



ECONOMIC ANALYSIS OF CRITICAL
HABITAT DESIGNATION FOR THE
CHIRICAHUA LEOPARD FROG

Final | March 19, 2012

A decorative horizontal bar spanning the width of the page. The left portion is a solid dark blue, and the right portion is a photograph of yellow wildflowers.A thin, curved yellow line that starts at the top right of the page and curves downwards towards the bottom right.

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LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|--------------|--|
| Act | Endangered Species Act |
| AGFD | Arizona Game and Fish Department |
| BANWR | Buenos Aires National Wildlife Refuge |
| CHD | critical habitat designation |
| CMED | Considerations for Making Effects Determinations |
| Corps | US Army Corps of Engineers |
| CWA | Clean Water Act |
| DOI | U.S. Department of the Interior |
| EPA | Environmental Protection Agency |
| ESA | Endangered Species Act |
| FERC | Federal Energy Regulatory Commission |
| FWS | Fish and Wildlife Service |
| HCP | Habitat Conservation Plan |
| IEc | Industrial Economics, Incorporated |
| Leopard frog | Chiricahua leopard frog (<i>Lithobates chiricahuensis</i>) |
| NAICS | North American Industry Classification System |
| OMB | U.S. Office of Management and Budget |
| PCEs | primary constituent elements |
| RFA | Regulatory Flexibility Act |
| SBREFA | Small Business Regulatory Enforcement Fairness Act |
| Service | U.S. Fish and Wildlife Service |
| SHA | Safe Harbor Agreement |

EXECUTIVE SUMMARY

1. The purpose of this report is to evaluate the potential economic impacts associated with the designation of critical habitat for the Chiricahua Leopard Frog (*Lithobates chiricahuensis*, hereafter: “leopard frog”). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service (Service).
2. The Service listed the leopard frog as threatened on June 13, 2002.¹ Included in the final rule was a special rule exempting operation and maintenance of livestock tanks on non-Federal lands from ESA section 9 take prohibitions.²
3. In a May 6, 2009 order from the Arizona District Court, the Secretary of the Interior was required to publish a critical habitat prudency determination for the leopard frog and, if found prudent, a proposed rule to designate critical habitat by December 8, 2010. The Service then requested a three-month extension to the court-ordered deadlines. As a result of this extension, new deadlines of March 8, 2011 for the proposed rule and March 8, 2012 for the final rule were established. The proposed critical habitat rule was published on March 15, 2011.³ The 2011 proposed rule is the subject of this analysis.
4. This analysis first describes existing plans and regulations that provide protection for the leopard frog and its habitat. For example, there are at least 11 management plans that address the leopard frog, including forest plans and Habitat Conservation Plans (HCPs). These are “baseline” protections accorded the leopard frog even absent the designation of critical habitat.
5. The discussion of the regulatory baseline provides context for the evaluation of economic impacts expected to result from critical habitat designation, which are the focus of this analysis. These “incremental” economic impacts are those that will occur as a result of designation of critical habitat for the leopard frog. 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

¹ 2002 Final Listing Rule, 67 FR 40790.

² 50 CFR 17.43(b).

³ 2011 Proposed Critical Habitat Rule, 76 FR 14126.

⁴ 16 U.S.C. §1533(b)(2).

OVERVIEW OF THE PROPOSED CRITICAL HABITAT

6. The 43 proposed units, located in Arizona and New Mexico, encompass lentic breeding habitat (e.g., ponds and livestock tanks) and lotic dispersal habitat (e.g., streams, river reaches, and ephemeral drainages) that the Service has deemed essential for the leopard frog's conservation. Federal lands comprise 59 percent of proposed units, private lands comprise 37 percent, and State lands the remaining four percent. The Service considers one unit, Carr Barn Pond (Unit 13), to be currently unoccupied.⁵ This unit represents less than one percent of the total proposed critical habitat designation (including the three additional units). Exhibit ES-1 summarizes land ownership for the 43 proposed units.

EXHIBIT ES-1. LANDOWNERSHIP WITHIN PROPOSED CRITICAL HABITAT BY UNIT

| UNIT | NAME | FEDERAL | STATE | PRIVATE | TOTAL | PERCENT OF TOTAL |
|------|--|---------|-------|---------|-------|------------------|
| 1 | Twin Tanks and Ox Frame Tank | 0 | 1.3 | 0.4 | 1.7 | 0.0% |
| 2 | Garcia Tank | 0.7 | 0 | 0 | 0.7 | 0.0% |
| 3 | Buenos Aires NWR Central Tanks | 1,720 | 0 | 0 | 1,720 | 15.0% |
| 4 | Bonita, Upper Turner, and Mojonera Tanks | 201 | 0 | 0 | 201 | 1.8% |
| 5 | Sycamore Canyon | 262 | 0 | 7 | 268 | 2.3% |
| 6 | Pena Blanca Lake and Spring and Associated Tanks | 202 | 0 | 0 | 202 | 1.8% |
| 7 | Florida Canyon | 4 | 0 | 0 | 4 | 0.0% |
| 8 | Eastern Slope of the Santa Rita Mountains | 172 | 0 | 14 | 186 | 1.6% |
| 9 | Las Cienegas National Conservation Area | 1,235 | 186 | 0 | 1,420 | 12.4% |
| 10 | Pasture 9 Tank | 0 | 0 | 0.5 | 0.5 | 0.0% |
| 11 | Scotia Canyon | 70 | 0 | 0 | 70 | 0.6% |
| 12 | Beatty's Guest Ranch | 0 | 0 | 10 | 10 | 0.1% |
| 13 | Carr Barn Bond | 0.6 | 0 | 0 | 0.6 | 0.0% |
| 14 | Ramsey and Brown Canyons | 58 | 0 | 65 | 123 | 1.1% |
| 15 | High Lonesome Well | 0 | 0 | 0.4 | 0.4 | 0.0% |
| 16 | Peloncillo Mountains | 366 | 0 | 289 | 655 | 5.7% |
| 17 | Cave Creek | 234 | 0 | 92 | 326 | 2.8% |
| 18 | Leslie Creek | 26 | 0 | 0 | 26 | 0.2% |
| 19 | Rosewood and North Tanks | 0 | 78 | 19 | 97 | 0.8% |
| 20 | Deer Creek | 17 | 69 | 34 | 120 | 1.0% |
| 21 | Oak Spring and Oak Creek | 27 | 0 | 0 | 27 | 0.2% |
| 22 | Dragoon Mountains | 74 | 0 | 0 | 74 | 0.6% |

⁵ When the Proposed Rule was published, Cave Creek (Unit 17) was also unoccupied. Since that time, however, leopard frogs have been released into this unit, so for purposes of this analysis, it is considered to be occupied.

| UNIT | NAME | FEDERAL | STATE | PRIVATE | TOTAL | PERCENT OF TOTAL |
|------|--|--------------|------------|--------------|---------------|------------------|
| 23 | Buckskin Hills | 232 | 0 | 0 | 232 | 2.0% |
| 24 | Crouch, Gentry, and Cherry Creeks, and Parallel Canyon | 334 | 64 | 6 | 404 | 3.5% |
| 25 | Ellison and Lewis Creeks | 83 | 0 | 15 | 99 | 0.9% |
| 26 | Concho Bill and Deer Creek | 17 | 0 | 0 | 17 | 0.1% |
| 27 | Campbell Blue and Coleman Creeks | 174 | 0 | 0 | 174 | 1.5% |
| 28 | Tularosa River | 335 | 0 | 1,575 | 1,910 | 16.7% |
| 29 | Deep Creek Divide Area | 408 | 0 | 102 | 510 | 4.4% |
| 30 | Main Diamond Creek | 14 | 0 | 40 | 54 | 0.5% |
| 31 | Beaver Creek | 132 | 0 | 25 | 157 | 1.4% |
| 32 | Left Prong of Dix Creek | 13 | 0 | 0 | 13 | 0.1% |
| 33 | Rattlesnake Pasture Tank and Associated Tanks | 59 | 0 | 0 | 59 | 0.5% |
| 34 | Coal Creek | 7 | 0 | 0 | 7 | 0.1% |
| 35 | Blue Creek | 24 | 0 | 12 | 37 | 0.3% |
| 36 | Seco Creek | 66 | 0 | 610 | 676 | 5.9% |
| 37 | Alamosa Warm Springs | 0.2 | 25 | 54 | 79 | 0.7% |
| 38 | Cuchillo Negro Warm Springs and Creek | 3 | 3 | 23 | 28 | 0.2% |
| 39 | Ash and Bolton Springs | 0 | 0 | 49 | 49 | 0.4% |
| 40 | Mimbres River | 0 | 0 | 1,097 | 1,097 | 9.6% |
| 41 | Kerr Canyon | 19 | 0 | 6 | 25 | 0.2% |
| 42 | West Fork Gila River | 177 | 0 | 0 | 177 | 1.5% |
| 43 | South Fork Palomas Creek | 23 | 0 | 106 | 129 | 1.1% |
| | Total | 6,790 | 426 | 4,251 | 11,466 | 100% |

Source: U.S. Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants; Endangered Status and Designation of Critical Habitat for the Chiricahua Leopard Frog; Proposed Rule. Published in the Federal Register on March 15, 2011, 76 FR 14139, Table 2.

- As discussed in the Proposed Rule, the Service is considering portions of ten critical habitat units for exclusion because it determined that existing conservation plans in place in these areas were sufficiently protective of leopard frog habitat. Exhibit ES-2 presents these units and lists the conservation plans associated with each unit.

EXHIBIT ES-2. AREAS CONSIDERED FOR EXCLUSION FROM CHIRICAHUA LEOPARD FROG CRITICAL HABITAT (IN ACRES)

| UNIT | AREA TO BE CONSIDERED FOR EXCLUSION | TOTAL UNIT AREA (ACRES) | AREA CONSIDERED FOR EXCLUSION (ACRES) | PERCENT CONSIDERED FOR EXCLUSION | ASSOCIATED CONSERVATION PLAN |
|---------------------------|-------------------------------------|-------------------------|---------------------------------------|----------------------------------|---|
| 10 | Pasture 9 Tank | 0.5 | 0.5 | 100% | The Service's Partners for Fish and Wildlife Program, Arizona Game and Fish Department (AGFD) Safe Harbor Agreement, Conservation Easements |
| 12 | Beatty's Guest Ranch | 10 | 10 | 100% | AGFD Safe Harbor Agreement, Ramsey Canyon Leopard Frog Conservation Plan |
| 14 | Ramsey Canyon Preserve | 123 | 16 | 13% | Conservation Easement, AGFD Safe Harbor Agreement, Ramsey Canyon Leopard Frog Conservation Plan |
| 16 | Canoncito Ranch | 655 | 289 | 44% | Malpai Borderlands Safe Harbor Agreement, Malpai Borderlands Habitat Conservation Plan, Conservation Easements |
| 17 | Southwest Research Station | 326 | 92 | 28% | The Service's Partners for Fish and Wildlife Program, AGFD Safe Harbor Agreement |
| 19 | Rosewood and North Tanks | 97 | 97 | 100% | Malpai Borderlands Safe Harbor Agreement, Malpai Borderlands Habitat Conservation Plan |
| 36 | Ladder Ranch | 676 | 610 | 90% | The Service's Partners for Fish and Wildlife Program |
| 38 | Ladder Ranch | 28 | 23 | 82% | The Service's Partners for Fish and Wildlife Program |
| 40 | Mimbres River Preserve | 1,097 | 510 | 46% | Conservation Easements |
| 43 | Ladder Ranch | 129 | 106 | 82% | The Service's Partners for Fish and Wildlife Program |
| Total (ten units): | | 3,142 | 1,754 | 56% | |
| Total (all units): | | 11,466 | 1,754 | 15% | |

Source: 2011 Proposed Critical Habitat Rule, 76 FR 14159.

8. The focus of this analysis is on the potential impacts of leopard frog conservation on certain economic activities. Review of the proposed rule, consultation history, and existing conservation plans identified the following economic activities as potential threats to the leopard frog and its habitat within the boundaries of proposed critical habitat.
- (1) **Livestock grazing:** Includes drying of stock tanks, potential disease transmission, alteration of breeding and dispersal habitat, and potential changes to water quality due to concentrated livestock use.

- (2) **Mining:** Includes mining operations and associated mining-related contaminants and runoff.
- (3) **Water diversion and management:** Includes groundwater pumping (lowering of the water table), agricultural development, and operations of dams and diversions.
- (4) **Residential and commercial development and transportation:** Includes sedimentation and runoff associated with construction, as well as stream channelization and loss of riparian or wetland vegetation.

9. In addition, the following threats to the leopard frog could potentially lead to incremental economic impacts through required project modifications:

- (1) **Fires and fire suppression activities:** Includes ash flow and fire retardants from fires and fire suppression activities.
- (2) **Non-native species introductions/disease:** Includes saltcedar control, stocking of nonnative fishes, bullfrogs, or crayfish, as well as chytridiomycosis (an infectious fungal disease).

KEY FINDINGS

10. No significant economic impacts are likely to result from the designation of critical habitat. Incremental costs are limited to administrative efforts of new and reinitiated consultations to consider adverse modification of critical habitat for the leopard frog. This result is attributed to the following key findings.

- **A significant level of baseline protection exists for the leopard frog,** addressing a broad range of habitat threats. At least 11 conservation plans as well as various Federal and state regulations currently provide protections for the leopard frog and its habitat.
- **Nearly all units have some level of conservation, with 59 percent of proposed critical habitat on federally-owned land and a number of conservation easements and safe harbor acts on privately owned land.** Portions of ten of the 43 proposed units, representing 15 percent of proposed critical habitat have what the Service believes to be adequate protection for the leopard frog.
- **The Service is unable to foresee a circumstance in which critical habitat would change the conservation efforts recommended for the leopard frog.** Because Action agencies already are aware of the presence of the leopard frog in occupied habitat, the Service does not expect that designating critical habitat will trigger any new section 7 consultations in these areas. Any conservation efforts that may result from section 7 consultation in occupied habitat would be considered baseline because, according to the Service, efforts to address potential jeopardy to the species are the same as those that would be recommended to address adverse modification of critical habitat. Specifically, the Service states that “it is unlikely that a future section 7 analysis would identify a difference between measures needed to avoid the destruction or adverse modification of

critical habitat from measures needed to avoid jeopardizing the continued existence of the species in areas of occupied habitat.”⁶ Furthermore, in the unoccupied habitat unit (Unit 13), the Service does not expect that section 7 consultations for adverse modification will require any project modifications.

- **No quantifiable economic benefits of critical habitat designation for the leopard frog.** This analysis does not anticipate that the designation of critical habitat will result in project modifications to avoid adverse modification of leopard frog habitat. As a result, no changes in economic activity or land management are expected to result from critical habitat designation. Because the extent to which designation of critical habitat for the leopard frog will provide habitat and species protection above baseline protections is unknown, quantitative estimation of incremental economic benefits is not feasible.

11. This analysis does foresee additional administrative costs associated with the designation of critical habitat. In total, incremental administrative efforts are estimated at \$1,280,000, or \$113,000 on an annualized basis (discounted at seven percent). Impacts are presented at both a three percent and seven percent discount rate in Exhibit ES-3 below.

EXHIBIT ES-3. ESTIMATED INCREMENTAL IMPACTS, BY HABITAT UNIT (2011\$)

| UNIT | DISCOUNTED AT 3% | | DISCOUNTED AT 7% | |
|------|------------------|------------|------------------|------------|
| | PRESENT VALUE | ANNUALIZED | PRESENT VALUE | ANNUALIZED |
| 1 | \$13,500 | \$879 | \$9,240 | \$815 |
| 2 | \$42,500 | \$2,770 | \$30,600 | \$2,700 |
| 3 | \$42,500 | \$2,770 | \$30,600 | \$2,700 |
| 4 | \$18,800 | \$1,230 | \$13,800 | \$1,220 |
| 5 | \$48,600 | \$3,170 | \$35,000 | \$3,090 |
| 6 | \$48,600 | \$3,170 | \$35,000 | \$3,090 |
| 7 | \$13,500 | \$883 | \$9,880 | \$872 |
| 8 | \$13,500 | \$883 | \$9,880 | \$872 |
| 9 | \$120,000 | \$7,840 | \$85,100 | \$7,510 |
| 10 | \$15,200 | \$993 | \$11,400 | \$1,000 |
| 11 | \$12,300 | \$799 | \$9,320 | \$822 |
| 12 | \$10,800 | \$705 | \$8,180 | \$721 |
| 13 | \$32,800 | \$2,140 | \$24,200 | \$2,140 |
| 14 | \$17,200 | \$1,120 | \$12,900 | \$1,130 |
| 15 | \$10,900 | \$712 | \$7,770 | \$685 |
| 16 | \$40,100 | \$2,620 | \$30,900 | \$2,730 |

⁶ U.S. Fish and Wildlife Service to Industrial Economics, Inc. April 26, 2011. “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Chiricahua Leopard Frog.” See also Appendix C.

| UNIT | DISCOUNTED AT 3% | | DISCOUNTED AT 7% | |
|--------------|--------------------|------------------|--------------------|------------------|
| | PRESENT VALUE | ANNUALIZED | PRESENT VALUE | ANNUALIZED |
| 17 | \$79,400 | \$5,180 | \$56,900 | \$5,020 |
| 18 | \$11,200 | \$732 | \$8,480 | \$748 |
| 19 | \$11,200 | \$732 | \$8,480 | \$748 |
| 20 | \$32,000 | \$2,090 | \$24,100 | \$2,120 |
| 21 | \$32,000 | \$2,090 | \$24,100 | \$2,120 |
| 22 | \$33,700 | \$2,200 | \$24,300 | \$2,140 |
| 23 | \$86,300 | \$5,630 | \$64,700 | \$5,710 |
| 24 | \$81,900 | \$5,340 | \$64,100 | \$5,650 |
| 25 | \$77,000 | \$5,030 | \$59,500 | \$5,250 |
| 26 | \$59,300 | \$3,870 | \$46,600 | \$4,110 |
| 27 | \$64,200 | \$4,190 | \$50,100 | \$4,420 |
| 28 | \$32,300 | \$2,110 | \$23,100 | \$2,040 |
| 29 | \$86,200 | \$5,620 | \$64,100 | \$5,650 |
| 30 | \$14,100 | \$923 | \$10,100 | \$893 |
| 31 | \$68,700 | \$4,480 | \$49,000 | \$4,320 |
| 32 | \$57,000 | \$3,720 | \$41,900 | \$3,690 |
| 33 | \$66,900 | \$4,370 | \$48,900 | \$4,320 |
| 34 | \$66,900 | \$4,370 | \$48,900 | \$4,320 |
| 35 | \$61,600 | \$4,020 | \$43,500 | \$3,830 |
| 36 | \$27,800 | \$1,810 | \$19,800 | \$1,750 |
| 37 | \$9,710 | \$634 | \$9,350 | \$824 |
| 38 | \$27,300 | \$1,780 | \$19,400 | \$1,710 |
| 39 | \$0 | \$0 | \$0 | \$0 |
| 40 | \$72,700 | \$4,750 | \$51,800 | \$4,570 |
| 41 | \$18,700 | \$1,220 | \$13,400 | \$1,180 |
| 42 | \$55,100 | \$3,590 | \$39,300 | \$3,460 |
| 43 | \$508 | \$33 | \$412 | \$36 |
| Total | \$1,730,000 | \$113,000 | \$1,280,000 | \$113,000 |

Note: Values are rounded to three significant figures. Totals may not sum due to rounding.

KEY ASSUMPTIONS

12. The key conclusion of this analysis is that the Service expects that incremental impacts of designating critical habitat for the leopard frog will consist only of additional administrative costs. This conclusion, and the resulting cost estimates, rely on the following assumptions:

- **Designation of critical habitat will result in new consultations regarding adverse modification of critical habitat only in unoccupied units.** The Service recognizes that designation of critical habitat could trigger new consultations regarding potential adverse modification in occupied units for one of two reasons:
 1. Designation of critical habitat provides new information to Action agencies about the presence of leopard frogs in occupied habitat, or
 2. Action agencies have not previously consulted for jeopardy in dispersal habitat and seasonally wet areas.

As discussed in Chapter 2 and Chapter 3, however, communication with several Action agencies—including the U.S. Forest Service, the Bureau of Land Management, the Army Corps of Engineers (the Corps), and the Rural Utilities Service—has confirmed both that they are already aware of the presence of the leopard frog and that they already account for dispersal habitat and seasonally wet areas when they consult for jeopardy. The analysis therefore assumes that all Action agencies are unlikely to initiate new consultations for adverse modification in occupied units as a result of critical habitat designation.

- **The number and location of past section 7 consultations is indicative of future consultations.** The analysis does not expect land use activities to change substantially in any of the proposed critical habitat units. This assumption is supported by the fact that a majority of managed lands in the areas with proposed critical habitat have already addressed the leopard frog and other species. However, it is possible that residential, commercial, or industrial development activities could increase in the region. If activity levels increase in the future, it is possible that this analysis underestimates associated incremental costs of section 7 consultation.
- **Additional baseline protections will not substantially change incremental impacts.** It is possible that additional conservation measures could be implemented for the leopard frog even in the absence of critical habitat designation. For example, additional participation in SHAs and development of additional HCPs could reduce the number of future per-project consultations and associated costs. In such a case, this analysis would overestimate incremental impacts.

CHAPTER 1 | INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

13. This chapter provides an overview of the proposed critical habitat for the leopard frog. It includes a summary of past legal actions that relate to the current proposal, a description of the area proposed for designation, and a discussion of threats to the proposed critical habitat. The information contained in this chapter provides context for the analysis. All official definitions and proposed critical habitat boundaries are provided in the proposed rule.⁷

1.1.1 PREVIOUS FEDERAL ACTIONS

14. The Service listed the leopard frog as threatened on June 13, 2002.⁸ Included in the final rule was a special rule exempting operation and maintenance of livestock tanks on non-Federal lands from ESA section 9 take prohibitions.⁹
15. In a May 6, 2009 order from the Arizona District Court, the Secretary of the Interior was required to publish a critical habitat prudency determination for the leopard frog and, if found prudent, a proposed rule to designate critical habitat by December 8, 2010. The Service then requested a three-month extension to the court-ordered deadlines. As a result of this extension, new deadlines of March 8, 2011 for the proposed rule and March 8, 2012 for the final rule were established. The proposed critical habitat rule was published on March 15, 2011.¹⁰

1.1.2 PROPOSED CRITICAL HABITAT DESIGNATION

16. The current proposed critical habitat area consists of approximately 11,130 acres in a total of 40 units. The Service is planning to propose an additional three units totaling 330 acres in New Mexico as part of the Notice of Availability of the Economic Analysis. Thus, the “study area” for this analysis is the roughly 11,460 acres proposed for critical habitat designation for the leopard frog. The 43 proposed units, located in Southeastern Arizona and Southwestern New Mexico, encompass lentic breeding habitat (e.g., ponds and livestock tanks) and lotic dispersal habitat (e.g., streams, river reaches, and ephemeral drainages) that the Service has deemed essential for the leopard frog’s conservation. Exhibit 1-1 presents the geographical extent of the current proposed designation; the name of each numbered unit is provided in Exhibit 1-3. The Service considers one unit to

⁷ 2011 Proposed Critical Habitat Rule, 76 FR 14126.

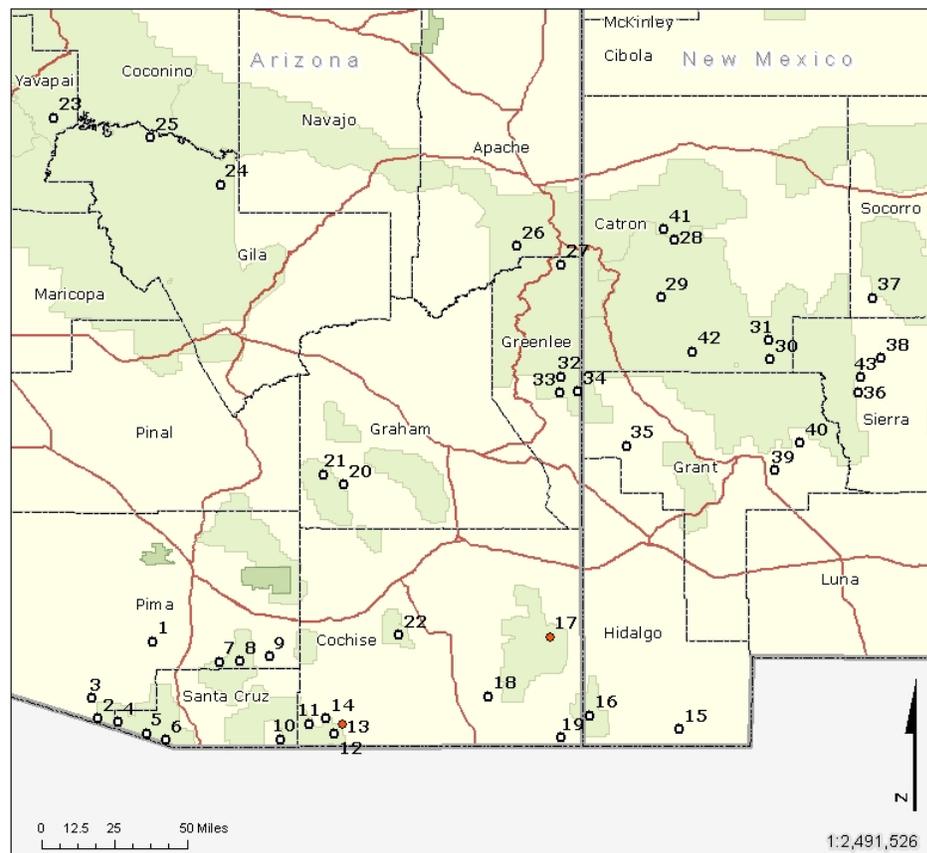
⁸ 2002 Final Listing Rule, 67 FR 40790.

⁹ 50 CFR 17.43(b).

¹⁰ 2011 Proposed Critical Habitat Rule, 76 FR 14126.

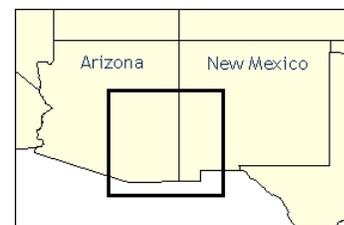
be currently unoccupied, the Carr Barn Pond Unit (Unit 13).¹¹ This unit represents less than one percent of the total proposed critical habitat designation (including the three additional units). Exhibit 1-2 highlights the location of this unoccupied unit, while Exhibit 1-3 summarizes land ownership for the 43 proposed units. As shown, Federal lands comprise 59 percent of proposed units, private lands comprise 37 percent, and state lands the remaining four percent.

EXHIBIT 1-1. OVERVIEW OF CHIRICAHUA LEOPARD FROG PROPOSED CRITICAL HABITAT



Proposed Critical Habitat

- Occupied Unit
- Unoccupied Unit
- County Boundary
- ▭ State Boundary
- Highway
- National Parks
- National Forests



IEc

INDUSTRIAL ECONOMICS, INCORPORATED

Map Projection: GCS North American 1983

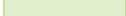
Data Sources:
 1. U.S. Fish and Wildlife Service
 2. ESRI GIS Background Layers

¹¹ When the Proposed Rule was published, Cave Creek (Unit 17) was also unoccupied. Since that time, however, leopard frogs have been released into this unit, so for purposes of this analysis, it is considered to be occupied.

EXHIBIT 1-2. UNOCCUPIED CRITICAL HABITAT UNIT FOR THE CHIRICAHUA LEOPARD FROG



Proposed Critical Habitat

-  Unoccupied Unit
-  Rivers
-  Highway
-  National Forests



INDUSTRIAL ECONOMICS, INCORPORATED

Map Projection: GCS North American 1983

Data Sources:
1. U.S. Fish and Wildlife Service
2. ESRI GIS Background Layers

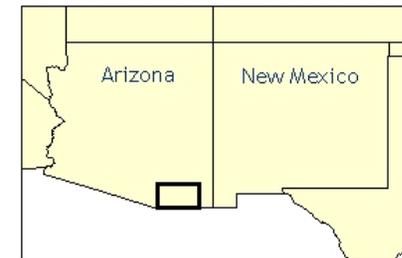


EXHIBIT 1-3. LAND OWNERSHIP WITHIN PROPOSED CRITICAL HABITAT BY UNIT

| UNIT | NAME | FEDERAL | STATE | PRIVATE | TOTAL | PERCENT OF TOTAL |
|------|--|---------|-------|---------|-------|------------------|
| 1 | Twin Tanks and Ox Frame Tank | 0 | 1.3 | 0.4 | 1.7 | 0.0% |
| 2 | Garcia Tank | 0.7 | 0 | 0 | 0.7 | 0.0% |
| 3 | Buenos Aires NWR Central Tanks | 1,720 | 0 | 0 | 1,720 | 15.0% |
| 4 | Bonita, Upper Turner, and Mojonera Tanks | 201 | 0 | 0 | 201 | 1.8% |
| 5 | Sycamore Canyon | 262 | 0 | 7 | 268 | 2.3% |
| 6 | Pena Blanca Lake and Spring and Associated Tanks | 202 | 0 | 0 | 202 | 1.8% |
| 7 | Florida Canyon | 4 | 0 | 0 | 4 | 0.0% |
| 8 | Eastern Slope of the Santa Rita Mountains | 172 | 0 | 14 | 186 | 1.6% |
| 9 | Las Cienegas National Conservation Area | 1,235 | 186 | 0 | 1,420 | 12.4% |
| 10 | Pasture 9 Tank | 0 | 0 | 0.5 | 0.5 | 0.0% |
| 11 | Scotia Canyon | 70 | 0 | 0 | 70 | 0.6% |
| 12 | Beatty's Guest Ranch | 0 | 0 | 10 | 10 | 0.1% |
| 13 | Carr Barn Bond | 0.6 | 0 | 0 | 0.6 | 0.0% |
| 14 | Ramsey and Brown Canyons | 58 | 0 | 65 | 123 | 1.1% |
| 15 | High Lonesome Well | 0 | 0 | 0.4 | 0.4 | 0.0% |
| 16 | Peloncillo Mountains | 366 | 0 | 289 | 655 | 5.7% |
| 17 | Cave Creek | 234 | 0 | 92 | 326 | 2.8% |
| 18 | Leslie Creek | 26 | 0 | 0 | 26 | 0.2% |
| 19 | Rosewood and North Tanks | 0 | 78 | 19 | 97 | 0.8% |
| 20 | Deer Creek | 17 | 69 | 34 | 120 | 1.0% |
| 21 | Oak Spring and Oak Creek | 27 | 0 | 0 | 27 | 0.2% |
| 22 | Dragoon Mountains | 74 | 0 | 0 | 74 | 0.6% |
| 23 | Buckskin Hills | 232 | 0 | 0 | 232 | 2.0% |
| 24 | Crouch, Gentry, and Cherry Creeks, and Parallel Canyon | 334 | 64 | 6 | 404 | 3.5% |
| 25 | Ellison and Lewis Creeks | 83 | 0 | 15 | 99 | 0.9% |
| 26 | Concho Bill and Deer Creek | 17 | 0 | 0 | 17 | 0.1% |
| 27 | Campbell Blue and Coleman Creeks | 174 | 0 | 0 | 174 | 1.5% |
| 28 | Tularosa River | 335 | 0 | 1,575 | 1,910 | 16.7% |
| 29 | Deep Creek Divide Area | 408 | 0 | 102 | 510 | 4.4% |
| 30 | Main Diamond Creek | 14 | 0 | 40 | 54 | 0.5% |
| 31 | Beaver Creek | 132 | 0 | 25 | 157 | 1.4% |
| 32 | Left Prong of Dix Creek | 13 | 0 | 0 | 13 | 0.1% |

| UNIT | NAME | FEDERAL | STATE | PRIVATE | TOTAL | PERCENT OF TOTAL |
|--------------|---|--------------|------------|--------------|---------------|------------------|
| 33 | Rattlesnake Pasture Tank and Associated Tanks | 59 | 0 | 0 | 59 | 0.5% |
| 34 | Coal Creek | 7 | 0 | 0 | 7 | 0.1% |
| 35 | Blue Creek | 24 | 0 | 12 | 37 | 0.3% |
| 36 | Seco Creek | 66 | 0 | 610 | 676 | 5.9% |
| 37 | Alamosa Warm Springs | 0.2 | 25 | 54 | 79 | 0.7% |
| 38 | Cuchillo Negro Warm Springs and Creek | 3 | 3 | 23 | 28 | 0.2% |
| 39 | Ash and Bolton Springs | 0 | 0 | 49 | 49 | 0.4% |
| 40 | Mimbres River | 0 | 0 | 1,097 | 1,097 | 9.6% |
| 41 | Kerr Canyon | 19 | 0 | 6 | 25 | 0.2% |
| 42 | West Fork Gila River | 177 | 0 | 0 | 177 | 1.5% |
| 43 | South Fork Palomas Creek | 23 | 0 | 106 | 129 | 1.1% |
| Total | | 6,790 | 426 | 4,251 | 11,466 | 100% |

Source: U.S. Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants; Endangered Status and Designation of Critical Habitat for the Chiricahua Leopard Frog; Proposed Rule. Published in the Federal Register on March 15, 2011, 76 FR 14139, Table 2.

1.1.3 AREAS CONSIDERED FOR EXCLUSION

17. As discussed in the Proposed Rule, the Service is considering portions of ten critical habitat units for exclusion because it determined that existing conservation plans in place in these areas were sufficiently protective of leopard frog habitat. Exhibit 1-4 presents these units and lists the conservation plans associated with each unit. Additional detail on the baseline protections in place in these areas is provided in Chapter 3.

EXHIBIT 1-4 AREAS CONSIDERED FOR EXCLUSION FROM CHIRICAHUA LEOPARD FROG CRITICAL HABITAT (IN ACRES)

| UNIT | AREA TO BE CONSIDERED FOR EXCLUSION | TOTAL UNIT AREA (ACRES) | AREA CONSIDERED FOR EXCLUSION (ACRES) | PERCENT CONSIDERED FOR EXCLUSION | ASSOCIATED CONSERVATION PLAN |
|--------------------|-------------------------------------|-------------------------|---------------------------------------|----------------------------------|---|
| 10 | Pasture 9 Tank | 0.5 | 0.5 | 100% | The Service's Partners for Fish and Wildlife Program, Arizona Game and Fish Department (AGFD) Safe Harbor Agreement, Conservation Easements |
| 12 | Beatty's Guest Ranch | 10 | 10 | 100% | AGFD Safe Harbor Agreement, Ramsey Canyon Leopard Frog Conservation Plan |
| 14 | Ramsey Canyon Preserve | 123 | 16 | 13% | AGFD Safe Harbor Agreement, Conservation Easements, Ramsey Canyon Leopard Frog Conservation Plan |
| 16 | Canoncito Ranch | 655 | 289 | 44% | Malpai Borderlands Safe Harbor Agreement, Malpai Borderlands Habitat Conservation Plan, Conservation Easements |
| 17 | Southwest Research Station | 326 | 92 | 28% | The Service's Partners for Fish and Wildlife Program, AGFD Safe Harbor Agreement |
| 19 | Rosewood and North Tanks | 97 | 97 | 100% | Malpai Borderlands Safe Harbor Agreement, Malpai Borderlands Habitat Conservation Plan |
| 36 | Ladder Ranch | 676 | 610 | 90% | The Service's Partners for Fish and Wildlife Program |
| 38 | Ladder Ranch | 28 | 23 | 82% | The Service's Partners for Fish and Wildlife Program |
| 40 | Mimbres River Preserve | 1,097 | 510 | 46% | Conservation Easements |
| 43 | Ladder Ranch | 129 | 106 | 82% | The Service's Partners for Fish and Wildlife Program |
| Total (ten units): | | 3,142 | 1,754 | 56% | |
| Total (all units): | | 11,466 | 1,754 | 15% | |

Source: 2011 Proposed Critical Habitat Rule, 76 FR 14159.

1.2 ECONOMIC ACTIVITIES CONSIDERED IN THIS ANALYSIS

18. Review of the proposed rule, consultation history, and existing conservation plans identified the following economic activities as potential threats to the leopard frog and its habitat within the study area.

- (1) **Livestock grazing:** Includes drying of stock tanks, potential disease transmission, alteration of breeding and dispersal habitat, and potential changes to water quality due to concentrated livestock use.
- (2) **Mining:** Includes copper mining operations and associated mining-related contaminants and runoff.

(3) **Water diversion and management:** Includes groundwater pumping, agricultural development, and operations of dams and diversions.

(4) **Residential and commercial development and transportation:** Includes sedimentation and runoff associated with construction.

19. In addition, the following threats to the leopard frog could potentially lead to incremental economic impacts through required project modifications:

(1) **Fires and fire suppression activities:** Includes ash flow and fire retardants from fires and fire suppression activities.

(2) **Non-native species introductions/disease:** Includes saltcedar control, stocking of nonnative fishes, bullfrogs, or crayfish, as well as chytridiomycosis (an infectious fungal disease).

1.3 ORGANIZATION OF THE REPORT

20. The remainder of this report includes four additional chapters. Chapter 2 discusses the framework employed in the analysis; Chapter 3 and describes the baseline protections currently afforded the leopard frog and its habitat; Chapter 4 describes the incremental impacts of critical habitat designation for the leopard frog; and Chapter 5 discusses potential benefits of critical habitat designation for the leopard frog. In addition, the report includes three appendices: Appendix A, which considers potential impacts on small entities and the energy industry; Appendix B, which provides information on the sensitivity of the economic impact estimates to alternative discount rates; and Appendix C, which provides the Service's incremental effects memorandum to IEc.

- **Chapter 2** – Framework for the Analysis
- **Chapter 3** – Baseline Conservation for the Chiricahua Leopard Frog within the Proposed Critical Habitat Designation
- **Chapter 4** – Incremental Impacts of Critical Habitat Designation for the Chiricahua Leopard Frog
- **Chapter 5** – Economic Benefits
- **Appendix A** – Small Business and Energy Impacts Analyses
- **Appendix B** – Sensitivity of Results to Discount Rate
- **Appendix C** – Information from the U.S. Fish and Wildlife Service Regarding Potential Changes in Conservation for the Chiricahua Leopard Frog Following Designation of Critical Habitat

CHAPTER 2 | FRAMEWORK FOR THE ANALYSIS

21. The purpose of this analysis is to estimate the economic impact of actions taken to protect the leopard frog and its habitat. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the species and its habitat within the proposed critical habitat area. 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 afforded the leopard frog; for example, under the Federal listing and other Federal, State, and local regulations. The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat for the leopard frog. The analysis qualitatively discusses baseline protections for the leopard frog (Chapter 3), and then quantifies potential incremental impacts forecasted to occur after the proposed critical habitat is finalized (Chapter 4).
22. This information is intended to assist the Secretary of the DOI in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.¹² In addition, this information allows the Service to address the requirements of Executive Orders 12866 and 13211, and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).¹³
23. This chapter describes the framework for this analysis. First, it describes the case law that led to the selection of the framework applied in this report. It then describes in economic terms the general categories of economic effects that are the focus of the impact analysis, including a discussion of both efficiency and distributional effects. Next, this chapter defines the analytic framework used to measure these impacts in the context of critical habitat regulation and the consideration of benefits. It concludes with a presentation of the information sources relied upon in the analysis.

¹² 16 U.S.C. §1533(b)(2).

¹³ Executive Order 12866, Regulatory Planning and Review, September 30, 1993; Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001; 5. U.S.C. §§601 *et seq*; and Pub Law No. 104-121.

2.1 BACKGROUND

24. The U.S. Office of Management and Budget's (OMB) guidelines for conducting economic analysis of regulations direct Federal agencies to measure the costs of a regulatory action against a baseline, which it defines as the "best assessment of the way the world would look absent the proposed action."¹⁴ In other words, the baseline includes the existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat. Impacts that are incremental to that baseline (i.e., occurring over and above existing constraints) are attributable to the proposed regulation. Significant debate has occurred regarding whether assessing the impacts of the Service's proposed regulations using this baseline approach is appropriate in the context of critical habitat designations.
25. In 2001, the U.S. Tenth Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of proposed critical habitat, regardless of whether those impacts are attributable co-extensively to other causes.¹⁵ 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].”¹⁶
26. 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.¹⁷ For example, in the March 2006 ruling that the August 2004 critical habitat rule for the Peirson's milk-

¹⁴ 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>.

¹⁵ *New Mexico Cattle Growers Assn v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

¹⁶ *Ibid.*

¹⁷ *Cape Hatteras Access Preservation Alliance v. Department of Interior*, 344 F. Supp. 2d 108 (D.D.C.); *Center for Biological Diversity v. United States Bureau of Land Management*, 422 F. Supp. 2d 1115 (N.D. Cal. 2006).

vetch was arbitrary and capricious, the United States District Court for the Northern District of California stated,

“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.’”¹⁸

27. Most recently, in 2010, the U.S. Ninth Circuit Court of Appeals came to similar conclusions during its review of critical habitat designations for the Mexican spotted owl and 15 vernal pool species.¹⁹ Plaintiffs in both cases requested review by the Supreme Court, which declined to hear the cases in 2011.
28. In order to address the divergent opinions of the courts and provide the most complete information to decision-makers, this economic analysis:
 - a. Describes the baseline protections afforded the leopard frog absent critical habitat designation (Chapter 3); and
 - b. Monetizes the potential incremental impacts precipitated specifically by the designation of critical habitat for the species (Chapter 4).
29. Incremental effects of critical habitat designation are determined using the Service's December 9, 2004 interim guidance on “Application of the ‘Destruction or Adverse Modification’ Standard Under Section 7(a)(2) of the Endangered Species Act” and information from the Service regarding what potential consultations and project modifications may be imposed as a result of critical habitat designation over and above those associated with the listing.²⁰ Specifically, in *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, the Ninth Circuit invalidated the Service’s regulation defining destruction or adverse modification of critical habitat, and the Service no longer relies on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat.²¹ Under the statutory provisions of the Act, the

¹⁸ *Center for Biological Diversity et al, Plaintiffs, v. United States Bureau of Land Management et. al, Defendants and American Sand Association, et al, Defendant Intervenors*. Order re: Cross Motions for Summary Judgment, Case 3:03-cv-02509 Document 174 Filed 03/14/2006, pages 44-45.

¹⁹ *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).

²⁰ Director, U.S. Fish and Wildlife Service, Memorandum to Regional Directors and Manager of the California-Nevada Operations Office, Subject: Application of the “Destruction or Adverse Modification” Standard under Section 7(a)(2) of the Endangered Species Act, dated December 9, 2004.

²¹ *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, No. 03-35279 (9th Circuit 2004).

Service determines destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the affected critical habitat would remain functional to serve its intended conservation role for the species. A detailed description of the methodology used to define baseline and incremental impacts is provided later in this Chapter.

2.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

30. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the leopard frog and its habitat (hereinafter referred to collectively as “leopard frog conservation efforts”). Economic efficiency effects generally reflect “opportunity costs” associated with the commitment of resources required to accomplish species and habitat conservation. For example, if the set of activities that may take place on a parcel of land is limited as a result of the designation or the presence of the species, and thus the market value of the land is reduced, this reduction in value represents one measure of opportunity cost or change in economic efficiency. Similarly, the costs incurred by a Federal action agency to consult with the Service under section 7 represent opportunity costs of leopard frog conservation efforts.
31. This analysis also addresses the distribution of impacts associated with the designation, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation efforts on small entities and the energy industry. This information may be used by decision-makers to assess whether the effects of species conservation efforts unduly burden a particular group or economic sector. For example, while conservation efforts may have a small impact relative to the national economy, individuals employed in a particular sector of the regional economy may experience relatively greater impacts. The differences between economic efficiency effects and distributional effects, as well as their application in this analysis, are discussed in greater detail below.

2.2.1 EFFICIENCY EFFECTS

32. 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 leopard frog habitat, these efficiency effects represent the opportunity cost of resources used or benefits foregone by society as a result of the regulations. Economists generally characterize opportunity costs in terms of changes in producer and consumer surpluses in affected markets.²²
33. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a Federal land

²² 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>.

manager may enter into a section 7 consultation with the Service to ensure that a particular activity will not adversely modify critical habitat. The effort required for the consultation is an economic opportunity cost because the landowner or manager's time and effort would have been spent in an alternative activity had the parcel not been included in the designation. When compliance activity is not expected to significantly affect markets—that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price—the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.

34. 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. In the case of the leopard frog, 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

35. 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.²³ 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

36. 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.²⁴ 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.²⁵

²³ U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

²⁴ 5 U.S.C. §§601 *et seq.*

²⁵ Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001.

Regional Economic Effects

37. Regional economic impact analysis can provide an assessment of the potential localized effects of conservation efforts. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that represent the relationship between a change in one sector of the economy (e.g., expenditures by recreators) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreators). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.
38. 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.
39. Despite these and other limitations, in certain circumstances regional economic impact analysis may provide useful information about the scale and scope of localized impacts. It is important to remember that measures of regional economic effects generally reflect shifts in resource use rather than efficiency losses. Thus, these types of distributional effects are reported separately from efficiency effects (i.e., not summed). In addition, measures of regional economic impact cannot be compared with estimates of efficiency effects, but should be considered as distinct measures of impact.
40. Impacts associated with leopard frog conservation activities largely include administrative costs (see chapter 4). Therefore, measurable regional impacts of the type typically assessed with input-output models are not anticipated.

2.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

41. This analysis: 1) identifies those economic activities most likely to threaten the leopard frog and its habitat; 2) describes the baseline regulation protection for the species; and 3) monetizes the incremental economic impacts to avoid adverse modification of the proposed critical habitat area. This section provides a description of the methodology used to separately identify baseline protections from the incremental impacts stemming from the proposed designation of critical habitat for the leopard frog. This evaluation of impacts in a "with critical habitat designation" versus a "without critical habitat

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

2.3.1 IDENTIFYING BASELINE IMPACTS

42. 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 Act, as well as under other Federal, State and local laws and guidelines. This "without critical habitat designation" scenario also considers a wide range of additional factors beyond the compliance costs of regulations that provide protection to the listed species. As recommended by OMB, the baseline incorporates, as appropriate, trends in market conditions, implementation of other regulations and policies by the Service and other government entities, and trends in other factors that have the potential to affect economic costs and benefits, such as the rate of regional economic growth in potentially affected economic sectors.
43. 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.
- Section 7 of Act, absent critical habitat designation, requires Federal agencies to consult with the Service to ensure that any discretionary action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species. Consultations under the jeopardy standard result in administrative costs, as well as impacts of conservation efforts resulting from consideration of this standard.
 - 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."²⁶ 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.²⁷ The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately avoided or minimized. The development and implementation of HCPs is considered a baseline protection for the species and habitat unless the HCP is determined to be precipitated by the designation of critical habitat, or the designation influences stipulated conservation efforts under HCPs.

²⁶ 16 U.S.C. 1532.

²⁷ U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at <http://endangered.fws.gov/hcp/>.

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

44. The protection of listed species and habitat is not limited to the Act. Other Federal agencies, as well as State and local governments, may also seek to protect the natural resources under their jurisdiction. If compliance with the Clean Water Act or State environmental quality laws, for example, protects habitat for the species, such protective efforts are considered to be baseline protections and costs associated with these efforts are categorized accordingly. Of note, however, is that such efforts may not be considered baseline in the case that they would not have been triggered absent the designation of critical habitat. In these cases, they are considered incremental impacts and are discussed below.

2.3.2 IDENTIFYING INCREMENTAL IMPACTS

45. This analysis identifies and separately 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.
46. When critical habitat is designated, section 7 requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat (in addition to considering whether the actions are likely to jeopardize the continued existence of the species). The added administrative costs of including consideration of critical habitat in section 7 consultations, and the additional impacts of implementing conservation efforts (i.e., reasonable and prudent alternatives) 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.
47. Incremental impacts may be the direct compliance costs associated with additional effort for consultations, reinitiated consultations, new consultations occurring specifically because of the designation, and additional conservation efforts that would not have been requested under the jeopardy standard. Additionally, incremental impacts may include indirect impacts resulting from reaction to the potential designation of critical habitat (e.g., implementing leopard frog 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

48. 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 measures requested by the Service through section 7 consultation to avoid potential destruction or adverse modification of critical habitat.

49. Section 7(a)(2) of the Act requires Federal agencies (Action agencies) to consult with the Service whenever activities that they undertake, authorize, permit, or fund may affect a listed species or designated critical habitat. In most cases, consultations will involve the Service and another Federal agency only, such as the Corps. Occasionally, they will also include a third party involved in projects that involve a permitted entity, such as the recipient of a Clean Water Act section 404 permit.
50. During a consultation, the Service, the Action agency, and the entity applying for Federal funding or permitting (if applicable) coordinate in an effort to minimize potential adverse effects to the species and/or to the proposed critical habitat. Coordination between these parties may occur via written letters, phone calls, in-person meetings, or any combination of these. 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.
51. Section 7 consultations with the Service may be either informal or formal. *Informal consultations* consist of project planning, coordination, and correspondence between the Service, the Action agency, and the applicant concerning an action that may affect a listed species or its designated critical habitat, and are designed to identify and resolve potential concerns at an early stage in the planning process. By contrast, a *formal consultation* is required if the Action agency determines that its proposed action may or will adversely affect the listed species or designated critical habitat in ways that cannot be resolved through informal consultation. 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 adversely modify critical habitat, and often includes terms and conditions and reasonable and prudent measures to minimize those impacts. Regardless of the type of consultation or proposed project, section 7 consultations can require substantial administrative effort on the part of all participants, depending on the complexity of the consultation.

Administrative Section 7 Consultation Costs

52. Parties involved in section 7 consultations include the Service, the Action agency, and in some cases, a private entity involved in the project or land use activity. The action agency (i.e., the Federal nexus necessitating the consultation) serves as the liaison with the Service under formal consultation. 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 adversely modify critical habitat. Administrative efforts for consultation may therefore result in both baseline and incremental impacts.
53. In general, three different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:

- 1. Additional effort to address adverse modification in a new consultation -**
New consultations taking place after critical habitat designation may require additional effort to address critical habitat issues above and beyond the listing issues. In this case, only the additional administrative effort required to consider critical habitat is considered an incremental impact of the designation.
 - 2. Re-initiation of consultation to address adverse modification -** Consultations that have already been completed on a project or activity (but for which the project or activity is not yet completed) generally require re-initiation to address potential effects to critical habitat. In this case, the costs of re-initiating the consultation, including all associated administrative and project modification costs are considered incremental impacts of the designation.
 - 3. Incremental consultation resulting entirely from critical habitat designation**
Critical habitat designation may trigger additional consultations that may not occur absent the designation (e.g., for an activity for which adverse modification may be an issue, while jeopardy is not, or consultations resulting from the new information about the potential presence of the species provided by the designation). Such consultations may, for example, be triggered in critical habitat areas that are not occupied by the species. All associated administrative and project modification costs of these consultations are considered incremental impacts of the designation.
54. 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 is not 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, this analysis applies the average of the range of costs in each category.
55. Exhibit 2-1 provides estimated administrative consultation costs representing effort required for all types of consultation, including those that considered both adverse modification and jeopardy. To estimate the fractions of the total administrative consultation costs that are baseline and incremental, the following assumptions are applied.
- The greatest effort will be associated with consultations that consider both jeopardy and adverse modification. Depending on whether the consultation is precipitated by the listing or the critical habitat designation, part or all of the costs, respectively, will be attributed to the proposed rule.
 - Efficiencies exist when considering both jeopardy and adverse modification at the same time (e.g., in staff time saved for project review and report writing), and therefore incremental administrative costs of considering adverse modification in consultations precipitated by the listing result in the least incremental effort, roughly 25 percent of the cost of the entire consultation. The remaining 75

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.

EXHIBIT 2-1. RANGE OF ADMINISTRATIVE CONSULTATIONS COSTS (2011 DOLLARS)

| BASELINE ADMINISTRATIVE COSTS OF CONSULTATION | | | | | |
|---|----------|----------------|-------------|-----------------------|-------------|
| CONSULTATION TYPE | SERVICE | FEDERAL AGENCY | THIRD PARTY | BIOLOGICAL ASSESSMENT | TOTAL COSTS |
| CONSULTATION CONSIDERING JEOPARDY (DOES NOT INCLUDE CONSIDERATION OF ADVERSE MODIFICATION) | | | | | |
| Technical Assistance | \$428 | n/a | \$788 | n/a | \$1,220 |
| Informal | \$1,840 | \$2,330 | \$1,540 | \$1,500 | \$7,130 |
| Formal | \$4,130 | \$4,650 | \$2,630 | \$3,600 | \$15,000 |
| Programmatic | \$12,500 | \$10,400 | n/a | \$4,200 | \$27,100 |
| INCREMENTAL ADMINISTRATIVE COSTS OF CONSULTATION | | | | | |
| CONSULTATION TYPE | SERVICE | FEDERAL AGENCY | THIRD PARTY | BIOLOGICAL ASSESSMENT | TOTAL COSTS |
| NEW CONSULTATION RESULTING ENTIRELY FROM CRITICAL HABITAT DESIGNATION (TOTAL COST OF A CONSULTATION CONSIDERING BOTH JEOPARDY AND ADVERSE MODIFICATION) | | | | | |
| Technical Assistance | \$570 | n/a | \$1,050 | n/a | \$1,620 |
| Informal | \$2,450 | \$3,100 | \$2,050 | \$2,000 | \$9,500 |
| Formal | \$5,500 | \$6,200 | \$3,500 | \$4,800 | \$20,000 |
| Programmatic | \$16,700 | \$13,900 | n/a | \$5,600 | \$36,100 |
| NEW CONSULTATION CONSIDERING ONLY ADVERSE MODIFICATION (UNOCCUPIED HABITAT) | | | | | |
| Technical Assistance | \$428 | n/a | \$788 | n/a | \$1,220 |
| Informal | \$1,840 | \$2,330 | \$1,540 | \$1,500 | \$7,130 |
| Formal | \$4,130 | \$4,650 | \$2,630 | \$3,600 | \$15,000 |
| Programmatic | \$12,500 | \$10,400 | n/a | \$4,200 | \$27,100 |
| RE-INITIATION OF CONSULTATION TO ADDRESS ADVERSE MODIFICATION | | | | | |
| Technical Assistance | \$285 | n/a | \$525 | n/a | \$810 |
| Informal | \$1,230 | \$1,550 | \$1,030 | \$1,000 | \$4,750 |
| Formal | \$2,750 | \$3,100 | \$1,750 | \$2,400 | \$10,000 |
| Programmatic | \$8,330 | \$6,930 | n/a | \$2,800 | \$18,100 |
| ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION (ADDITIVE WITH BASELINE COSTS, SHOWN ABOVE, OF CONSIDERING JEOPARDY) | | | | | |
| Technical Assistance | \$143 | n/a | \$263 | n/a | \$405 |
| Informal | \$613 | \$775 | \$513 | \$500 | \$2,380 |
| Formal | \$1,380 | \$1,550 | \$875 | \$1,200 | \$5,000 |
| Programmatic | \$4,160 | \$3,460 | n/a | \$1,400 | \$9,030 |
| <p>Source: IEc analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2008, and a review of consultation records from several Service field offices across the country conducted in 2002.</p> <p>Notes: 1. Estimates are rounded to three significant digits and may not sum due to rounding. 2. Estimates reflect average hourly time required by staff.</p> | | | | | |

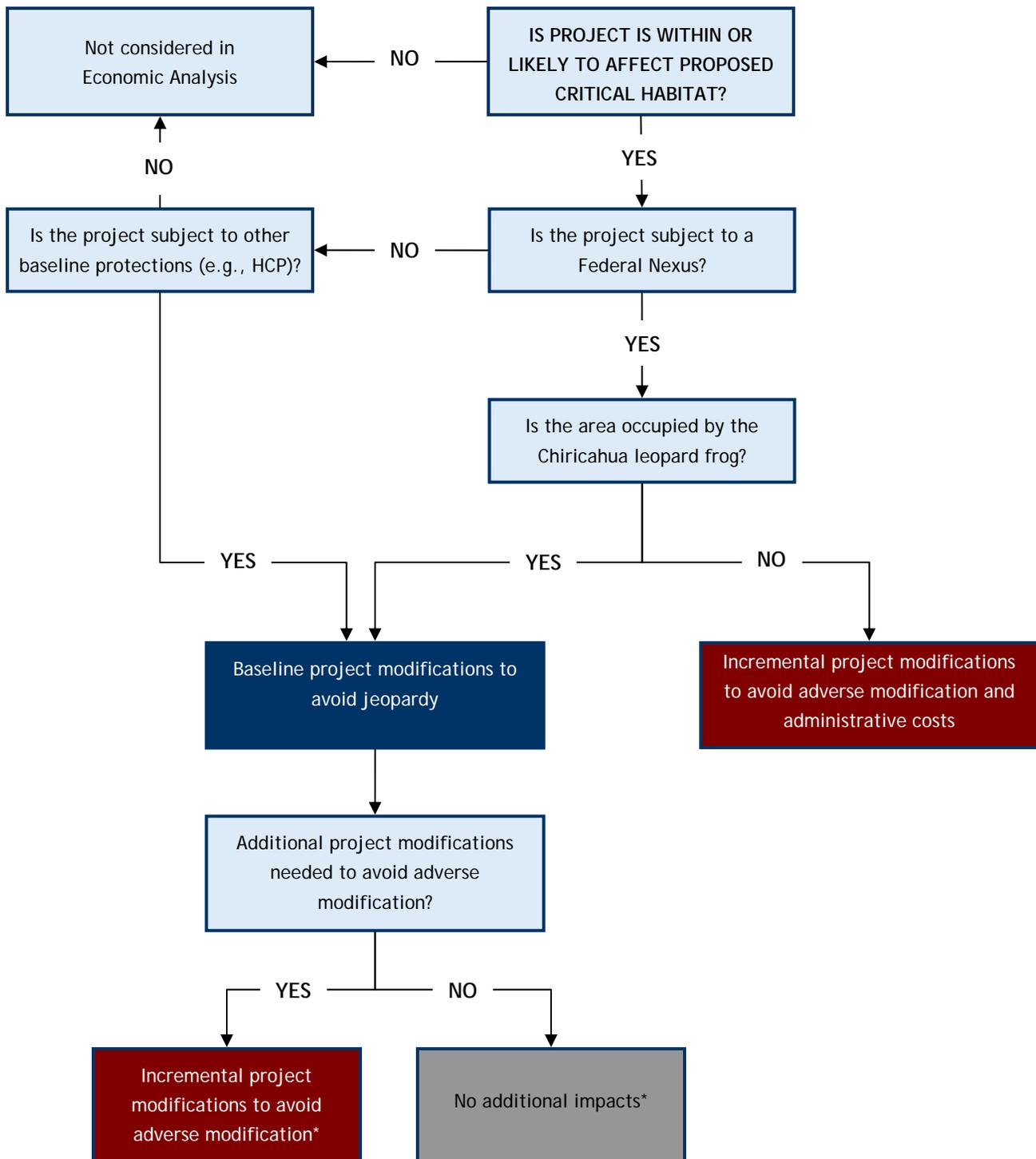
Section 7 Conservation Effort Impacts

56. 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 (incremental consultations), 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.

Specific Steps Applied to Identify and Quantify Incremental Impacts

57. The methodology used to identify and separate baseline and incremental impacts for the leopard frog is depicted in Exhibit 2-2. As is discussed above, in areas where conservation measures exist for the leopard frog, the costs associated with implementing these measures are considered baseline. Projects without a Federal nexus will not be affected and therefore are not included in the Economic Analysis. For projects located in areas without existing conservation measures in place that have a Federal nexus, baseline and incremental impacts will be defined differently for occupied and unoccupied habitat. The following sections describe this flowchart in detail.

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



Key:



Baseline Impacts



Incremental Impacts

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

Occupied Habitat

58. If the project area is currently occupied by the leopard frog, the Service expects that the only anticipated incremental impacts of the designation will be the additional administrative cost of addressing adverse modification in the consultation.²⁸ The Service believes that “the PCEs [primary constituent elements of critical habitat] are so closely tied to the survival of the species that actions that degrade or alter the PCEs almost always result in adverse effects to the species in occupied habitat.”²⁹ Thus, the Service has defined no difference in project modifications for jeopardy versus adverse modification for the leopard frog in occupied areas. According to the Service, “it is unlikely that a future section 7 analysis would identify a difference between measures needed to avoid the destruction or adverse modification of critical habitat from measures needed to avoid jeopardizing the continued existence of the species in areas of occupied habitat.”³⁰
59. The Service did note, however, that there may be incremental impacts of critical habitat designation in certain units currently occupied by the leopard frog that contain dispersal habitat and seasonally wet areas. Because leopard frogs do not occupy these portions of proposed critical habitat units year-round, Action agencies may not be required to consult for jeopardy in these areas at all times. Nevertheless, many Action agencies have voluntarily implemented conservation measures for the leopard frog in dispersal habitat, in accordance with the Chiricahua leopard frog Recovery Plan. As will be discussed in Chapter 3, the Service expects that dispersal habitat and seasonally wet areas are already protected by baseline measures.
60. Critical habitat is not expected to provide new information to landowners about the presence of the leopard frog in occupied areas. The Service has noted that “there is an active Chiricahua leopard frog recovery program that encourages good working relationships” between Action agencies and private stakeholders, and communication with Action agencies has confirmed that they are already familiar with the presence of the leopard frog in occupied areas.³¹

Unoccupied Habitat

61. If the project area is currently unoccupied by the leopard frog, the Service believes that costs associated with project modifications implemented to avoid adversely modifying critical habitat would be attributable to the critical habitat designation alone. Thus, in unoccupied areas, costs associated with section 7 consultation and project modifications are considered incremental impacts.

²⁸ U.S. Fish and Wildlife Service to Industrial Economics, Inc. April 26, 2011. “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Chiricahua Leopard Frog.” See also Appendix C.

²⁹ *Ibid.*

³⁰ *Ibid.*

³¹ *Ibid.*; Personal communication with Ondrea Hummel, U.S. Army Corps of Engineers, July 26, 2011; personal communication with Walt Ellsworth, Rural Utilities Service, July 26, 2011.

Indirect Impacts

62. 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 could potentially be associated with the designation of critical habitat. Importantly, these types of impacts are not always considered incremental. In the case of the leopard frog, these types of conservation efforts and economic effects are expected to occur regardless of critical habitat designation and are appropriately considered baseline impacts in this analysis.

Habitat Conservation Plans

63. Under section 10(a)(1)(B) of the Act, private 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 to the maximum extent practicable. Thus, HCPs are developed to ensure compliance with section 9 of the Act and to meet the requirements of section 10 of the Act. The Malpai Borderlands HCP for the leopard frog will be discussed in Chapter 3; the possibility that an HCP will be pursued for a proposed copper mine in Pima County, Arizona will be discussed in Chapter 4.
64. Application for a section 10(a)(1)(B) 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. However, no specific plans to prepare new HCPs in response to this proposed designation were identified for the leopard frog.

Other State and Local Laws

65. 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. In this case, no other state or local laws will be triggered by designation of critical habitat for the leopard frog.

Additional Indirect Impacts

66. In addition to the indirect effects of compliance with other laws or triggered by the designation, project proponents, land managers and landowners may face additional indirect impacts, including the following:
- **Time Delays.** Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the need to reinitiate the section 7 consultation process. To the extent that delays result from the designation, they are considered indirect, incremental impacts of the designation.
 - **Regulatory Uncertainty** - The Service conducts each section 7 consultation on a case-by-case basis and issues a biological opinion on formal consultations based on species- and site-specific information. As a result, government agencies and affiliated private parties who consult with the Service under section 7 may face uncertainty concerning whether project modifications will be recommended by the Service and what the nature of these modifications will be. This uncertainty may diminish as consultations are completed and additional information becomes available on the effects of critical habitat on specific activities. Where information suggests that this type of regulatory uncertainty stemming from the designation may affect a project or economic behavior, associated impacts are considered indirect, incremental impacts of the designation.
 - **Stigma** – Misinformation may influence public perception that critical habitat designation may result in limitations on private property uses above and beyond those associated with anticipated project modifications and regulatory uncertainty described above. Public attitudes about the limits or restrictions that critical habitat may impose can cause real economic effects to property owners, regardless of whether such limits are likely. All else equal, a property that is designated as critical habitat may have a lower market value than an identical property that is not within the boundaries of critical habitat due to perceived limitations or restrictions. As the public becomes aware of the true regulatory burden imposed by critical habitat, the impact of the designation on property markets may decrease. In addition, increased protection of scenic habitat may provide aesthetic values that increase the value of surrounding properties. To the extent that potential stigma effects on markets are probable and identifiable, these impacts are considered indirect, incremental impacts of the designation.
- 2.3.3 BENEFITS
67. Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.³² OMB's Circular A-4 distinguishes two types of economic benefits: *direct benefits and ancillary benefits*.

³² Executive Order 12866, Regulatory Planning and Review, September 30, 1993.

Ancillary benefits are defined as favorable impacts of a rulemaking that are typically unrelated, or secondary, to the statutory purpose of the rulemaking.³³

68. 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.³⁴ *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.*
69. Critical habitat designation may also generate ancillary benefits. Critical habitat aids in the conservation of species specifically by protecting the primary constituent elements on which the species depends. To this end, critical habitat designation can result in maintenance of particular environmental conditions that may generate other social benefits aside from the preservation of the species. That is, management actions undertaken to conserve a species or habitat may have coincident, positive social welfare implications, such as increased recreational opportunities in a region. While they are not the primary purpose of critical habitat, these ancillary benefits may result in gains in employment, output, or income that may offset the direct, negative impacts to a region's economy resulting from actions to conserve a species or its habitat. Potential benefits of designating critical habitat for the leopard frog are discussed in Chapter 5.

2.3.4 GEOGRAPHIC SCOPE OF THE ANALYSIS

70. Economic impacts of leopard frog conservation are considered across the entire area proposed for revised critical habitat designation, as defined in Chapter 1. Results are presented by proposed critical habitat unit.

2.3.5 ANALYTIC TIME FRAME

71. Ideally, the time frame of this analysis would be based on the expected time period over which the critical habitat regulation is 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). However, absent specific information on the expected time frame for recovery of the leopard frog, this analysis forecasts impacts over a "reasonably foreseeable" time frame. Based on available data, this analysis considers economic impacts to activities from 2012 (expected year of final critical habitat designation) through 2031.

³³ 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>

³⁴ *Ibid.*

2.4 INFORMATION SOURCES

72. The primary sources of information for this report are communications with, and data provided by, personnel from the Service, local governments and other stakeholders. In addition, this analysis relies upon the Service's section 7 consultation records, published information, GIS data, and existing habitat management and conservation plans that consider the leopard frog. A complete list of references is provided at the end of this document.

CHAPTER 3 | BASELINE CONSERVATION FOR THE CHIRICAHUA LEOPARD FROG WITHIN THE PROPOSED CRITICAL HABITAT

73. This chapter discusses the baseline state of leopard frog conservation absent designation of critical habitat to provide context for the incremental analysis presented in Chapter 4. The species and habitat protections described in this chapter result from implementation of the Endangered Species Act (“the Act”), as well as other Federal, State and local regulations and conservation plans. The textbox below describes the key issues and conclusions presented in this baseline analysis.

KEY ISSUES AND CONCLUSIONS OF THE BASELINE ANALYSIS

- A significant level of baseline protection exists for the leopard frog, addressing a broad range of habitat threats. At least 11 conservation plans as well as various Federal and state regulations currently provide protections for the leopard frog and its habitat.
- Nearly all units have some level of conservation, with 59 percent of proposed critical habitat on federally-owned land and a number of conservation easements and safe harbor acts on privately owned land. Portions of ten of the 43 proposed units, representing 15 percent of proposed critical habitat, have what the Service believes to be adequate protection for the leopard frog and are therefore being considered for exclusion.

74. The conservation efforts and baseline protections described in the following sections address potential threats to the leopard frog and its habitat. These threats include: (1) improperly managed livestock grazing, (2) mining, (3) water diversion and management, (4) residential and commercial development and transportation, (5) fires and fire suppression activities, and (6) non-native species policies, introductions, and disease. These threats are described in greater detail in Chapter 1.
75. This chapter provides an overview of the consultation history of the leopard frog, along with conservation recommendations made previously by the Service, and a description of existing baseline protections for the leopard frog, including regulations, land management plans, HCPs, easements, and other measures that provide protection specifically for the leopard frog.

3.1 LEOPARD FROG CONSULTATION HISTORY AND PAST CONSERVATION RECOMMENDATIONS

76. Since the listing in 2002, the Service has conducted total of 78 formal section 7 consultations for the leopard frog, 66 in Arizona and 12 in New Mexico. These consultations considered a range of economic activities, including:

- Management of livestock grazing;
- Fire suppression and controlled fire;
- Habitat restoration (including invasive species eradication);
- Water management (including maintenance of irrigation ditches and livestock tanks);
- Road construction and maintenance;
- Residential and commercial development; and
- Other activities, including leopard frog recovery actions.

77. Exhibit 3-1 summarizes leopard frog conservation efforts recommended by the Service through these past consultations.

EXHIBIT 3-1. SUMMARY OF LEOPARD FROG CONSULTATION HISTORY: 2002-2010

| ACTIVITY | FEDERAL AGENCIES AND THIRD PARTIES | NUMBER OF CONSULTATIONS | CONSERVATION EFFORTS |
|--------------------------------------|--|-------------------------|--|
| Livestock Management | U.S. Forest Service Bureau of Land Management U.S. Fish and Wildlife Service | 28 | <ul style="list-style-type: none"> • Restrictions on number of livestock, allowable use rates, and when grazing can take place • Limited riparian use, invasive species control, erosion control, and fence construction • Monitoring and adaptive management |
| Fire Suppression and Controlled Fire | U.S. Forest Service Bureau of Land Management Natural Resources Conservation Service U.S. Fish and Wildlife Service | 17 | <ul style="list-style-type: none"> • Maintaining equipment away from sensitive habitat/species • Refraining from using water from habitat • Minimizing fire retardant use on aquatic habitat • For prescribed burns, limitations on burn quantities, developing a burn plan, burning at approved times, burning possible fuel periodically, and removing species from habitat before burning |
| Habitat Restoration | U.S. Forest Service U.S. Army Corps of Engineers Bureau of Land Management U.S. Fish and Wildlife Service | 17 | <ul style="list-style-type: none"> • Habitat preservation, restoration and improvement (construction, erosion control) • Threatened species enhancement/reintroduction • Invasive species monitoring/removal • Monitoring and adaptive management |

| ACTIVITY | FEDERAL AGENCIES AND THIRD PARTIES | NUMBER OF CONSULTATIONS | CONSERVATION EFFORTS |
|--|--|-------------------------|---|
| Water Management | U.S. Army Corps of Engineers U.S. Bureau of Reclamation U.S. Forest Service | 8 | <ul style="list-style-type: none"> preventing introduction of invasive species Preventing the spread of disease Minimizing habitat disturbance Monitoring/surveying and adaptive management |
| Road construction and maintenance | U.S. Army Corps of Engineers U.S. Forest Service Natural Resources Conservation Service U.S. Department of Homeland Security Bureau of Land Management | 8 | <ul style="list-style-type: none"> Minimizing habitat disturbance Preparing mitigation consultation for construction that impacts habitat Planning to re-vegetate access roads created Monitoring/surveying |
| Recreation | U.S. Forest Service Bureau of Land Management U.S. Fish and Wildlife Service | 6 | <ul style="list-style-type: none"> Habitat conservation Monitoring Non-native species removal Adaptive management |
| Development | U.S. Army Corps of Engineers | 1 | <ul style="list-style-type: none"> Water saving mechanisms Stream and vegetation restoration |
| Leopard frog recovery | U.S. Fish and Wildlife Service Bureau of Land Management | 4 | <ul style="list-style-type: none"> Following collection and transportation protocols Removing eggs with apparent disease |
| <p>Note: The number of consultations per activity does not sum to the total number of consultations because some consultations cover multiple activities.</p> <p>Sources: Consultation history in New Mexico provided by the Service on March 9, 2011 and April 7, 2011. Consultation history in Arizona obtained from http://www.fws.gov/southwest/es/arizona/Biological.htm on July 14, 2011.</p> | | | |

78. In the future, several additional Federal projects are likely to go through the section 7 consultation process regardless of the designation of critical habitat. The types of activities that Federal agencies are likely to consult upon going forward are described below.

- U.S. Bureau of Land Management.** Aquatic habitat restoration, fire suppression, fuel reduction treatments, land resource management plans, livestock grazing and management plans, mining permits, native fish and frog reestablishment, and renewable energy development. There are a variety of programs and plans on proposed critical habitat that would require consultations with the Service.
- U.S. Bureau of Reclamation.** Transportation and delivery of water, including the transportation and delivery of Central Arizona Project Water to the Gil River Basin in Arizona and New Mexico.

- **U.S. Department of Homeland Security.** Border security infrastructure and operations, which may include the Secure Border Initiative Tucson West Tower Project.
- **U.S. Department of Transportation.** Highway and bridge construction and maintenance.
- **U.S. Fish and Wildlife Service.** Section 10 permits for the enhancement of survival, HCPs, and safe harbor agreements (SHA); Incidental Take Permits; and additional fire management plans and sportfish stocking programs.
- **U.S. Forest Service.** Aquatic habitat restoration, fire management plans, fire suppression, fuel reduction treatments, forest plans, livestock grazing allotment management plans, mining permits, native fish and frog reestablishment, and travel management plans. The Apache-Sitgreaves, Coconino, Coronado, Gila, and Tonto National Forests all overlap with proposed critical habitat and have forest and other plans that will need to consider leopard frog conservation.

3.2 EXISTING BASELINE PROTECTIONS FOR THE LEOPARD FROG

79. This section describes the baseline protections currently in place for the leopard frog. These protections, including regulations, land management plans, HCPs, SHAs, and easements, provide protection to the leopard frog even absent the designation of critical habitat.

3.2.1 CLEAN WATER ACT

80. The Clean Water Act (CWA) serves as an important means by which the Service has authority to consult for endangered species and their habitat on non-Federal lands. The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the United States. It gives the Environmental Protection Agency (EPA) the authority to implement pollution control programs such as setting wastewater standards for industry. The CWA also continued requirements to set water quality standards for all contaminants in surface waters. Sections 401, 402, and 404 of the CWA may offer protection to the leopard frog by enhancing water quality, and preventing or limiting the discharge of dredge or fill materials.³⁵ In particular, 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.”³⁶ This permitting process represents a Federal nexus for purposes of section 7 consultation. Specifically, the Corps would generally go through the section 7 consultation process for the leopard frog for bridge projects, stream restoration, and urban development.

³⁵ Note that because EPA delegated authority for administering Section 402 of the CWA to Arizona, there is no Federal nexus for this section of the CWA in critical habitat units in Arizona. For critical habitat units in New Mexico, where EPA continues to administer Section 402, the Federal nexus still applies. Source: personal communication with Carrie Marr, U.S. Fish and Wildlife Service, November 17, 2011.

³⁶ U.S. Code. Title 33, 1344.

81. Since the listing of the Chiricahua leopard frog in 2002, the Service has conducted three formal section 7 consultations for it with the Corps. These consultations considered potential impacts to the leopard frog that may result from construction of an irrigation ditch, restoration along the Gila River, and rehabilitation of the Nelson Dam. Leopard frog conservation recommendations outlined in these consultations included:
- Exploring the use of water features with the AGFD and the Service, and recommending the Corps work with the Service to reestablish the leopard frog in suitable habitats.³⁷
 - Placing barrier nets upstream and downstream of the work areas to enable fish and amphibian removal and relocation upstream, minimizing removal of established native riparian vegetation for equipment access and re-planting cleared areas with native vegetation, timing in-water construction activities during low water periods while using erosion and sediment control measures, and implementing pollution control measures.³⁸
 - Leaving the Nelson Dam project as is, as it is not likely to jeopardize the leopard frog.³⁹

3.2.2 SECTION 4(D) RULE UNDER THE ACT

82. In the 2002 listing, the Service finalized a rule under Section 4(d) of the Act. The rule states that “incidental take of the species will not be considered a violation of section 9 of the Act if that take results from livestock use or maintenance activities at livestock tanks located on private, State, or Tribal lands.⁴⁰ ‘Livestock tanks,’ which provide habitat for the leopard frog, were defined as an existing or future impoundment in an ephemeral drainage or upland site constructed primarily as a watering site for livestock. Under the rule, ranchers can develop and maintain their livestock tanks on non-Federal lands, and are not penalized for activities that incidentally take leopard frogs. Additionally, private landowners are encouraged to manage habitat for the species. The Service has determined that the rule yields net conservation benefits by encouraging private landowners to maintain and operate stock tanks for cattle that serve as habitat for the leopard frog.⁴¹

3.2.3 CHIRICAHUA LEOPARD FROG RECOVERY PLAN (RECOVERY PLAN)

83. Recovery Plans are used by the Service to guide its efforts to recover and delist endangered species. Such plans help to guide conservation efforts for each species,

³⁷ U.S. Army Corps of Engineers. Biological Opinion Summary, Effects of the proposed Section 404 permit for Bachmann Springs, Ltd. Development in Cochise County, Arizona 2-21-00-1-212. August 28, 2001.

³⁸ U.S. Army Corps of Engineers. “Final Biological Opinion on the Clean Water Act 404 Permit Associated with Proposed Restoration of the Gila River at Apache Grove (SPL-2010-00233-RWF).” AESO/SE 22410-2010-F-0487. March 22, 2011.

³⁹ U.S. Army Corps of Engineers. Biological Opinion, “Rehabilitation of Nelson Dam.” AESO/SE 22410-2007-F-0403. February 3, 2009.

⁴⁰ 2002 Final Listing Rule, 67 FR 40790.

⁴¹ U.S. Fish and Wildlife Service. “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Chiricahua Leopard frog.” April 26, 2011, pp. 2-3.

ensuring that they all contribute to the ultimate goal of species recovery. The Recovery Plan for the Chiricahua leopard frog is being implemented by a two-tier recovery team, including regional steering committees and local recovery groups in eight recovery units identified for the species. Local recovery groups implement recovery actions and document their progress in annual recovery updates. Stakeholders in the process include private landowners, ranching permittees, non-governmental organizations, Arizona Game and Fish Department, New Mexico Department of Game and Fish, National Wildlife Refuges, U.S. Forest Service, U.S. Bureau of Land Management, U.S. Geological Survey, and others.⁴²

3.2.4 CONSIDERATIONS FOR MAKING EFFECTS DETERMINATIONS (CMED) AND RECOMMENDATIONS FOR REDUCING AND AVOIDING ADVERSE EFFECTS TO THE CHIRICAHUA LEOPARD FROG

84. The CMED is a guidance document based on practitioner experience in section 7 consultations and Recovery Plan implementation, which includes guidance on how to define the action area and describes how changes in habitat negatively affect the species. Under the CMED, proposed projects should consider reasonable dispersal capabilities of the species and the extent of downstream or upstream effects.⁴³ If proposed actions will result in adverse effects within these distances, the CMED recommends measures to minimize, rectify, reduce and/or compensate for adverse effects to the species and take of the species. The Forest Service, Bureau of Land Management, Bureau of Reclamation, and National Wildlife Refuges use the CMED's guidance. These agencies therefore implement conservation measures in dispersal areas not necessarily occupied by the leopard frog but that are necessary for the recovery of the leopard frog.⁴⁴ Because these guidelines are voluntary, it is possible that consultation for adverse modification on dispersal habitat and seasonally wet areas could lead to incremental impacts associated with designated critical habitat. However, communications with the Corps and the U.S. Department of Agriculture's Rural Utilities Service confirmed that both Action agencies already consider dispersal habitat when consulting for the leopard frog or for similar species.⁴⁵ Assuming that Action agencies would follow the CMED guidelines in the absence of critical habitat, conservation measures in dispersal areas will be considered part of the baseline in this analysis.

3.2.5 MALPAI BORDERLANDS HABITAT CONSERVATION PLAN

85. The Malpai Borderlands HCP covers individual landowners in the Malpai Borderlands area of southeastern Arizona and southwestern New Mexico. When landowners seek

⁴² *Ibid*, pp. 3.

⁴³ Dispersal distances for the leopard frog, as stated in the Proposed Rule, are a) within 1 mile overland, b) within 3 miles along an ephemeral or intermittent drainage, c) within 5 miles along a perennial stream, or some combination thereof (known as the "1-3-5 rule"). 76 FR 14133.

⁴⁴ U.S. Fish and Wildlife Service. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Chiricahua Leopard frog." April 26, 2011, pp. 3-4.

⁴⁵ Personal communication with Ondrea Hummel, U.S. Army Corps of Engineers, July 26, 2011; personal communication with Walt Ellsworth, Rural Utilities Service, July 26, 2011.

assistance from the Malpai Borderlands Group for projects covered by the HCP, conservation measures from the HCP are required for those projects. The leopard frog occupies covered areas of the HCP on the Magoffin Ranch (Unit 19) and the Diamond A Ranch (Unit 16). To date, no private landowners have carried out Malpai-assisted projects within the leopard frog's habitat, so this protection has not yet been utilized.⁴⁶

3.2.6 MALPAI BORDERLANDS SAFE HARBOR AGREEMENT

86. The Malpai Borderlands SHA was signed in 2004 with participation by individual landowners in the Malpai Borderlands area of Southeastern Cochise County, Arizona and southwestern Hidalgo County, New Mexico. To participate in this agreement, landowners commit to specific conservation actions for the leopard frog under Certificates of Inclusion. So far, there are two signed Certificates of Inclusion for the Magoffin Ranch (Unit 19) and the Diamond A Ranch (Unit 16), covering approximately 308 acres of non-Federal land. Two metapopulations exist in this area, contributing to species recovery under the Recovery Plan.⁴⁷

3.2.7 ARIZONA GAME AND FISH DEPARTMENT (AGFD) STATEWIDE SAFE HARBOR AGREEMENT

87. The AGFD SHA was signed in 2006 and is open to any individual landowners in the Arizona range of the leopard frog on non-Federal and tribal lands. As with the Malpai Borderlands SHA, landowners commit to specific conservation actions for the leopard frog under Certificates of Inclusion. There are 12 signed Certificates of Inclusion under this SHA covering 35,816 acres of non-Federal lands. These sites include four isolated populations and one metapopulation that are identified as contributing to species recovery by the Recovery Plan.⁴⁸ This area includes portions of Units 10, 12, 14 and 17.

3.2.8 LESLIE CANYON WATERSHED SAFE HARBOR AGREEMENT

88. The Leslie Canyon SHA was signed in 2008 and includes two enrolled properties, Bar Boot Ranch and 99 Bar Ranch. These properties cover 24,585 acres in the upper Leslie Canyon watershed downstream from the Coronado National Forest Boundary and upstream from the Leslie Canyon National Wildlife Refuge in Cochise County, Arizona. Participants in this SHA enhance and maintain enrolled properties in the Leslie Canyon Watershed to benefit several aquatic species including the leopard frog. However, currently enrolled properties do not include any proposed critical habitat for the leopard frog.⁴⁹
89. It is likely that additional landowners will sign Certificates of Inclusion for the three SHAs listed above. To the extent that additional private and state lands enter into these agreements in the future, baseline protections for the leopard frog would increase.

⁴⁶ U.S. Fish and Wildlife Service. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Chiricahua Leopard frog." April 26, 2011, pp. 4.

⁴⁷ *Ibid.*

⁴⁸ *Ibid.*

⁴⁹ *Ibid.*

3.2.9 RAMSEY CANYON LEOPARD FROG CONSERVATION AGREEMENT AND CONSERVATION ASSESSMENT AND STRATEGY

90. The Ramsey Canyon leopard frog (*Lithobates subaquavocalis* = *chiricahuensis*) was subsumed into *Lithobates chiricahuensis* (Chiricahua leopard frog) in 2008 based on further evaluation of morphometric, behavioral, and genetic traits. Conservation strategies for the Ramsey Canyon leopard frog are therefore included among baseline conservation measures for the Chiricahua leopard frog.⁵⁰ The goal of this plan is to ensure the existence of this metapopulation. This includes the preservation of privately owned ponds within canyons that are linked to the leopard frog's habitat. Units 12, 13, 14 and 15 all include conservation efforts from this agreement. The main conservation goals and objectives include:

- Remove threats and maintain occupied and unoccupied habitat, create new habitat and manage habitat;
- Establish, re-establish, and augment wild populations through translocation to suitable habitats;
- Monitor leopard frog populations to better focus efforts;
- Maintain or maximize genetic diversity; and
- Research the biology of and threats to the leopard frog.⁵¹

3.2.10 DRAFT CONSERVATION PLANS

91. The Service, AGFD, Arizona State Land Department, and an agate miner (Penney Mine Tanks) have drafted a conservation plan for managing leopard frog habitat on the mine lease, but the adequate funds have not been acquired to execute the plan.⁵² If developed, this plan would affect Unit 20, though the timeline for implementation of this plan is uncertain.

3.2.11 CONSERVATION EASEMENTS

92. Conservation easements on non-Federal lands provide protection to the leopard frog and its habitat through preventing subdivisions, limiting development, maintaining ecological conservation values or a combination of the above. Properties with conservation easements include the Diamond A Ranch (also part of Malpai Borderlands SHA), Hidalgo County, New Mexico; San Rafael Ranch (also part of AGFD SHA), Santa Cruz County, Arizona; the Nature Conservancy Ramsey Canyon Preserve (also part of AGFD SHA), Cochise County, Arizona; and the Nature Conservancy Mimbres River Preserve,

⁵⁰ Proposed critical habitat rule, 76 FR 14127.

⁵¹ Arizona Game and Fish Department, Nongame Branch, Wildlife Management Division. "Ramsey Canyon Leopard frog Conservation Agreement and Conservation Assessment and Strategy." August 2007.

⁵² Proposed critical habitat rule, 76 FR 14146.

Grant County, New Mexico.⁵³ Portions of Units 10, 14, 16 and 40 are under conservation easements.

3.2.12 FEDERAL LAND MANAGEMENT AGENCY PLANS

93. The Forest Service actively considers the leopard frog in its land management planning; and most historical and current populations occur on or near Forest Service Lands. Forest Plans are already in place for Apache-Sitgreaves, Coconino, Coronado, Gila, and Tonto National Forests. The Coconino and Tonto National Forests have made progress toward leopard frog recovery on the Red Rock Ranger District in Yavapai County, Arizona and the Pleasant Valley and Payson Ranger districts in Gila County, Arizona. The Service actively manages for the Chiricahua leopard frog on the Buenos Aires National Wildlife Refuge (BANWR) in Cochise County, Arizona (BANWR Habitat Management Plan, San Bernardino Habitat Management Plan), which holds the most robust metapopulation of leopard frogs. Lastly, the Bureau of Land Management is actively making progress toward leopard frog recovery at Las Cienegas National Conservation Area, Pima and Santa Cruz Counties, Arizona under the Las Cienegas Resource Management Plan.⁵⁴ Portions of all units except 1, 12, 15, 19, 39 and 40 are under Federal land management agency jurisdiction.

3.2.13 AREAS CONSIDERED FOR EXCLUSION

94. As a result of the baseline protections described above, the Service is considering portions of ten critical habitat units for exclusion. The areas under consideration for exclusion, as listed in Exhibit 1-4, total 1,754 acres, representing approximately 15 percent of the total proposed critical habitat area.
95. Exhibit 3-2 lists the baseline protections for the leopard frog discussed in this section, together with the proposed critical habitat units covered by each.

⁵³ U.S. Fish and Wildlife Service. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Chiricahua Leopard Frog." April 26, 2011, pp. 5.

⁵⁴ *Ibid*, pp. 5.

EXHIBIT 3-2. BASELINE PROTECTIONS FOR THE CHIRICAHUA LEOPARD FROG

| PROTECTION | CRITICAL HABITAT UNITS COVERED |
|--|---|
| Clean Water Act | All units with non-Federal land where Section 404 permits may be required |
| Section 4(D) Rule under the Endangered Species Act | All units with livestock use on non-Federal land |
| Chiricahua Leopard Frog Recovery Plan | All units |
| Considerations for Making Effects Determinations | All units |
| Malpai Borderlands Habitat Conservation Plan | 16, 19 |
| Malpai Borderlands Safe Harbor Agreement | 16, 19 |
| Arizona Game and Fish Department (AGFD) Safe Harbor Agreement | 10, 12, 14, 17 |
| Leslie Canyon Watershed Safe Harbor Agreement | No units yet |
| Ramsey Canyon Leopard Frog Conservation Agreement and Conservation Assessment and Strategy | 12, 13, 14, 15 |
| Penney Mine Tanks Conservation Plan (Draft) | 20 |
| Conservation Easements | 10, 14, 16, 40 |
| Federal Land Management Agency Plans | Portions of all units except 1, 12, 15, 19, 39, 40 |
| Sources: Proposed critical habitat rule, 76 FR 14157-14159 U.S. Fish and Wildlife Service. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Chiricahua Leopard Frog." April 26, 2011, pp. 2-5 | |

CHAPTER 4 | INCREMENTAL IMPACTS OF CRITICAL HABITAT DESIGNATION FOR THE CHIRICAHUA LEOPARD FROG

96. This chapter evaluates the potential for critical habitat designation to result in additional (“incremental”) conservation costs for the leopard frog. Section 4.1 summarizes the results of the incremental analysis; Section 4.2 provides the expected incremental administrative costs of forecast consultations for the leopard frog subject to Service review; Section 4.3 discusses why project modifications are not anticipated for consultations in unoccupied habitat; and Section 4.4 concludes with a description of key assumptions related to the analysis of incremental impacts.

4.1 SUMMARY OF RESULTS

97. The key conclusion of this analysis is that the Service does not expect designation of critical habitat to lead to any project modifications beyond those required by baseline protections for the leopard frog. Discussions with Action agencies and stakeholders have confirmed that the presence of the leopard frog in proposed habitat is already known in occupied units, and the unoccupied unit is already managed for leopard frog conservation. In addition, although Action agencies currently are not required to consult for jeopardy to the leopard frog in dispersal habitat and seasonally wet areas in occupied critical habitat units,⁵⁵ they currently do so, in accordance with the CMED for the leopard frog. Accordingly, the critical habitat designation is not anticipated to trigger new consultations in occupied habitat.

98. Because the unoccupied unit, Carr Barn Pond, is already managed for leopard frog conservation, consultation in that unit is unlikely to lead to project modifications. Even in the unoccupied unit, the incremental impacts of designating critical habitat for the leopard frog will likely consist of the following categories of administrative effort: (1) re-initiating past consultations to consider adverse modification of habitat for the leopard frog; (2) consideration of adverse modification in the context of section 7 consultations that are projected to occur in occupied habitat regardless of the critical habitat designation; and (3) consideration of adverse modification in the context of section 7 consultations projected to occur in unoccupied habitat as a result of critical habitat designation.

⁵⁵ U.S. Fish and Wildlife Service. “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Chiricahua Leopard Frog.” April 26, 2011.

KEY ISSUES AND CONCLUSIONS OF THE INCREMENTAL ANALYSIS

- **Incremental Impacts of Critical Habitat Designation.** Incremental impacts resulting from critical habitat designation for the leopard frog are limited to additional administrative efforts in the context of section 7 consultation. The present value impacts of critical habitat designation over the first 20 years (2012 through 2031) are \$1.28 million, assuming a seven percent discount rate. These costs represent an annualized impact of approximately \$113,000.
- **Project Modifications are not likely to be required by consultations for the leopard frog in the unoccupied critical habitat unit.** Communication with biologists at the U.S. Forest Service has confirmed that the unoccupied critical habitat unit is already managed for leopard frog conservation. In addition, livestock grazing is currently not allowed in the unit, so there are no permittees likely to propose projects that would require modification in order to avoid adverse modification of critical habitat.

99. Exhibit 4-1 summarizes the estimated incremental impacts of designating critical habitat for the leopard frog. Future consultations are projected for the leopard frog based on a review of the consultation history from 2002 to 2010, accounting for expected re-initiations of prior consultations. For the 20-year timeframe of this analysis, the estimated present value of total incremental costs of critical habitat designation is \$1,280,000 assuming a seven percent real discount rate. This figure represents an annualized impact of approximately \$113,000. As described above, these costs represent expectations of additional administrative effort as part of future section 7 consultations. The designation is not expected to result in additional conservation efforts for the leopard frog.

EXHIBIT 4-1. TOTAL ESTIMATED INCREMENTAL IMPACTS BY UNIT (\$2011, DISCOUNTED AT SEVEN PERCENT)

| UNIT | UNIT NAME | PRESENT VALUE | ANNUALIZED |
|------|--|---------------|------------|
| 1 | Twin Tanks and Ox Frame Tank | \$9,240 | \$879 |
| 2 | Garcia Tank | \$30,600 | \$2,770 |
| 3 | Buenos Aires NWR Central Tanks | \$30,600 | \$2,770 |
| 4 | Bonita, Upper Turner, and Mojonera Tanks | \$13,800 | \$1,230 |
| 5 | Sycamore Canyon | \$35,000 | \$3,170 |
| 6 | Pena Blanca Lake and Spring and Associated Tanks | \$35,000 | \$3,170 |
| 7 | Florida Canyon | \$9,880 | \$883 |
| 8 | Eastern Slope of the Santa Rita Mountains | \$9,880 | \$883 |
| 9 | Las Cienegas National Conservation Area | \$85,100 | \$7,840 |
| 10 | Pasture 9 Tank | \$11,400 | \$993 |
| 11 | Scotia Canyon | \$9,320 | \$799 |
| 12 | Beatty's Guest Ranch | \$8,180 | \$705 |
| 13 | Carr Barn Bond | \$24,200 | \$2,140 |
| 14 | Ramsey and Brown Canyons | \$12,900 | \$1,120 |
| 15 | High Lonesome Well | \$7,770 | \$712 |
| 16 | Peloncillo Mountains | \$30,900 | \$2,620 |
| 17 | Cave Creek | \$56,900 | \$5,020 |
| 18 | Leslie Creek | \$8,480 | \$732 |
| 19 | Rosewood and North Tanks | \$8,480 | \$732 |
| 20 | Deer Creek | \$24,100 | \$2,090 |
| 21 | Oak Spring and Oak Creek | \$24,100 | \$2,090 |
| 22 | Dragoon Mountains | \$24,300 | \$2,200 |
| 23 | Buckskin Hills | \$64,700 | \$5,630 |
| 24 | Crouch, Gentry, and Cherry Creeks, and Parallel Canyon | \$64,100 | \$5,340 |
| 25 | Ellison and Lewis Creeks | \$59,500 | \$5,030 |
| 26 | Concho Bill and Deer Creek | \$46,600 | \$3,870 |
| 27 | Campbell Blue and Coleman Creeks | \$50,100 | \$4,190 |
| 28 | Tularosa River | \$23,100 | \$2,110 |
| 29 | Deep Creek Divide Area | \$64,100 | \$5,620 |
| 30 | Main Diamond Creek | \$10,100 | \$923 |
| 31 | Beaver Creek | \$49,000 | \$4,480 |
| 32 | Left Prong of Dix Creek | \$41,900 | \$3,720 |
| 33 | Rattlesnake Pasture Tank and Associated Tanks | \$48,900 | \$4,370 |
| 34 | Coal Creek | \$48,900 | \$4,370 |
| 35 | Blue Creek | \$43,500 | \$4,020 |

| UNIT | UNIT NAME | PRESENT VALUE | ANNUALIZED |
|--------------|---------------------------------------|--------------------|------------------|
| 36 | Seco Creek | \$19,800 | \$1,810 |
| 37 | Alamosa Warm Springs | \$9,350 | \$634 |
| 38 | Cuchillo Negro Warm Springs and Creek | \$19,400 | \$1,780 |
| 39 | Ash and Bolton Springs | \$0 | \$0 |
| 40 | Mimbres River | \$51,800 | \$4,750 |
| 41 | Kerr Canyon | \$13,400 | \$1,220 |
| 42 | West Fork Gila River | \$39,300 | \$3,590 |
| 43 | South Fork Palomas Creek | \$412 | \$33 |
| Total | | \$1,280,000 | \$113,000 |

4.2 ADMINISTRATIVE COSTS OF FORECAST SECTION 7 CONSULTATIONS

100. This section describes the methodology for estimating the additional administrative costs required to consult for adverse modification resulting from designating critical habitat. It first presents estimates of the administrative costs per section 7 consultation and then discusses projections of future section 7 consultations.

4.2.1 INCREMENTAL ADMINISTRATIVE COSTS OF SECTION 7 CONSULTATIONS

101. Exhibit 4-2 summarizes incremental administrative consultation costs per effort, reproducing portions of Exhibit 2-1. These costs represent time and effort of all parties to the consultation to consider the potential for the proposed project to result in adverse modification of critical habitat. The first category includes the cost to consider adverse modification for consultations precipitated by critical habitat designation. The full costs are considered incremental for these consultations because the consultation would not have occurred (and, therefore, the costs incurred) but for the designation of critical habitat. In the case of the leopard frog, these consultations would only occur on the unoccupied critical habitat unit, Unit 13.
102. The second category considers incremental costs associated with a re-initiated consultation. In this case, the consultation is precipitated by critical habitat designation but is expected to be less costly than the previous category. This is due to the groundwork of the previously completed consultation regarding the same project.
103. The final category considers the incremental effort to consider critical habitat designation as part of a future section 7 consultation that considers both adverse modification and jeopardy. This category is the least costly as efficiencies exist when considering both jeopardy and adverse modification at the same time (e.g., in staff time for project review and report writing).

EXHIBIT 4-2. INCREMENTAL ADMINISTRATIVE CONSULTATIONS COSTS (\$2011)

| CONSULTATION TYPE | SERVICE | FEDERAL AGENCY | THIRD PARTY | BIOLOGICAL ASSESSMENT | TOTAL COSTS |
|--|----------|----------------|--------------------|-----------------------|-------------|
| NEW CONSULTATION CONSIDERING ONLY ADVERSE MODIFICATION | | | | | |
| Informal | \$1,840 | \$2,330 | \$1,540 | \$1,500 | \$7,130 |
| Formal | \$4,130 | \$4,650 | \$2,630 | \$3,600 | \$15,000 |
| Programmatic | \$12,500 | \$10,400 | n/a | \$4,200 | \$27,100 |
| RE-INITIATION OF CONSULTATION TO ADDRESS ADVERSE MODIFICATION | | | | | |
| Informal | \$1,230 | \$1,550 | \$1,030 | \$1,000 | \$4,750 |
| Formal | \$2,750 | \$3,100 | \$1,750 | \$2,400 | \$10,000 |
| Programmatic | \$8,330 | \$6,930 | n/a | \$2,800 | \$18,100 |
| ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION (ADDITIVE WITH BASELINE COSTS OF CONSIDERING JEOPARDY) | | | | | |
| Informal | \$613 | \$775 | \$513 ^a | \$500 | \$2,380 |
| Formal | \$1,380 | \$1,550 | \$875 ^a | \$1,200 | \$5,000 |
| Programmatic | \$4,160 | \$3,460 | n/a | \$1,400 | \$9,030 |
| Source: IEc analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2008, and a review of consultation records from several Service field offices across the country conducted in 2002. | | | | | |
| Notes: 1. Estimates are rounded to three significant digits and may not sum due to rounding. | | | | | |
| 2. Estimates reflect average hourly time required by staff. | | | | | |

4.2.2 FUTURE CONSULTATIONS REQUIRING ADDITIONAL EFFORT RELATED TO ADVERSE MODIFICATION

104. This section discusses the projected frequency of section 7 consultations, by unit, which would require additional administrative effort to consider adverse modification for the leopard frog. This includes consultations in occupied habitat, in which the incremental impacts of designating critical habitat would be the additional effort of addressing adverse modification in addition to jeopardy, as well as consultations in unoccupied habitat, in which the incremental impacts would be the cost of a new consultation considering only adverse modification.
105. To project the type, location, and frequency of future consultations, this analysis assumes that the section 7 consultation history since the listing of the leopard frog in 2002 is an indicator of the potential frequency and distribution of projects across the proposed critical habitat area. This analysis also considers whether available data indicate that these activity levels would likely increase or decrease in the foreseeable future. Fifty-nine percent of proposed critical habitat is Federal land managed for conservation of the leopard frog and other species, and an additional 15 percent of proposed critical habitat has in place what the Service believes to be adequate protection for the leopard frog. As shown in Exhibit 3-1, the majority of section 7 consultations for the leopard frog between 2002 and 2010 consisted either of agricultural activities (e.g., livestock management) or

conservation activities (e.g., fire suppression and controlled fire, habitat restoration, leopard frog recovery), suggesting that residential, commercial, or industrial development are not major activities in the study area. Thus, the nature of land use and management in the region indicates that the level of economic activities is unlikely to measurably change in the foreseeable future. In the case that development pressure or economic activity associated with land use changes increases in the region, this analysis would underestimate the administrative costs of consultation due to critical habitat designation for the leopard frog.

106. Between 2002 and 2010, the Service conducted 63 formal section 7 consultations for the leopard frog in Arizona, averaging about seven consultations per year. During this time period, the Service conducted 12 formal consultations in New Mexico, averaging slightly more than one consultation per year. For these consultations, the analysis examined published biological opinions to determine which proposed critical habitat units were likely affected by the actions requiring consultations. As stated above, the analysis assumes that future formal consultations for the leopard frog will follow the same pattern of frequency and geographical distribution as during the period between 2002 and 2010. The Service also conducted 16 informal consultations per year in Arizona and eight informal consultations per year in New Mexico. Absent additional information on these informal consultations, this analysis assumes that the ratio of informal to formal consultations (two to one in Arizona and eight to one in New Mexico) will remain constant in the future.⁵⁶ The analysis also assumes that informal consultations follow the same geographical distribution as formal consultations.
107. Where consultations on activities with known recurrence intervals occurred between 2002 and 2010, such as a 10-year livestock grazing permit, the analysis forecasts future consultations in the future years when they are projected to occur. For example, if a livestock grazing permit requires renewal every 10 years and was last permitted in 2005, then the analysis assumes that future consultations associated with this permitting process will occur at 10-year intervals from 2005 through 2031 (i.e., the end of the study period), or in this example, 2015 and 2025.⁵⁷

4.2.3 REINITIATIONS OF CONSULTATIONS FOR ONGOING ACTIONS

108. Past section 7 consultations on ongoing activities on Federal lands may need to be reinitiated in order to consider adverse modification to the leopard frog's habitat. Specifically, the Forest Service has indicated that consultations on multiple ongoing programs for livestock management, fire management, and habitat restoration will be

⁵⁶ The number of formal consultations presented here is derived from a review of the consultation history and differs slightly from the annual averages reported by the Service's Phoenix Field Office in the Incremental Memorandum (eight formal consultations per year in Arizona and one per year in New Mexico). The Incremental Memorandum is included in Appendix C.

⁵⁷ It is possible that some consultations may not need to be initiated if the affected action (e.g., permit re-issuance by the Forest Service) does not change. However, the analysis makes the conservative assumption that all consultations on activities with known recurrence intervals will require reinitiation in the future.

reinitiated.⁵⁸ Based on the above discussion and a review of the consultation history for the leopard frog, a total of 17 formal consultations for ongoing actions are forecast to be reinitiated to consider adverse modification.

109. Exhibit 4-3 presents the estimated the number of formal and informal section 7 consultations expected to occur in the proposed designated critical habitat units each year, based on a review of the consultation history for the leopard frog. On average, a total of about 8 formal consultations and 25 informal consultations are forecast to occur each year. These annual averages include the consultations that are forecast to occur at a known time interval. The exhibit also lists the number of consultations expected to be reinitiated in each unit. Based on communications with the Forest Service the analysis assumes that reinitiations will occur in 2012.⁵⁹ In addition to the consultations shown in the exhibit, the Forest Service has indicated that it will initiate a programmatic consultation for 11 National Forest Land and Resource Management Plans. The analysis forecasts this consultation to occur once in 2012 and once in 2025, affecting all units with land managed by the Forest Service.
110. The total administrative costs of designating critical habitat for the leopard frog are estimated by multiplying the forecast administrative costs per consultation by the projected number of formal, informal, programmatic, and reinitiated consultations (as discussed above). These costs are summarized by unit in Exhibit 4-1.

⁵⁸ Communications with Fred Wong, Elizabeth Humphrey, and Cecilia Overby, Biologists at Tonto, Apache-Sitgreaves, and Coconino National Forests, respectively, on July 26, 2011 confirmed that consultations for these ongoing programs will be re-initiated.

⁵⁹ Communications with Fred Wong, Elizabeth Humphrey, and Cecilia Overby, Biologists at Tonto, Apache-Sitgreaves, and Coconino National Forests, respectively, on July 26, 2011 indicated that re-initiations will occur in 2012.

EXHIBIT 4-3. PROJECTED SECTION 7 CONSULTATIONS PER YEAR AND TOTAL RE-INITIATIONS BY UNIT

| UNIT | UNIT NAME | NUMBER OF CONSULTATIONS PER YEAR | | REINITIATIONS IN 2012 (FORMAL) |
|------|--|----------------------------------|----------|--------------------------------|
| | | FORMAL | INFORMAL | |
| 1 | Twin Tanks and Ox Frame Tank | 0.1 | 0.1 | 0.0 |
| 2 | Garcia Tank | 0.2 | 0.7 | 0.1 |
| 3 | Buenos Aires NWR Central Tanks | 0.2 | 0.7 | 0.1 |
| 4 | Bonita, Upper Turner, and Mojonera Tanks | 0.1 | 0.2 | 0.1 |
| 5 | Sycamore Canyon | 0.3 | 0.7 | 0.1 |
| 6 | Pena Blanca Lake and Spring and Associated Tanks | 0.3 | 0.7 | 0.1 |
| 7 | Florida Canyon | <0.1 | 0.2 | 0.1 |
| 8 | Eastern Slope of the Santa Rita Mountains | <0.1 | 0.2 | 0.1 |
| 9 | Las Cienegas National Conservation Area | 0.8 | 1.7 | 0.0 |
| 10 | Pasture 9 Tank | <0.1 | 0.2 | 0.2 |
| 11 | Scotia Canyon | <0.1 | 0.1 | 0.2 |
| 12 | Beatty's Guest Ranch | <0.1 | 0.1 | 0.2 |
| 13 | Carr Barn Bond | <0.1 | 0.1 | 0.2 |
| 14 | Ramsey and Brown Canyons | <0.1 | 0.2 | 0.2 |
| 15 | High Lonesome Well | <0.1 | 0.3 | 0.0 |
| 16 | Peloncillo Mountains | 0.2 | 0.4 | 1.2 |
| 17 | Cave Creek | 0.2 | 0.6 | 0.2 |
| 18 | Leslie Creek | <0.1 | 0.2 | 0.2 |
| 19 | Rosewood and North Tanks | <0.1 | 0.2 | 0.2 |
| 20 | Deer Creek | 0.1 | 0.4 | 0.5 |
| 21 | Oak Spring and Oak Creek | 0.1 | 0.4 | 0.5 |
| 22 | Dragoon Mountains | 0.2 | 0.5 | 0.2 |
| 23 | Buckskin Hills | 0.6 | 0.7 | 1.8 |
| 24 | Crouch, Gentry, and Cherry Creeks, and Parallel Canyon | 0.4 | 0.7 | 2.3 |
| 25 | Ellison and Lewis Creeks | 0.4 | 0.7 | 1.8 |
| 26 | Concho Bill and Deer Creek | 0.4 | 0.5 | 1.2 |
| 27 | Campbell Blue and Coleman Creeks | 0.4 | 0.5 | 1.2 |
| 28 | Tularosa River | <0.1 | 0.8 | 0.0 |
| 29 | Deep Creek Divide Area | 0.2 | 1.6 | 1.0 |
| 30 | Main Diamond Creek | <0.1 | 0.3 | 0.0 |
| 31 | Beaver Creek | 0.1 | 1.6 | 0.0 |
| 32 | Left Prong of Dix Creek | 0.3 | 0.8 | 0.5 |
| 33 | Rattlesnake Pasture Tank and Associated Tanks | 0.4 | 0.9 | 0.5 |

| UNIT | UNIT NAME | NUMBER OF CONSULTATIONS PER YEAR | | REINITIATIONS IN 2012 (FORMAL) |
|--------------|---------------------------------------|----------------------------------|-------------|--------------------------------|
| | | FORMAL | INFORMAL | |
| 34 | Coal Creek | 0.4 | 0.9 | 0.5 |
| 35 | Blue Creek | 0.2 | 1.3 | 0.0 |
| 36 | Seco Creek | <0.1 | 0.7 | 0.0 |
| 37 | Alamosa Warm Springs | 0.0 | 0.0 | 1.0 |
| 38 | Cuchillo Negro Warm Springs and Creek | <0.1 | 0.7 | 0.0 |
| 39 | Ash and Bolton Springs | 0.0 | 0.0 | 0.0 |
| 40 | Mimbres River | 0.1 | 1.7 | 0.0 |
| 41 | Kerr Canyon | <0.1 | 0.4 | 0.0 |
| 42 | West Fork Gila River | 0.1 | 1.3 | 0.0 |
| 43 | South Fork Palomas Creek | 0.0 | 0.0 | 0.0 |
| Total | | 8.2 | 25.0 | 17.0 |

Notes:

1. The number of consultations per year represents an annual average over the 20-year analytic time frame. Thus, 0.1 consultations per year is equivalent to two consultations over 20 years.
2. The number of formal consultations includes a projection of expected annual consultations, including consultations forecast to occur at a known time interval.
3. In addition to the formal and informal consultations listed in the exhibit, the analysis forecasts one programmatic consultation to occur in U.S.F.S. lands in 2012 and 2025. This consultation covers Units 4, 5, 6, 7, 8, 11, 13, 14, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 36, 41, 42, and 43.
4. Values do not sum to totals due to rounding.

Sources: Derived from the consultation history for the Chiricahua Leopard Frog. Consultation history in New Mexico provided by the Service on March 9, 2011 and April 7, 2011. Consultation history in Arizona obtained from <http://www.fws.gov/southwest/es/arizona/Biological.htm> on July 14, 2011.

4.3 UNOCCUPIED HABITAT

111. As noted in Chapter 2, the Service believes that any project modifications in unoccupied habitat implemented to avoid adversely modifying critical habitat for the leopard frog will be incremental to the baseline protections afforded the leopard frog. That is, these modifications would not be required absent the listing. However, biologists at the U.S. Forest Service do not expect that consultations for the leopard frog in the unoccupied Carr Barr Pond Unit will lead to any project modifications. This unit consists of 0.6 acres of land currently used by the Forest Service as a horse pasture, so there are no permittees that could propose projects requiring modification to avoid adverse modification.⁶⁰

⁶⁰ Personal communication with Glenn Frederick, Coronado National Forest, July 14, 2011.

4.4 KEY ASSUMPTIONS

112. The key conclusion of this analysis is that the Service expects that incremental impacts of designating critical habitat for the leopard frog will consist only of additional administrative costs. This conclusion, and the resulting cost estimates, rely on the following assumptions:

- **Designation of critical habitat will result in new consultations for adverse modification of critical habitat only in unoccupied units.** The Service recognizes that designation of critical habitat could trigger new consultations for adverse modification in occupied units for one of two reasons:
 1. Designation of critical habitat provides new information to Action agencies about the presence of leopard frogs in occupied habitat, or
 2. Action agencies have not previously consulted for jeopardy in dispersal habitat and seasonally wet areas.

As discussed in Chapter 2 and Chapter 3, however, communication with several Action agencies—including the U.S. Forest Service, the Bureau of Land Management, the Corps, and the Rural Utilities Service—has confirmed both that they are already aware of the presence of the leopard frog and that they already account for dispersal habitat and seasonally wet areas when they consult for jeopardy. Consequently, it is reasonable to assume that Action agencies are unlikely to initiate new consultations for adverse modification in occupied units as a result of critical habitat designation.

- **The number and location of past section 7 consultations is indicative of future consultations.** As discussed above, land use activities are not expected to change substantially in any of the proposed critical habitat units. The fact that a majority of the land area in the proposed critical habitat is already managed for conservation of the leopard frog and other species supports this assumption. However, it is possible that residential, commercial, or industrial development activities could increase in the region. If activity levels increase in the future, it is possible that this analysis underestimates associated incremental costs of section 7 consultation.
- **Additional baseline protections will not substantially change incremental impacts.** It is possible that additional conservation measures could be implemented for the leopard frog even in the absence of critical habitat designation. For example, additional participation in SHAs and development of additional HCPs could reduce the number of future per-project consultations and associated costs. In such a case, this analysis would overestimate incremental impacts.

CHAPTER 5 | ECONOMIC BENEFITS OF CRITICAL HABITAT DESIGNATION FOR THE CHIRICAHUA LEOPARD FROG

113. There are two types of economic benefits that could result from the proposed critical habitat designation: direct benefits and ancillary benefits. The primary intended benefit of critical habitat (i.e., the direct benefit) is to support the conservation of threatened and endangered species, such as the Chiricahua leopard frog. 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 the leopard frog resulting from this designation.
114. Quantification and monetization of species conservation benefits would require information on the incremental change in the probability of leopard frog conservation that is expected to result from the designation. As described in Chapters 3 and 4, however, modifications to future projects are unlikely given the extensive baseline protections already provided to leopard frog habitat under various conservation plans and safe harbor agreements. Thus, it is difficult to determine the extent to which the designation is likely to materially increase the probability that the species will be conserved. Furthermore, there is no published valuation literature to support monetization of such changes for this species.
115. Numerous published studies estimate individuals' willingness to pay to protect endangered species.⁶¹ The economic values reported in these studies reflect various groupings of benefit categories (including both use and non-use values). For example, these studies assess public willingness to pay for wildlife-viewing opportunities, for the option of seeing or experiencing the species in the future, to assure that the species will exist for future generations, and simply knowing a species exists, among other values. Unfortunately, this literature addresses a relatively narrow range of species and circumstances compared to the hundreds of species and habitats that are the focus of the Act. Specifically, existing studies focus almost exclusively on large mammal, bird, and fish species, and generally do not report values for incremental changes in species conservation. We are not aware of any published studies that estimate the value the public places on preserving the Chiricahua leopard frog or other frog species.
116. Other ancillary benefits may also be achieved through designation of critical habitat. For example, the public may hold a value for habitat conservation, beyond its willingness to pay for conservation of a specific species. Studies have estimated the public's

⁶¹ See, for example, Loomis, J.B. and Douglas S. White. 1996. Economic Benefits of Rare and Endangered Species: Summary and Meta-Analysis. *Ecological Economics*, 18(3): 197-206.

willingness to pay to preserve wilderness areas for wildlife management and preservation programs, protection of open space, and ecosystem maintenance. These studies address categories of benefits (e.g., ecosystem integrity) that may be similar to the types of benefits provided by critical habitat, but do not provide values that can be used to establish the incremental values associated with this proposed critical habitat designation (i.e., the ecosystem and species protection measures in these studies are too dissimilar from the habitat protection benefits that may be afforded by this designation). Again, because the extent to which designation of critical habitat for the leopard frog will provide habitat and species protection above existing baseline protections is unknown, estimation of expected ancillary benefits is not feasible.

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APPENDIX A | SMALL BUSINESS AND ENERGY IMPACTS ANALYSES

117. 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.
118. 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

119. 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).⁶² 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. To assist in this process, this appendix provides a screening level analysis of the potential for leopard frog critical habitat to affect small entities.
120. To ensure broad consideration of impacts on small entities, the Service has prepared this small business analysis without first making the threshold determination in the proposed rule regarding whether the proposed critical habitat designation could be certified as not having a significant economic impact on a substantial number of small entities. This small business analysis will therefore inform the Service's threshold determination.

⁶² 5 U.S.C. § 601 et seq.

A.1.1 SUMMARY OF IMPACTS TO SMALL ENTITIES

121. This screening analysis is based on the estimated incremental impacts associated with the proposed rulemaking.⁶³ As discussed in Chapter 3 and 4 of this analysis, activities that may be affected by the designation include livestock management, fire management, habitat management, water management, transportation, recreation, and development.
122. Small entities may participate in section 7 consultation as a third party (the primary consulting parties being the Service and the Federal action agency). It is therefore possible that the small entities may spend additional time considering critical habitat during section 7 consultation for the leopard frog. These incremental administrative impacts to third parties are also considered in this analysis. 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.
123. Review of the consultation history revealed that, of the seven activities listed above, fire management and recreation do not involve consultation with third parties, so small entities would not be affected by consultation for these activities. Habitat restoration activities also generally do not involve consultation with third parties, though a few consultations did include participation of cattle ranches. Accordingly, the small entities most likely to be affected by the designation of critical habitat for the leopard frog fall into four categories: livestock management, water management, transportation, and development.
124. Exhibit A-1 describes the number of entities that may bear incremental impacts related to these activities. It presents the relevant small entity thresholds by North American Industry Classification System (NAICS) code, the total number of entities and small entities in proposed critical habitat, and the estimated annualized incremental impacts to small entities in each activity category. For reference, the exhibit also presents the small entity size standard for each industry, which is the upper bound revenue figures for small entities within each industry; note that the average annual revenues for small businesses in the region will likely be lower.
125. As shown in Exhibit A-1, this analysis estimates that up to 171 small entities may be affected by section 7 consultations stemming from this rule. Annualized incremental economic impacts to small businesses range from \$251 per year for transportation and residential and commercial development to \$8,270 per year for livestock management.
126. Although 171 entities would represent a substantial number, this is likely to be a high-end estimate of the number of small businesses that would be affected by this rule for several reasons:
- It assumes that each consultation projected to occur between 2012 and 2031 in the four activity categories will involve the participation of a third party;

⁶³ As discussed in greater detail in Chapter 2, determination of baseline and incremental impacts depends on whether the area is considered occupied.

- It assumes that one small entity will participate in each forecast consultation, but it is possible that the same entity may participate in multiple consultations. For example, the analysis forecasts up to 135 consultations that may involve the participation of small cattle ranches, but the number of ranches participating in these consultations could range from 1 to 135; and
 - It assumes that each third party will be a small entity, although some consulting parties may not be small.
127. Consequently, this approach likely overstates the number of small entities that may be affected by the critical habitat designation.
128. Similarly, although the highest annualized impact of \$8,270 per year for livestock management would represent a significant impact if those costs are borne by only a few small ranchers with annual revenues that are considerably lower than the small entity revenue size standard of \$750,000 per year, this is an unlikely outcome. In the extreme case where a single ranch participates in all 135 consultations, annualized impacts to that single entity would be \$8,270; however, in the other extreme, if 135 small ranches each participate in a single consultation, annualized impacts to each entity would be approximately \$61. If 68 small ranches participate (i.e., the midpoint between 1 and 135), the annualized impacts would be \$122 per entity. Given that the consultations on livestock management activities are projected to occur on U.S. Forest Service allotments and other Federally managed areas that are spread over large parts of Arizona and New Mexico, it is unlikely that only a few ranchers would participate in all 135 of these consultations. If only a few did participate, it is unlikely that these entities would be small businesses. As a result, although the analysis does not have access to average annual revenues for small entities in the proposed critical habitat areas and thus cannot estimate annualized impacts as a percent of annual revenues, it is unlikely that these impacts would be significant.

EXHIBIT A-1. SUMMARY OF UPPER-BOUND POTENTIAL IMPACTS ON SMALL ENTITIES

| ACTIVITY | INDUSTRY (NAICS CODES) | SMALL ENTITY SIZE STANDARD | TOTAL NUMBER OF ENTITIES | NUMBER OF SMALL ENTITIES | NUMBER OF AFFECTED SMALL ENTITIES ¹ | ANNUALIZED INCREMENTAL ECONOMIC IMPACTS TO SMALL BUSINESSES (7%) |
|--|---|----------------------------|--------------------------|--------------------------|--|--|
| Livestock Management | Beef Cattle Ranching and Farming (112111) | \$750,000 | 162 | 135 | Up to 135 | \$8,270 |
| Water Management | Water Supply and Irrigation Systems (221310) | \$7.0 million | 120 | 104 | Up to 18 | \$501 |
| Transportation | Highway, Street, and Bridge Construction (237310) | \$33.5 million | 165 | 154 | Up to 9 | \$251 |
| Residential and Commercial Development | New Single-Family Housing Construction (236115) | \$33.5 million | 3,239 | 3,207 | Up to 9 | \$251 |
| | New Housing Operative Builders (236117) | | 62 | 58 | | |
| | Land Subdivision (237210) | \$7.0 million | 416 | 277 | | |

Notes:

1. To estimate the number of affected small entities, this analysis assumes one small entity per forecast section 7 consultation, rounded up to the nearest unit. In the case of livestock management, the analysis forecasts 286 consultations over 20 years (74 formal and 212 informal), which exceeds the total number of small ranches in the area, so the analysis uses the total number of small ranches (135) as the upper bound.

2. Annual revenues are estimated using Risk Management Association (RMA), *Annual Statement Studies: Financial Ratio Benchmarks 2010 to 2011*, 2010. For each NAICS code, RMA provides the net sales and the number of entities falling within several sales categories: \$0 to \$500,000, \$500,000 to \$2 million, \$2 to \$10 million, or \$10 to \$50 million. Based on the number of entities and total net sales falling within each sales category, we developed an estimate of average net sales (revenues) per small entity. Specifically, the analysis averages data for the sales categories at or below the small business threshold for each industry.

Source: Dialog search of File 516, Dun and Bradstreet, "Duns Market Identifiers," on June 23, 2011.

A.1.2 DETAILED ANALYSIS OF IMPACTS TO SMALL BUSINESSES

129. 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 rulemaking. 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."
130. Three types of small entities are defined in the RFA:
- **Small Business** - Section 601(3) of the RFA defines a small business as having the same meaning as small business concern under section 3 of the Small Business Act. This includes any firm that is independently owned and operated and is not dominant in its field of operation. The SBA has developed size standards to carry out the purposes of the Small Business Act, and those size standards can be found in 13 CFR 121.201. The size standards are matched to 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.
131. 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.⁶⁴

132. Similarly, *American Trucking Associations, Inc. v. Environmental Protection Agency* addressed a rulemaking in which EPA established a primary national ambient air quality standard for ozone and particulate matter.⁶⁵ The basis of EPA's RFA/SBREFA certification was that this standard did not directly regulate small entities; instead, small entities were indirectly regulated through the implementation of state plans that incorporated the standards. The court found that, while EPA imposed regulation on states, it did not have authority under this rule to impose regulations directly on small entities and therefore small entities were not directly impacted within the definition of the RFA.
133. 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.⁶⁶ "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."⁶⁷
134. The regulatory mechanism through which critical habitat protections are enforced is section 7 of the Act, which directly regulates only those activities carried out, funded, or permitted by a Federal agency. By definition, Federal agencies are not considered small entities, although the activities they may fund or permit may be proposed or carried out by small entities. Given the SBA guidance described above, this analysis considers the extent to which this designation could potentially affect small entities, regardless of whether these entities would be directly regulated by the Service through the proposed rule or by a delegation of impact from the directly regulated entity.
135. This screening analysis focuses on small entities that may bear the incremental impacts of this rulemaking quantified in Chapter 4 of this economic analysis. Small entities also may participate in section 7 consultation as a third party (the primary consulting parties

⁶⁴ 773 F. 2d 327 (D.C. Cir. 1985).

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

⁶⁶ Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act, pg. 20.

⁶⁷ *Ibid.*, pg. 21.

being the Service and the Federal action agency). It is therefore possible that the small entities may spend additional time considering critical habitat during section 7 consultation for the leopard frog. 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.

136. As described above and detailed in Chapters 3 and 4 of this report, estimated incremental costs that may be borne by small entities consist of additional administrative costs for livestock management, water management, transportation, and development activities. These potential impacts are described in greater detail below.
- **Livestock management.** Incremental costs to small livestock management entities are estimated at \$8,270 on an annualized basis (discounted at seven percent). Assuming that between 1 and 135 small entities undergo section 7 consultation over the 20-year period considered in this analysis, annualized impacts per small entity are expected to be between \$61 and \$8,270.
 - **Water Management.** Incremental costs to water management activities that may be borne by small entities are estimated at \$501 on an annualized basis. Assuming that between 1 and 18 small entities undergo section 7 consultation, annualized impacts per small entity are expected to be between \$28 and \$501.
 - **Transportation.** Incremental costs to transportation activities that may be borne by small entities are estimated at \$251 on an annualized basis. Assuming that these impacts are borne by between one and nine small entities, annualized impacts per small entity are expected to be between \$28 and \$251.
 - **Residential and Commercial Development.** Potential incremental impacts to small development firms are estimated to be \$251 on an annualized basis. Assuming that these impacts are borne by between one and nine small entities, annualized impacts per small entity are expected to be between \$28 and \$251.

A.2 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY

137. 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.”⁶⁸

⁶⁸ 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>.

138. OMB 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.⁶⁹
139. As none of these criteria is relevant to this analysis, energy-related impacts associated with leopard frog conservation activities within the proposed critical habitat are not expected.

⁶⁹ *Ibid.*

APPENDIX B | SENSITIVITY OF RESULTS TO DISCOUNT RATE

140. This appendix summarizes the costs of leopard frog 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).

EXHIBIT B-1. ESTIMATED INCREMENTAL IMPACTS, BY HABITAT UNIT (2011\$, DISCOUNTED AT 3 PERCENT)

| UNIT | UNIT NAME | PRESENT VALUE | ANNUALIZED |
|------|--|---------------|------------|
| 1 | Twin Tanks and Ox Frame Tank | \$13,500 | \$879 |
| 2 | Garcia Tank | \$42,500 | \$2,770 |
| 3 | Buenos Aires NWR Central Tanks | \$42,500 | \$2,770 |
| 4 | Bonita, Upper Turner, and Mojonera Tanks | \$18,800 | \$1,230 |
| 5 | Sycamore Canyon | \$48,600 | \$3,170 |
| 6 | Pena Blanca Lake and Spring and Associated Tanks | \$48,600 | \$3,170 |
| 7 | Florida Canyon | \$13,500 | \$883 |
| 8 | Eastern Slope of the Santa Rita Mountains | \$13,500 | \$883 |
| 9 | Las Cienegas National Conservation Area | \$120,000 | \$7,840 |
| 10 | Pasture 9 Tank | \$15,200 | \$993 |
| 11 | Scotia Canyon | \$12,300 | \$799 |
| 12 | Beatty's Guest Ranch | \$10,800 | \$705 |
| 13 | Carr Barn Bond | \$32,800 | \$2,140 |
| 14 | Ramsey and Brown Canyons | \$17,200 | \$1,120 |
| 15 | High Lonesome Well | \$10,900 | \$712 |
| 16 | Peloncillo Mountains | \$40,100 | \$2,620 |
| 17 | Cave Creek | \$79,400 | \$5,180 |
| 18 | Leslie Creek | \$11,200 | \$732 |
| 19 | Rosewood and North Tanks | \$11,200 | \$732 |
| 20 | Deer Creek | \$32,000 | \$2,090 |
| 21 | Oak Spring and Oak Creek | \$32,000 | \$2,090 |
| 22 | Dragoon Mountains | \$33,700 | \$2,200 |

| UNIT | UNIT NAME | PRESENT VALUE | ANNUALIZED |
|--|--|---------------|------------|
| 23 | Buckskin Hills | \$86,300 | \$5,630 |
| 24 | Crouch, Gentry, and Cherry Creeks, and Parallel Canyon | \$81,900 | \$5,340 |
| 25 | Ellison and Lewis Creeks | \$77,000 | \$5,030 |
| 26 | Concho Bill and Deer Creek | \$59,300 | \$3,870 |
| 27 | Campbell Blue and Coleman Creeks | \$64,200 | \$4,190 |
| 28 | Tularosa River | \$32,300 | \$2,110 |
| 29 | Deep Creek Divide Area | \$86,200 | \$5,620 |
| 30 | Main Diamond Creek | \$14,100 | \$923 |
| 31 | Beaver Creek | \$68,700 | \$4,480 |
| 32 | Left Prong of Dix Creek | \$57,000 | \$3,720 |
| 33 | Rattlesnake Pasture Tank and Associated Tanks | \$66,900 | \$4,370 |
| 34 | Coal Creek | \$66,900 | \$4,370 |
| 35 | Blue Creek | \$61,600 | \$4,020 |
| 36 | Seco Creek | \$27,800 | \$1,810 |
| 37 | Alamosa Warm Springs | \$9,710 | \$634 |
| 38 | Cuchillo Negro Warm Springs and Creek | \$27,300 | \$1,780 |
| 39 | Ash and Bolton Springs | \$0 | \$0 |
| 40 | Mimbres River | \$72,700 | \$4,750 |
| 41 | Kerr Canyon | \$18,700 | \$1,220 |
| 42 | West Fork Gila River | \$55,100 | \$3,590 |
| 43 | South Fork Palomas Creek | \$508 | \$33 |
| Total | | \$1,730,000 | \$113,000 |
| Note: Values are rounded to three significant figures. Totals may not sum due to rounding. | | | |

APPENDIX C:
INCREMENTAL EFFECTS MEMORANDUM TO IEC