, (5) public outreach and education, and (6) establishment and maintenance of a captive breeding program which includes the Austin blind salamander.

Texas Commission on Environmental Quality - The Texas Commission on Environmental Quality (TCEQ) developed optional water quality measures that, if implemented, should provide protection from water quality related impacts to some cave or spring sites that may contain listed species. These measures are voluntary and are meant to streamline the compliance with the Act for development activities above the Edwards Aquifer. The measures do not apply to development projects that are within the Contributing Zone of the Edwards Aquifer and that disturb less than 5 ac (2 ha), or those that are not part of a larger development that may disturb 5 or more acres. The measures are expected to provide some conservation benefit; however, they are not mandatory and do not apply to all areas where all four central Texas salamander species occur. Because of the limited use of these measures, we anticipate they would have little effect on securing the survival or recovery of these salamander species.

Adverse Modification Analysis

The following discussion describes the regulatory circumstances that are anticipated with the proposed designation of critical habitat for the four central Texas salamander species. Once critical habitat is designated, section 7 of the Act also requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat.

How is adverse modification defined and determined for these species?

The Service is currently working to update the regulatory definition of adverse modification since it was invalidated by a prior court ruling, *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service*, 378 F.3d 1059 (9th Cir. 2004). In the meantime, we will rely on guidance provided by the Director's December 9, 2004, Memorandum, *Application of the "Destruction or Adverse Modification" Standard under Section 7(a)(2) of the Endangered Species Act*. The Director's memo explains that the conclusion for a section 7 analysis of a Federal action is to determine if the "critical habitat would remain functional (or retain the current ability for the primary constituent elements to be functionally established) to serve the intended conservation role for the species..." (p. 3).

Drawing from *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service*, Director's December 2004 memo, and *Butte Environmental Council v. U.S. Army Corps of Engineers et al.*, 620 F.3d 936 (9th Cir. 2010), we have developed the following working definition for adverse modification when considering the four central Texas salamander species. Adverse modification of critical habitat means an action that, directly or indirectly, adversely alters the primary constituent elements (PCEs) of the physical or biological features that are essential to the conservation of the species or habitat quality (or the ability of PCEs to be functionally established) such that the ability of the critical habitat unit to function and serve its conservation (recovery) role is appreciably reduced. Water quality within a site known to be occupied by one of the four central Texas salamander species can be influenced by activities occurring upstream within the same watershed. Therefore, for these salamander species, the role of each critical habitat unit depends on: (1) the quality of habitat within the unit (with consideration given to the amount of impervious cover within the watershed where that unit occurs) and its ability to contribute to recovery of the species; (2) the number of other units; and (3) the protected status of the other units (with consideration to the protection of the rest of the watershed upstream from a particular unit).

From section 3(3) of the Act the terms "conserve," "conserving," and "conservation" mean to use, and the use of, all methods and procedures necessary to bring any endangered species or threatened species to the point where the measures provided under the Act are no longer necessary. The holding in *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service*, states, "...the Act was enacted not merely to forestall the extinction of species (i.e., promote a species survival), but to allow a species to recover to the point where it may be delisted." Thus, designation of critical habitat helps ensure that proposed project actions will not result in the adverse modification of habitat to the point that the species potential to achieve recovery will be appreciably reduced.

What types of project impacts could we potentially call adverse modifications?

Regarding critical habitat for the four central Texas salamander species, we may call adverse modification when an action has an effect that would appreciably diminish the functionality of an area to meet recovery. Therefore, we might call adverse modification if the quality, quantity, or configuration of habitat is impacted to a point that would appreciably reduce its ability to meet recovery. An adverse modification analysis would take into account the role of the critical habitat based on the quality and distribution of other critical habitat areas that are already protected, in relation to habitat needed for the species' recovery. Taking into consideration habitat that is "already protected" is appropriate because only habitat that is protected is likely to serve its continued conservation role for the species.

Actions that may result in adverse modification of critical habitat may occur when the effects of the proposed action:

- (1) Would reduce the quality of the critical habitat unit, degrade the quality of the PCEs, or preclude the ability of the PCEs to be established, or
- (2) Where the given unit's role or ability to contribute to recovery or maintain the survival of the species is precluded by the action when taking into consideration the environmental baseline of protected critical habitat units (including their quality and distribution) and finding that they are insufficient to meet recovery without additional protected critical habitat.

What would we ask people to do to avoid adverse modification?

If we determine that an action adversely modifies critical habitat, recommended project modifications could include the following to reduce the effect of the action to critical habitat to a level that would not destroy or adversely modify it: (1) reduce the size or configuration of the proposed project to avoid, reduce, or eliminate the effects to critical habitat; (2) mitigate the effects to the species in critical habitat by increasing permanent protection within the same creek drainage or to another site within the same creek watershed; and/or (3) move the project so that it does not affect designated critical habitat.

What Federal agencies or project proponents are likely to consult with the Service under section 7 due to designation of critical habitat? What kinds of additional activities are likely to undergo consultation with critical habitat?

We expect that the same agencies and types of projects would go through the section 7 consultation process with or without critical habitat. We estimate that the same number of projects would likely undergo consultation with critical habitat as without.

How much administrative effort does or will the Service expend to address adverse modification in its section 7 consultations due to critical habitat being designated? Estimate the difference compared to baseline.

We expect an increase in administrative costs associated with the critical habitat designation because each consultation will take more time to complete due to the additional adverse modification analysis. Specifically, we estimate that it would take both a GS-12 and GS-9 biologist about 8 hours per week each to address adverse modification with critical habitat as compared to approximately 4 hours per week without critical habitat during the life of a consultation (up to 135 days). In addition, we expect more personnel time will be needed to address additional work associated with an increase in HCPs although this time may be reduced if a regional HCP is completed as discussed above.

Conclusion

What is the difference between jeopardy and adverse modification for the four central Texas salamanders?

A jeopardy analysis for any of the four central Texas salamander species would analyze the magnitude of a proposed project's impacts relative to the population(s) across the species' entire range, including areas inside and outside critical habitat. In contrast, an adverse modification analysis would focus on the effects of a proposed project's impacts to the physical features, PCEs, or other habitat characteristics determined by the Secretary to be essential for the conservation of the species in areas designated as critical habitat.

In addition, in an adverse modification analysis, we would analyze impacts to the capability of the critical habitat unit to maintain its conservation (recovery) role and function for the species. This analysis takes into account the effects of a direct or indirect alteration that appreciably diminishes the value of critical habitat for the survival or recovery of a listed species. In the case of these species, the following could result in an adverse modification

determination: (1) reduction in quality or quantity of surface flow and water discharging from natural spring outlets; (2) disruption of natural hydrologic regimes; (3) alteration or loss of rocky substrate with interstitial spaces that provides cover, shelter, or foraging habitat; (4) a decline or loss of aquatic invertebrates that provide food; and (5) loss of access to the subsurface water table. It is important to note that activities occurring outside of the areas designated as critical habitat could also diminish the value of critical habitat and will be included in the adverse modification analysis.

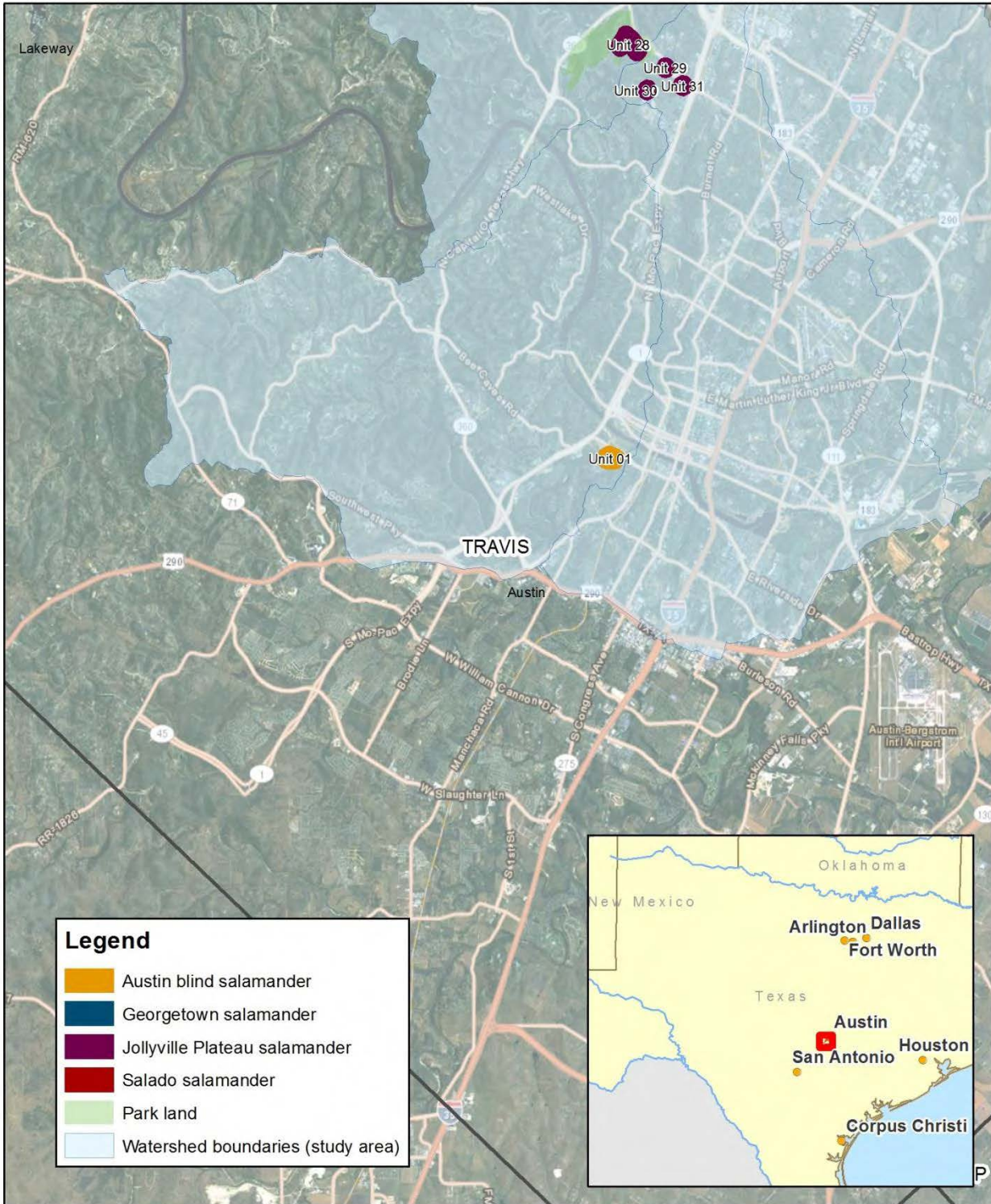
What types of actions might the Service recommend pursuant to a section 7 consultation to avoid destruction or adverse modification of critical habitat that are different than those for avoiding jeopardy?

The types of actions we might recommend to avoid jeopardy are similar to those we might recommend to avoid adverse modification, except that recommendations for adverse modification might include the following: (1) avoiding or reducing impacts to quality and quantity of water discharging from surface flow and natural spring outlets; (2) maintaining natural hydrologic regimes; (3) maintaining rocky substrate with interstitial spaces; (4) maintaining aquatic invertebrates for food; and/or (5) maintaining access to the subsurface water table.

Specific recommendations to avoid destruction or adverse modification of critical habitat include, but are not necessarily limited to, the following: (1) avoiding or reducing the amount of development within a particular watershed; (2) mitigating the effects to the species in critical habitat by increasing permanent protection within the same creek drainage or to another site within the same creek watershed; and/or (3) moving the project so that it does not affect designated critical habitat to offset these effects.

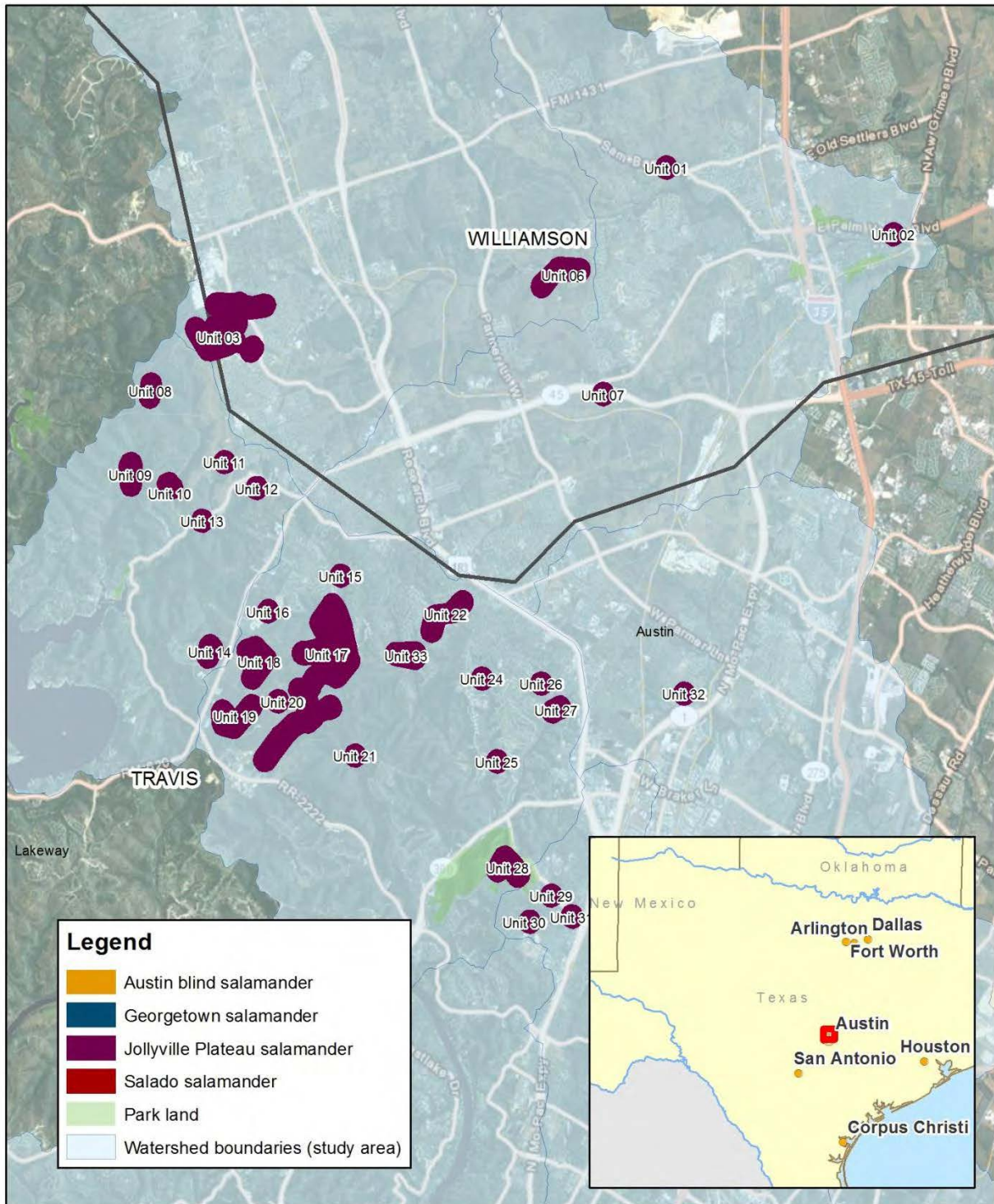
APPENDIX D | DETAILED MAPS OF PROPOSED CRITICAL HABITAT

EXHIBIT D-1. PROPOSED CRITICAL HABITAT FOR THE AUSTIN BLIND SALAMANDER



Sources:
 1. U.S. Fish and Wildlife Service
 2. Environmental Systems Research Institute, Inc. (ESRI)

EXHIBIT D-2. PROPOSED CRITICAL HABITAT FOR THE JOLLYVILLE PLATEAU SALAMANDER



Sources:
 1. U.S. Fish and Wildlife Service
 2. Environmental Systems Research Institute, Inc. (ESRI)

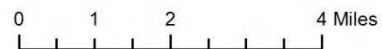
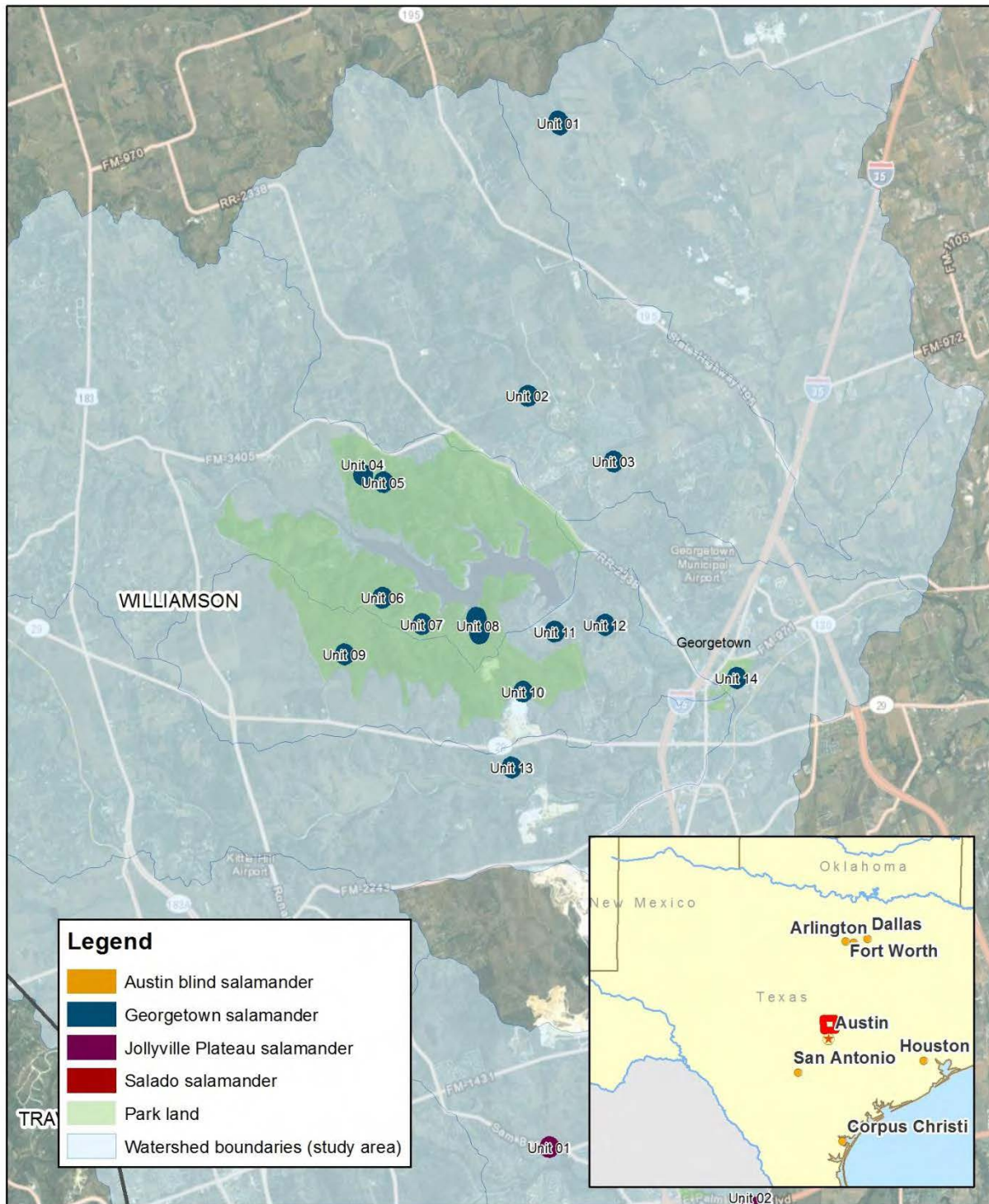


EXHIBIT D-3. PROPOSED CRITICAL HABITAT FOR THE GEORGETOWN SALAMANDER



Sources:
 1. U.S. Fish and Wildlife Service
 2. Environmental Systems Research Institute, Inc. (ESRI)

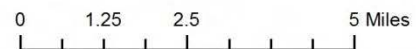
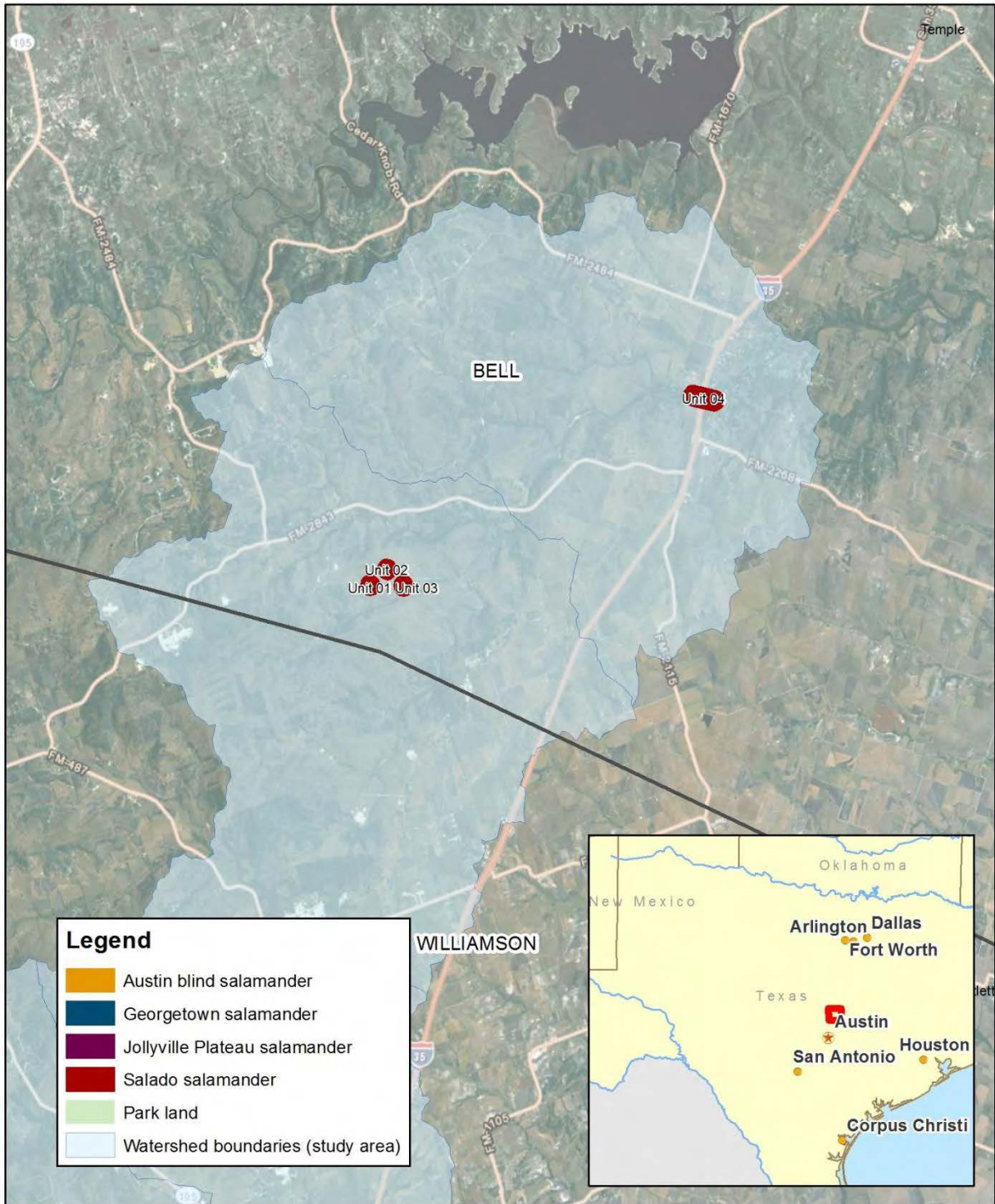


EXHIBIT D-4. PROPOSED CRITICAL HABITAT FOR THE SALADO SALAMANDER



Sources:
 1. U.S. Fish and Wildlife Service
 2. Environmental Systems Research Institute, Inc. (ESRI)

