



ECONOMIC ANALYSIS OF CRITICAL
HABITAT DESIGNATION FOR THE
PHANTOM CAVE SNAIL, PHANTOM
SPRINGSNAIL, DIMINUTIVE AMPHIPOD,
DIAMOND Y SPRING SNAIL, GONZALES
SPRINGSNAIL, AND PECOS AMPHIPOD

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EXECUTIVE SUMMARY

1. The purpose of this report is to evaluate the potential economic impacts associated with the designation of critical habitat for six West Texas invertebrate species. On August 16, 2012, the U.S. Fish and Wildlife Service (Service) published a Proposed Rule proposing both the listing of these species as endangered, as well as critical habitat designation for each species under the Endangered Species Act (Act).¹ The proposed critical habitat designation includes five units totaling approximately 450 acres in Reeves, Jeff Davis, and Pecos Counties, Texas. As described in the Proposed Rule, each of the units is occupied by one or more of the six invertebrate species.
2. This analysis first qualitatively describes protections provided by Federal, State and local statutes and regulations that may affect proposed critical habitat areas, including the listing of the species under the Act. These protections are not generated by or affected by critical habitat; they are “baseline” protections afforded the invertebrates regardless of the designation of critical habitat. The discussion of baseline protections provides context for the evaluation of the “incremental” economic impacts of critical habitat designation, those impacts that are not expected to occur absent critical habitat. Such incremental impacts are the focus of this analysis. Because the Service believes that the direct benefits of the Proposed Rule are best expressed in biological terms, this analysis provides qualitative discussion of economic benefits at the end of this report.
3. The Service has stated that, due to the specific life history circumstances of these six invertebrate species, any negative impacts to critical habitat would represent a threat to the continued existence of the species.² Therefore, no incremental conservation costs are expected to occur, as all potential conservation efforts recommended for protection of critical habitat would otherwise be recommended due to the listing of the species. However, the potential exists for Federal agencies and private entities to incur incremental administrative costs during the section 7 consultation process, where proponents of projects receiving Federal funding or permitting are required to consult the Service in an effort to avoid adverse effects on listed species and their critical habitat. Incremental administrative impacts related to consultations on the six West Texas invertebrates and their critical habitat are expected to amount to \$41,000 over 20 years (\$3,600 on an annualized basis), assuming a discount rate of seven percent.

¹ U.S. Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants; Endangered Status for Six West Texas Aquatic Invertebrate Species and Designation of Critical Habitat; Proposed Rule. 77 FR 49602 *et seq.* August 16, 2012.

² U.S. Fish and Wildlife Service, Field Supervisor, Austin ESFO. “Memorandum to Jennifer Baxter, Industrial Economics, Inc., Subject: Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Six West Texas Invertebrates,” August 27, 2012.

CHAPTER 1 | INTRODUCTION

1.1 INTRODUCTION

1. This report estimates the economic costs of proposed critical habitat for six species of invertebrates: Phantom Cave snail (*Pyrgulopsis texana*), Phantom springsnail (*Tryonia cheatumi*), diminutive amphipod (*Gammarus hyalleloides*), Diamond Y Spring snail (*Pseudotryonia adamantina*), Gonzales springsnail (*Tryonia circumstriata*), and Pecos amphipod (*Gammarus pecos*) (hereafter, “six invertebrates”). The report was prepared by Industrial Economics, Incorporated (IEc) for the U.S. Fish and Wildlife Service (Service).
2. This analysis identifies the incremental economic effects of the proposed rule by estimating the costs of actions taken to protect the six invertebrates and their habitat under two scenarios, one “without critical habitat” and the other “with critical habitat.” The difference between the two represents the incremental costs of the proposed rule. This information is intended to assist the Secretary in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation, unless such exclusion would result in the extinction of the species.³ In addition, this information allows the Service to address the requirements of Executive Orders (E.O.) 12866 (as amended by 13563), 13211, and 12630, the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA), and the Unfunded Mandates Reform Act (UMRA).⁴
3. This chapter provides a brief introduction to the 2012 proposed critical habitat for the six invertebrates. It includes a map of the proposed units, an overview of the framework of the analysis, and a summary of threats to the proposed critical habitat, as determined by the Service. Detailed discussion of the framework for this analysis is provided in Appendix B.

1.2 PROPOSED CRITICAL HABITAT DESIGNATION

4. The six invertebrates occupy springs, seeps, sinkholes, and wetlands in Jeff Davis, Reeves, and Pecos Counties, Texas. The species are not currently listed and no critical

³ 16 U.S.C. §1533(b)(2).

⁴ Executive Order 12866, Regulatory Planning and Review, September 30, 1993 (as amended by Executive Order 13563 (2011)); Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights, March 15, 1988; Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001; 5. U.S.C. § 601 et seq; Pub Law No. 104-121; and 2 U.S.C. 1501, et seq.

habitat designations have been previously proposed. The Service is proposing three units in Reeves County, one in Jeff Davis County, and one in Pecos County.

5. Exhibits 1-1 through 1-6 summarize the proposed units in tabular and map form. Note that all the proposed units are currently occupied by one or more of the six invertebrate species.

EXHIBIT 1-1 SUMMARY OF PROPOSED CRITICAL HABITAT, BY UNIT

CRITICAL HABITAT UNIT	COUNTY	LAND OWNERSHIP	WEST TEXAS INVERTEBRATE SPECIES PRESENT	UNIT ACREAGE
San Solomon Spring Unit	Reeves	State-Texas Parks and Wildlife Department	Phantom Cave snail, Phantom springsnail, and diminutive amphipod	4.4 acres
Giffin Spring Unit		Private landowner		1.7 acres
East Sandia Spring Unit		Private-The Nature Conservancy		3.0 acres
Phantom Lake Spring Unit	Jeff Davis	Federal-Bureau of Reclamation		0.05 acres
Diamond Y Spring Unit	Pecos	Private-The Nature Conservancy	Diamond Y Spring snail, Gonzales springsnail, and Pecos amphipod	441.4 acres
TOTAL				450.6 acres

EXHIBIT 1-2. OVERVIEW OF PROPOSED CRITICAL HABITAT

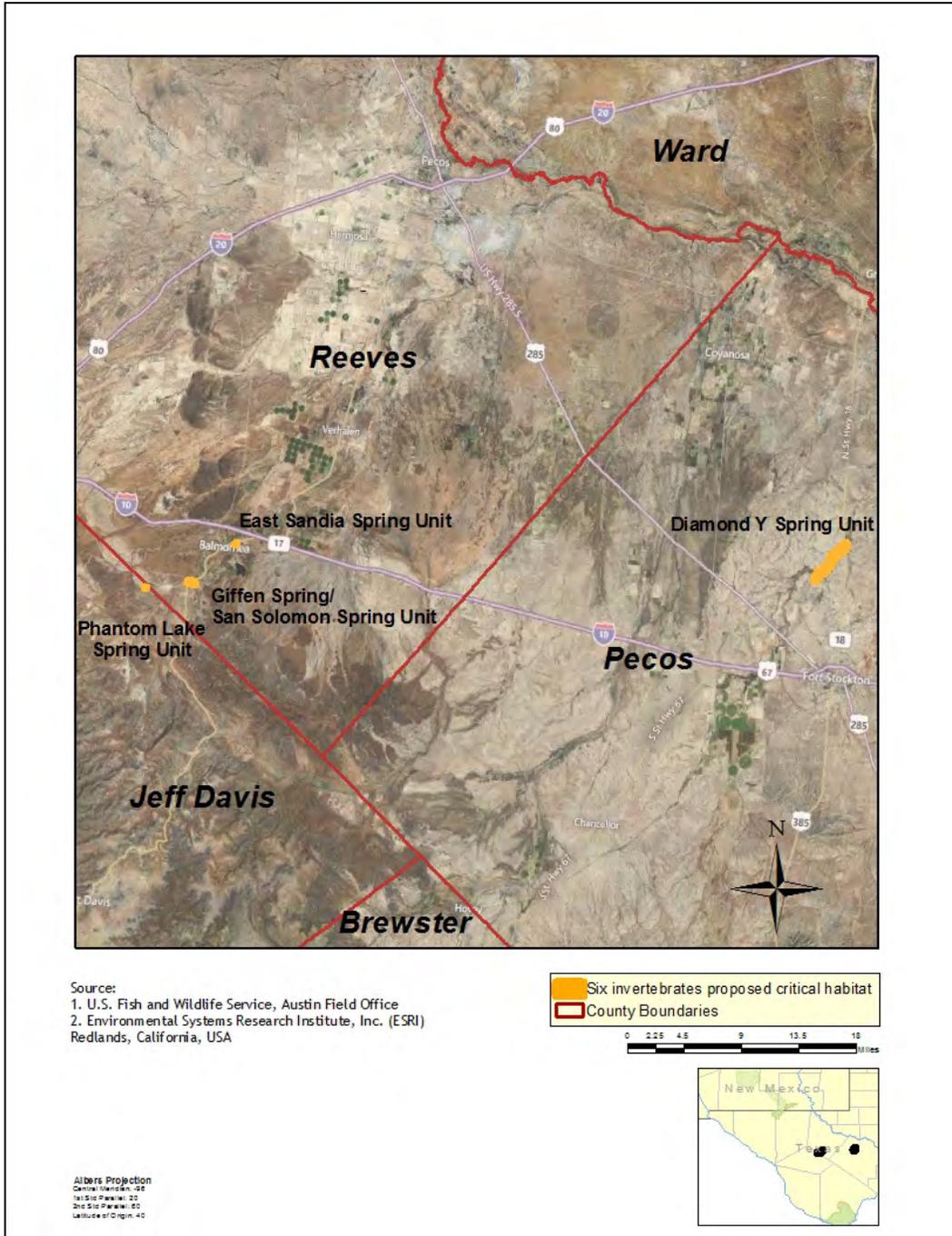


EXHIBIT 1-3. PROPOSED CRITICAL HABITAT - SAN SOLOMON SPRING SYSTEM AND GIFFIN SPRING UNIT

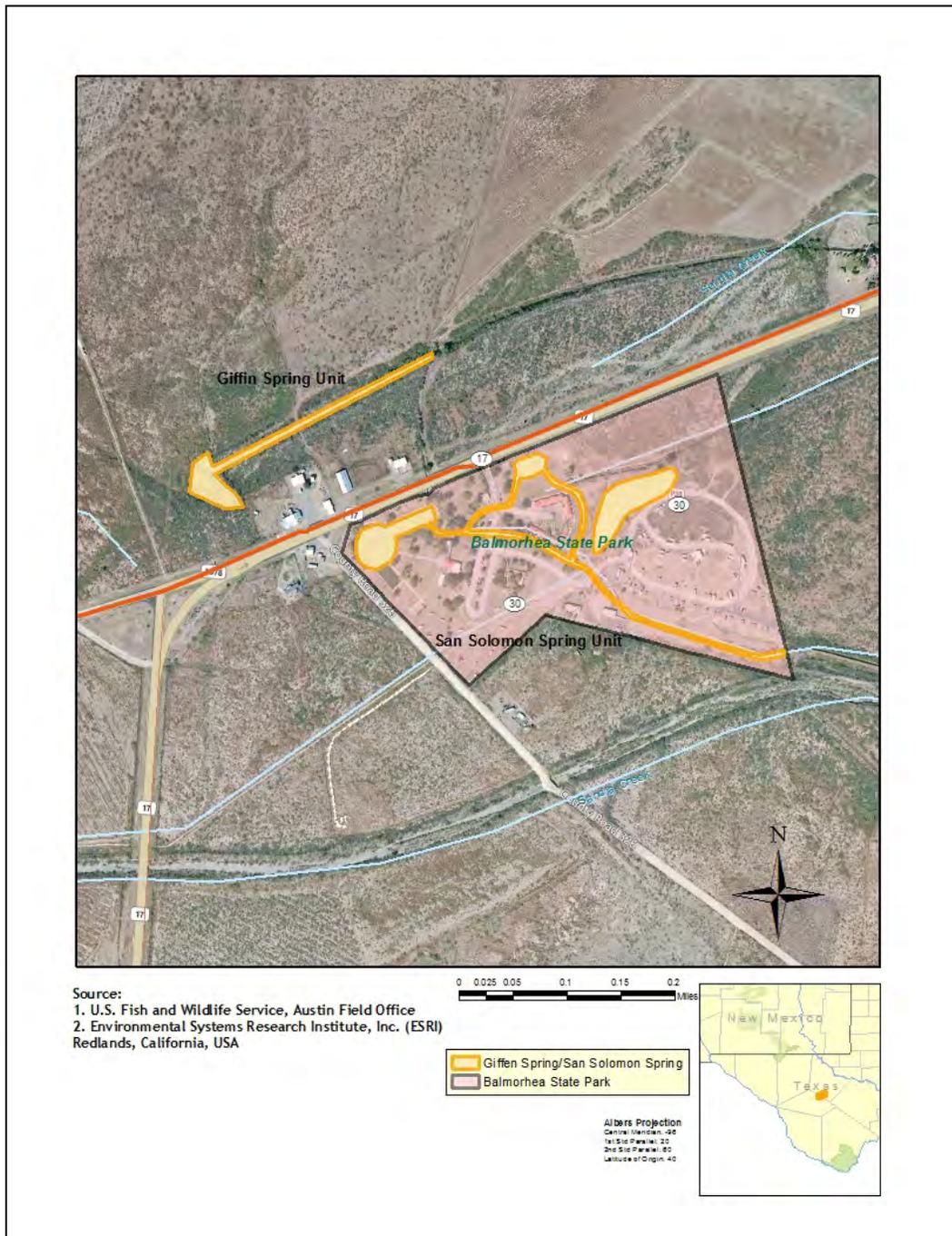


EXHIBIT 1-4. PROPOSED CRITICAL HABITAT - PHANTOM LAKE SPRING UNIT

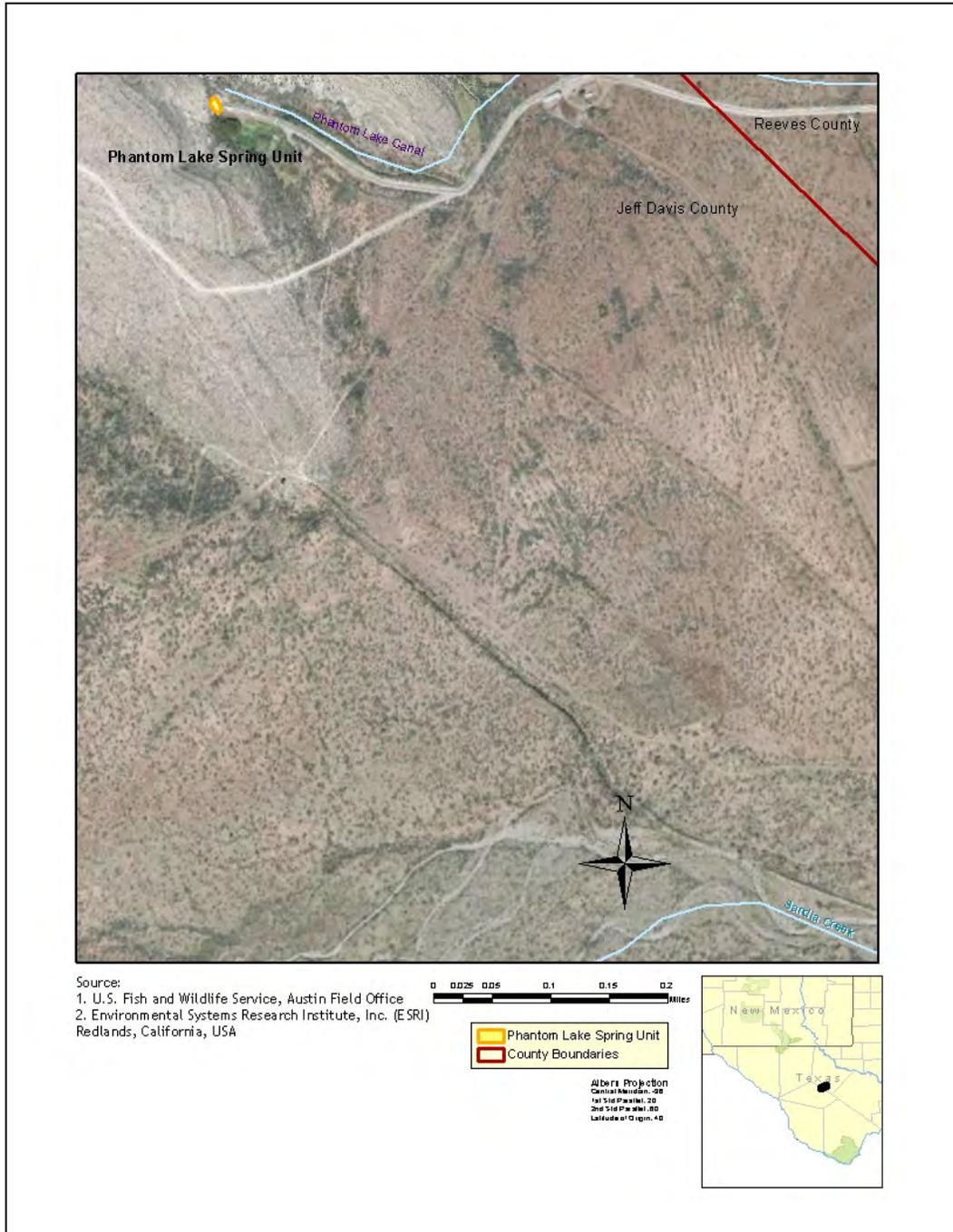


EXHIBIT 1-5. PROPOSED CRITICAL HABITAT - EAST SANDIA SPRING UNIT



Source:
 1. U.S. Fish and Wildlife Service, Austin Field Office
 2. Environmental Systems Research Institute, Inc. (ESRI)
 Redlands, California, USA

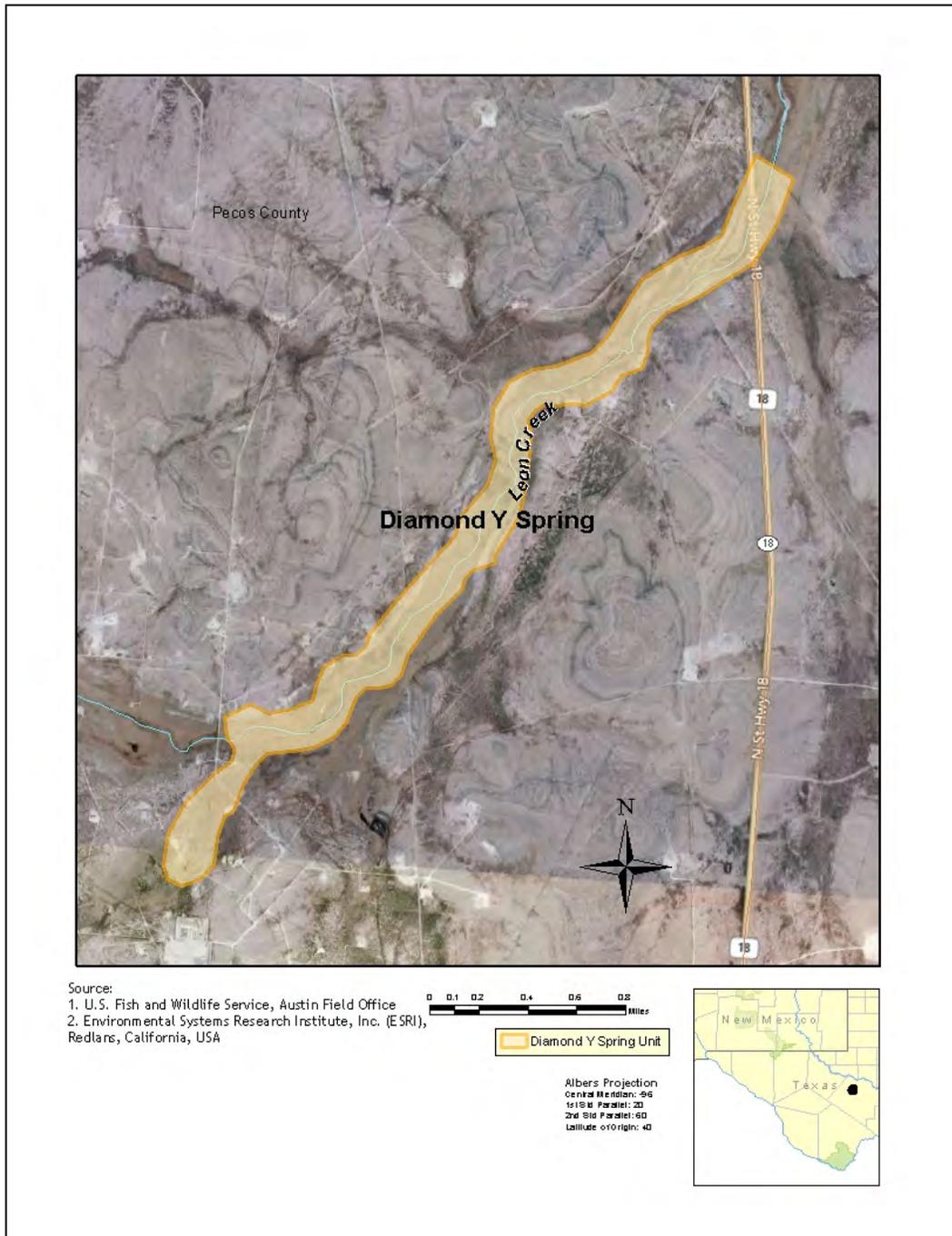
0 0.04 0.08 0.16 0.24 0.32 Miles

East Sandia Spring Unit

Albers Projection
 Central Meridian: -99
 1st Side Parallel: 20
 2nd Side Parallel: 20
 Latitude of Origin: 40



EXHIBIT 1-6. PROPOSED CRITICAL HABITAT - DIAMOND Y SPRING UNIT



1.3 THREATS TO CRITICAL HABITAT AREAS

6. The proposed rule describes specific categories of threats to proposed critical habitat, including:
 - Reductions in available water as a result of irrigation or other withdrawals;
 - Water pollutants associated with oil and gas activities; and
 - Recreation in Balmorhea State Park.
7. The economic analysis focuses on assessing conservation efforts that may be implemented in order to alleviate these threats. It also focuses on the costs of habitat and species management and recovery actions undertaken by the Service, U.S. Bureau of Reclamation (USBR), The Nature Conservancy (TNC), and Texas Parks and Wildlife Department (TPWD). No impacts to military or tribal lands or activities are anticipated as a result of this rule.

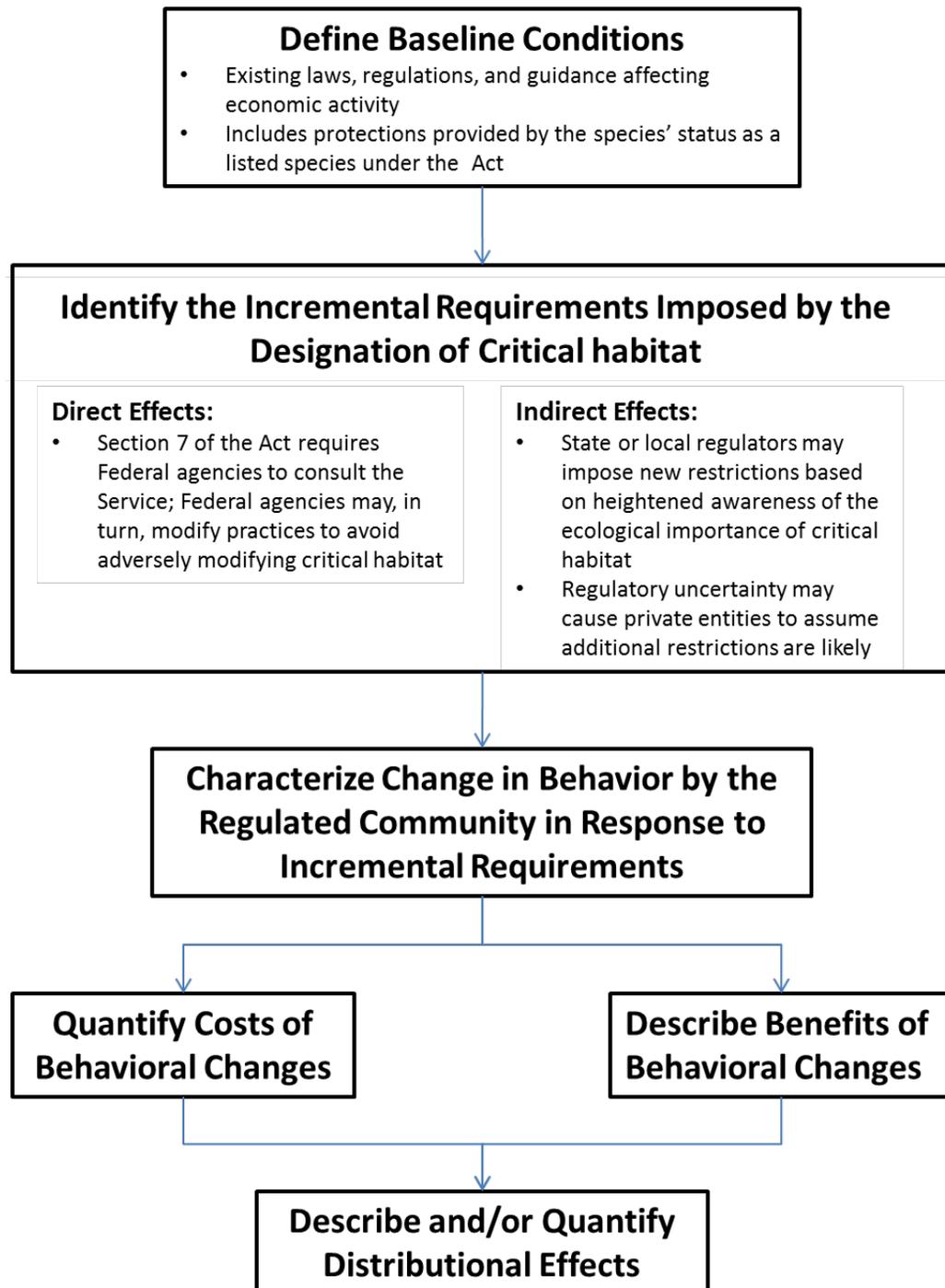
1.4 FRAMEWORK FOR THE ANALYSIS

8. In this section, we provide a summary of the analytic framework applied in this report. For a more detailed discussion of the case law informing this approach, the types of economic impacts quantified, and the scope of the analysis, please refer to Appendix B.
9. This analysis estimates the *incremental* impacts resulting from the designation of critical habitat. Specifically, the U.S. Office of Management and Budget’s (OMB) guidelines for best practices concerning the conduct of economic analysis of Federal regulations direct 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.”⁵ Significant debate has occurred regarding whether assessing the impact of critical habitat designations using this approach is appropriate, with several courts issuing divergent opinions.
10. In order to address these court opinions and provide the most complete information to decision-makers, this economic analysis both: (1) describes the baseline protections afforded the six invertebrates absent critical habitat; and (2) quantifies the potential incremental impacts precipitated specifically by the proposed designation (i.e., those impacts occurring over and above the baseline). The general steps taken in this analysis are illustrated in Exhibit 1-7.⁶

⁵ OMB, “Circular A-4,” September 17, 2003, available at http://www.whitehouse.gov/omb/circulars_a004_a-4.

⁶ We note that for the purpose of estimating the social costs of this regulation, we define “direct” and “indirect” effects consistent with the framework developed by the U.S. Fish and Wildlife Service and provided in Appendix B of this report. This framework was developed to ensure consistency across all the regulatory analyses of proposed critical habitat designation promulgated by the Service nationally. We note that these definitions differ from the statutory and legal definitions of “direct” and “indirect” applied in the context of NEPA and the RFA. Analysis of the effects of the proposed regulation under those statutes is conducted consistent with the applicable statutory and legal definitions.

EXHIBIT 1-7. STEPS IN THE ANALYSIS



11. First, we describe baseline conditions in Reeves, Jeff Davis, and Pecos Counties, Texas, including existing regulations that may provide some level of protection to the six invertebrates. For example, we describe the current land management in the five areas proposed as critical habitat. We also describe the protections imposed by the Act due to the listing of the six West Texas invertebrates and due to the presence of other listed species and critical habitat already occurring in the area, as described in greater detail in Chapter 2. These activities will continue to be implemented regardless of the designation of critical habitat.
12. Next, the most challenging part of this analysis involves isolating the new requirements imposed on regulated entities as a result of the designation of critical habitat given the considerable baseline protection already provided the six invertebrate species. When critical habitat is designated, section 7 of the Act requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat. Agencies engage in consultation with the Service whenever activities they undertake, authorize, permit, or fund may affect designated critical habitat. The administrative costs of this process, and the additional impacts of implementing project modifications necessary to avoid adverse modification, are the direct compliance costs of the designation.
13. The Service is the best source of information concerning the types of project modifications it is likely to request during the section 7 consultation process. It describes its likely recommendations in a memorandum drafted to support this analysis, titled “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Six West Texas Invertebrates.”⁷ This memorandum is provided in Appendix C of this report.
14. In addition to the direct implementation of the regulation, the information provided by the critical habitat designation (i.e., highlighting areas on a map that may require additional protection) may also influence State and local regulators or private entities. For example, State permitting agencies may request additional protective measures prior to the issuance of permits on private lands designated as critical habitat.
15. Such outcomes are unintended consequences of the regulation; however, these outcomes may result in real costs or benefits. To better understand the potential for such indirect effects, we conduct interviews with State regulators and owners or managers of land proposed as critical habitat. These conversations are documented throughout the report. Once we understand the incremental change in requirements for the management of public and private lands in proposed critical habitat, we describe how the regulated community will respond to these requirements.
16. The costs of the regulation represent the opportunity cost to the regulated community of complying with, or implementing, these requirements. We use readily available data to estimate these costs. Benefits are the positive gains in welfare (e.g., improved habitat to

⁷ U.S. Fish and Wildlife Service, Field Supervisor, Austin ESFO. “Memorandum to Jennifer Baxter, Industrial Economics, Inc., Subject: Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Six West Texas Invertebrates,” August 27, 2012.

support recovery of the species) resulting from these behavioral changes. We describe the potential benefits of such action qualitatively.

17. Finally, we consider the distribution of economic impacts. Specifically, we are interested in understanding whether certain sub-populations, such as small entities or State and local governments, experience a disproportionate share of the costs or benefits. Potential distributional effects are summarized in Appendix A of this report.

1.4.1 IDENTIFYING INCREMENTAL VERSUS BASELINE IMPACTS

18. This analysis separately quantifies the incremental impacts of this rulemaking. The focus of the incremental analysis is to determine the impacts on land uses and activities from the designation of critical habitat that are above and beyond those impacts resulting from existing required or voluntary conservation efforts being undertaken due to other Federal, State, and local regulations or guidelines, including conservation measure required under the Act due to the listing of the species.
19. Absent critical habitat designation, section 7 of the Act requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species. The portion of the administrative costs of consultations considering the jeopardy standard, along with the impacts of project modifications resulting from consideration of this standard, are baseline impacts
20. 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 considering critical habitat in section 7 consultations, and the additional impacts of implementing project modifications resulting from the protection of critical habitat, are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental impacts of the rulemaking. Appendix B, Exhibit B-2, depicts the decision analysis regarding whether an impact should be considered incremental.
21. Quantifiable impacts may include direct compliance costs associated with additional administrative effort in reinitiated consultations, administrative and project modification costs resulting from new consultations occurring specifically because of the designation, and the additional project modifications that would not have been required under the jeopardy standard. Additionally, incremental impacts may include indirect impacts resulting from reaction to the potential designation of critical habitat (e.g., developing Habitat Conservation Plans (HCPs) in an effort to avoid designation of critical habitat), triggering of additional requirements under State or local laws intended to protect sensitive habitat, and uncertainty and perceptual effects on markets.
22. For this analysis, the determination of whether future impacts are considered incremental to the critical habitat rulemaking for the six invertebrates is based on Service guidance and the presumed occupancy of the critical habitat units as described in the proposed rule. The Service states that consideration of adverse modification in section 7 consultations for the six invertebrates has the potential to result in some additional or potentially

different conservation measures compared to a jeopardy analysis, as the two standards are not equivalent. However, in its Incremental Effects Memorandum, the Service states that “because the biology and life-history characteristics of these species are so closely tied to their habitat, it seems highly unlikely to reach a conclusion of adverse modification without also reaching jeopardy under section 7 consultation for a proposed Federal action that substantially impacted habitat conditions in the springs.”⁸

23. Furthermore, this analysis forecasts limited incremental impacts of the proposed critical habitat for the six invertebrates for several reasons:
- First, the past record of consultations for other co-occurring listed species indicates that very few Federal actions that would require section 7 consultation for these species or their critical habitat have occurred in the past and are unlikely to occur in the future.⁹ Exhibit 1-7 provides information on co-occurring listed species in the areas proposed for critical habitat.
 - Second, most of the previous section 7 consultations for other co-occurring listed species were for recovery actions and none resulted in jeopardy or adverse modification determinations.¹⁰
 - Additionally, conversations with the Service and with landowners potentially affected by the designation do not indicate that there will be an increase in the number or level of economic burden of future section 7 consultations following the designation of critical habitat.¹¹
 - Finally, as mentioned before, for any future section 7 consultations, the Service is unlikely to require additional conservation measures to avoid adverse modification of critical habitat beyond those measures that would be required to avoid jeopardy of the species. This finding is based on the fact that all proposed critical habitat areas are occupied by the species and, because the continued existence of the six invertebrate species is so closely tied to their aquatic habitat, future actions that could result in adverse modification of critical habitat will also result in jeopardy.¹²
24. Thus, we assume that no additional project modifications will be recommended to accommodate critical habitat in occupied areas.

⁸ U.S. Fish and Wildlife Service, Field Supervisor, Austin ESFO. “Memorandum to Jennifer Baxter, Industrial Economics, Inc., Subject: Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Six West Texas Invertebrates,” August 27, 2012, p. 7.

⁹ Ibid., p. 9.

¹⁰ Written communication with the Service on August 3, 2012.

¹¹ U.S. Fish and Wildlife Service, Field Supervisor, Austin ESFO. “Memorandum to Jennifer Baxter, Industrial Economics, Inc., Subject: Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Six West Texas Invertebrates,” August 27, 2012, p. 9.

¹² Ibid., pp. 10.

EXHIBIT 1-8. LISTED CO-OCCURRING SPECIES IN PROPOSED CRITICAL HABITAT, BY UNIT

OTHER LISTED SPECIES	STATUS	LISTING YEAR	OVERLAPPING UNIT
Pecos gambusia (fish)	Endangered, no critical habitat	1983	All Units
Pecos sunflower	Threatened, with critical habitat designated	1999	Diamond Y Spring System and East Sandia Spring Unit
Pecos assiminea (snail)	Endangered, with critical habitat designated	2005	Diamond Y Spring System and East Sandia Spring Unit
Leon Springs pupfish	Endangered, with critical habitat designated	1985	Diamond Y Spring System
Comanche Springs pupfish	Endangered, no critical habitat	1981	San Solomon Spring Unit

Source: U.S. Fish and Wildlife Service. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Six West Texas Invertebrates," August 27, 2012.

1.4.2 BENEFITS

25. With regard to the benefits of the designation, 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.¹³ The Service believes that the direct benefits of critical habitat are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking. Thus, we include a qualitative discussion of the potential benefits of this proposed rule in this report and summarize available literature describing the potential benefits of conservation of the six invertebrates and their critical habitat.

1.5 STRUCTURE OF THE REPORT

26. The remainder of this report is organized as follows:
- Chapter 2 – Economic costs of conservation efforts; and
 - Chapter 3 – Economic benefits.
27. In addition, the report includes three appendices: Appendix A considers potential impacts on small entities, State and local governments, and the energy industry. It also considers whether the proposed rule constitutes a Federal "takings" as defined in Executive Order 12630. Appendix B provides a more detailed explanation of the framework of this analysis. Finally, Appendix C provides the Service's memorandum describing the incremental effects of designating critical habitat for the six invertebrates.

¹³ OMB, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars_a004_a-4.

CHAPTER 2 | ECONOMIC IMPACTS

28. This chapter reports the estimated costs of conservation efforts benefiting the six invertebrates, including a qualitative discussion of baseline conservation efforts and quantified incremental costs. The analysis examines impacts to economic activity related to 1) water withdrawals for agricultural and municipal uses, 2) oil and gas development, and 3) recreation and species management. As the area proposed for critical habitat are very limited (451 acres in total) and because the Service does not anticipate recommending incremental conservation measures to avoid adverse modification of critical habitat over and above those recommended to avoid jeopardy of the species, this analysis forecasts few incremental economic impacts of the designation.

2.1 SUMMARY

29. Exhibit 2-1 summarizes the potential costs of conservation measures and administrative efforts associated with the six invertebrates. All project modification costs are expected to occur under the baseline and are not directly associated with the designation of critical habitat. A number of factors limit the extent to which the proposed critical habitat designation results in incremental costs, including the fact that all the proposed habitat is occupied by the species, the species' survival is so closely linked to the quality of their habitat, few actions being carried out in the area are subject to a Federal nexus, and much of the proposed habitat is managed for conservation. Consistent with these conditions, the Service's incremental memorandum observes that, while consideration of adverse modification in section 7 consultations for the invertebrates has the potential to result in some additional or potentially different conservation measures compared to a jeopardy analysis, "In the case of these invertebrates, no additional project modifications as a result of designating critical habitat are predictable."¹⁴ Some incremental costs are realized through administrative procedures, as discussed in Section 2.5.

30. This analysis forecasts seven formal consultations, 15 informal, and three technical assistance efforts (25 total section 7 actions) associated with the designation of critical habitat for the six invertebrates over 20 years, based on the historical rate of consultation for other co-occurring species in the areas proposed for critical habitat. These consultations and the entities involved are discussed in greater detail in Section 2.2 through 2.5. No incremental project modifications are anticipated in association with these consultations.

¹⁴ U.S. Fish and Wildlife Service, Field Supervisor, Austin ESFO. "Memorandum to Jennifer Baxter, Industrial Economics, Inc., Subject: Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Six West Texas Invertebrates," August 27, 2012, p. 9.

EXHIBIT 2-1. ECONOMIC IMPACTS OF CRITICAL HABITAT BY UNIT
(2012 DOLLARS, ASSUMES A 7 PERCENT DISCOUNT RATE)

CRITICAL HABITAT UNIT	PRESENT VALUE (2013 - 2032)	ANNUALIZED COSTS
San Solomon Spring Unit	\$9,900	\$880
Giffin Spring Unit	\$0	\$0
East Sandia Spring Unit	\$4,300	\$380
Phantom Lake Spring Unit	\$9,900	\$870
Diamond Y Spring Unit	\$17,000	\$1,500
TOTAL	\$41,000	\$3,600
Note: Totals may not sum due to rounding. Present value estimated as of year 2013.		

2.2 AGRICULTURAL AND MUNICIPAL WATER WITHDRAWALS

Groundwater Conservation Districts and Private Landowners

31. In Texas, without a groundwater conservation district in place, groundwater use is largely unregulated, and opportunities for managing groundwater withdrawals in the area are limited. Under current Texas law, there are no limitations on the amount of groundwater that landowners are allowed to pump unless otherwise limited by a groundwater conservation district. Despite the presence of listed species and critical habitat, little Federal oversight exists on private lands and no clear Federal nexus exists.¹⁵ Therefore, it is unlikely that conservation measures limiting water use will be introduced, and no such measures are quantified in this analysis.
32. The possibility exists for local and county Groundwater Conservation Districts (GCDs) or private landowners to develop HCPs in order to address potential take of listed species due to groundwater withdrawals and depletion. If a GCD or private landowner were to develop an HCP that covers the six invertebrate species, some level of incremental administrative burden would result to the extent that the HCP addresses critical habitat.
33. However, the two GCDs that overlap proposed critical habitat—Middle Pecos GCD and Culberson County GCD—currently manage the watersheds containing critical habitat for the purpose of maintaining spring flows to benefit aquatic life and recreation, so their actions are unlikely to result in adverse effects on the six invertebrates.¹⁶ Additionally, in Texas, the link between irrigation withdrawals and water depletion requires further hydrological study. Therefore, the Service and local water authorities do not anticipate the development of HCPs for groundwater pumping activity.

¹⁵ Personal communication with Paul Weatherby, Manager, Middle Pecos Groundwater Conservation District, on September 20, 2012; personal communication with John Jones, Manager, Culberson County Groundwater Conservation District, on October 5, 2012; personal communication with Abel Balleza, Manager, Reeves County Water improvement District #1, on October 9, 2012.

¹⁶ Personal communication with Paul Weatherby, Manager, Middle Pecos Groundwater Conservation District, on September 20, 2012; Personal communication with John Jones, Manager, Culberson County Groundwater Conservation District, on October 5, 2012; Personal communication with Abel Balleza, Manager, Reeves County Water improvement District #1, on October 9, 2012.

34. We also attempted to contact the private landowner with land in the Giffin Spring Unit to determine whether groundwater pumping could be affected at this property. We were unable to make contact; however, a Federal nexus for such activity is unlikely. Thus, we do not anticipate a future section 7 consultation.

Natural Resource Conservation Service

35. The U.S. Department of Agriculture's Natural Resource Conservation Service (NRCS) provides assistance in the form of technical assistance and funding to farmers and ranchers for projects that benefit resource conservation. These projects can include, but are not limited to, the construction of irrigation systems for agriculture. NRCS funding constitutes a Federal nexus, and one formal consultation, two informal, and one technical assistance effort over the past 20 years have resulted from NRCS-sponsored projects. The formal consultation was related to an irrigation project near East Sandia Spring Unit (owned by TNC). The consultation considered potential threats to the Comanche Springs pupfish related to agricultural withdrawals downstream of the spring. NRCS and the Service do not anticipate further consultations related to projects of this nature because proposed critical habitat for the six invertebrates occurs upstream of all potential irrigation withdrawal sites.¹⁷ Therefore, we do not anticipate incremental administrative impacts related to NRCS projects.

2.3 OIL AND GAS DEVELOPMENT

36. Conversations with the Service and TNC suggest the potential for oil and gas interests to incur costs associated with species conservation around the Diamond Y Spring unit in Texas.¹⁸ Diamond Y Spring Preserve is located within the Gomez Field, an actively producing oil and gas field. According to a 1991 report cited in the Proposed Rule, there were 45 active and plugged oil and gas wells within the Diamond Y Spring Preserve, and 800 to 1,000 wells located within the aquifer throughout the spring basin.¹⁹ Operations could potentially affect surface and groundwater quality within the springs, which are occupied by the Diamond Y Spring snail, Gonzales springsnail, and Pecos amphipod. However, the area also supports a variety of other threatened and endangered species, including the Leon Springs pupfish, the Pecos gambusia, the Pecos assiminea, and the Pecos sunflower, and is already designated as critical habitat for the Leon Springs pupfish, the Pecos assiminea, and the Pecos sunflower. As a result, oil and gas developers currently work in coordination with The Nature Conservancy and have voluntarily implemented a variety of safeguards to protect surface waters within the preserve from contamination. For all these reasons, it is unlikely that designation of critical habitat for the six invertebrates would trigger any additional project modifications. Likewise, it is difficult to characterize baseline conservation efforts

¹⁷ Personal communication with Russell Castro, State Wildlife Biologist, NRCS Texas, on October 5, 2012.

¹⁸ As of 2005, there were no oil and gas activities occurring adjacent to the East Sandia Spring unit.

¹⁹ Veni, G. and Associates. 1991. Delineation and preliminary hydrogeologic investigation of the Diamond Y Spring, Pecos County, Texas. Final Report to The Nature Conservancy, San Antonio, TX.

specifically associated with the six invertebrates given the variety of listed species in the region benefiting from existing protections.

37. Since 1992, oil and natural gas and other utility projects have resulted in seven informal consultations and two technical assistance consultations related to co-occurring species in the areas proposed as critical habitat for the six invertebrates. The majority of these projects were subject to a Federal nexus due to permitting and/or funding of major natural gas pipelines under the Federal Energy Regulatory Commission (FERC) and the United States Department of Energy (DOE). No formal consultations or project modifications have resulted from such activities in that time.²⁰ Conversations with TNC and the Service indicated that future actions related to oil and gas development would be unlikely to affect the six invertebrates or their critical habitat.²¹ Additionally, no clear Federal nexus exists for oil and gas development in the area outside of FERC and DOE permitting and/or funding of major natural gas pipelines. Therefore, this analysis does not anticipate incremental project modification impacts related to oil and gas development.
38. Based on the historical consultation record, we estimate that seven informal consultations and two technical assistance consultations related to oil and gas development and other utility projects are likely to occur over the next 20 years. Potential incremental administrative impacts resulting from these section 7 consultations are estimated in Section 2.5.

2.4 RECREATION AND HABITAT MANAGEMENT COSTS

39. Several organizations commit funding to maintaining the quality of or actively manage habitat vital to the six invertebrates. The discussion below considers species and habitat management funded or carried out by: (1) TPWD; (2) the Service; (3) USBR; and (4) TNC.

2.4.1 BALMORHEA STATE PARK

40. The entirety of the proposed San Solomon Spring Unit falls within Balmorhea State Park in Reeves County, Texas. TPWD manages all lands contained within the unit to improve habitat at the spring. Between 17 million and 28 million gallons of water flow through a 3.5 million gallon recreational pool, built around the spring as part of the park. The pool, covering 1.75 acres, is the largest spring-fed pool on earth.²²
41. Since September 2008, TPWD has managed the spring and surrounding areas for co-occurring aquatic species, including the Comanche Springs pupfish, Pecos gambusia, Phantom springsnail, diminutive amphipod, and Phantom Lake Cave snail, under the Low-Effect Habitat Conservation Plan for Balmorhea State Park.²³ All habitat in the San

²⁰ Written communication with the Service on August 3, 2012.

²¹ Personal communication with Jason Wrinkle, Desert Program Manager, The Nature Conservancy, Texas Chapter, on September 19, 2012.

²² "Balmorhea State Park," accessed on October 1, 2012 at <http://www.tpwd.state.tx.us/state-parks/balmorhea>.

²³ Texas Parks and Wildlife Department, Natural Resources Program, State Parks Division. "Low-Effect Habitat Conservation Plan for Balmorhea State Park Management Plan," September 2008.

Solomon Spring Unit is managed for listed aquatic species and is man-made, including two refugia originally built by the Service and the TPWD to provide habitat for the Comanche Springs pupfish.²⁴ The six invertebrate species also inhabit these refugia.

42. Management of habitat in these refugia is unlikely to change as a result of the listing of or designation of critical habitat for the six invertebrates. TPWD does not anticipate any section 7 consultations related to the six invertebrates or additional administrative effort to reinitiate the park's HCP.²⁵

2.4.2 FWS RECOVERY ACTIONS AND MANAGEMENT OF SPRING UNITS

43. In the past 20 years, the Service has conducted 16 total section 7 actions (six formal, eight informal, and two technical assistance consultations) on co-occurring listed species related to the Service's internal species and habitat management initiatives in the areas proposed for critical habitat at Diamond Y Spring and East Sandia Spring. This is by far the largest number of consultations for any Federal agency working in the area, followed by FERC, which has conducted three informal consultations in that time, and USBR, which has conducted two formal consultations.
44. All internal section 7 actions were related to recovery actions for listed species and their habitat intended to improve the quality of habitat for co-occurring listed species by constructing man-made habitat structures and maintaining spring flow. The Service has stated that its efforts to protect the habitat of co-occurring listed species provide some benefit to the six invertebrates. Additionally, as with other activities, any habitat or species management actions the Service carries out to protect critical habitat would already be carried out to avoid jeopardizing the continued existence of the species. Therefore, any such actions would occur under the baseline, absent the designation of critical habitat.
45. We forecast five formal, eight informal, and one technical assistance effort over 20 years related to internal Service-led recovery actions based on historical rates of consultation and certain adjustments to the historical consultation rate based on conversations with stakeholders. Section 2.5 estimates potential incremental administrative impacts resulting from the future section 7 consultations.

2.4.3 USBR MANAGEMENT OF HABITAT AT PHANTOM LAKE SPRING UNIT

46. USBR manages 0.05 acres proposed as critical habitat at Phantom Lake Spring Unit, as well as 17 additional acres surrounding the proposed unit, for the conservation of other co-occurring aquatic species and their spring habitat.²⁶ Since 1992, USBR conservation activities have resulted in two formal consultations at Phantom Lake Spring, both related

²⁴ Personal communication with Mark Lockwood, Natural Resources Coordinator and State Conservation Biologist, TPWD, on September 20, 2012.

²⁵ Personal communication with Mark Lockwood, Natural Resources Coordinator and State Conservation Biologist, TPWD, on September 20, 2012.

²⁶ U.S. Fish and Wildlife Service. "Formal Consultation on Temporary, Emergency Pumping System at Phantom Lake Spring," May 11, 2000. 2000-F-0067.

to the Comanche Springs pupfish and the Pecos gambusia.²⁷ Both consultations considered projects being undertaken solely for the benefit of aquatic species in the spring (maintaining adequate stream flows), and neither consultation recommended project modifications.

47. The Service states it may have future consultations with USBR of a similar nature and at a similar rate as has occurred in the past.²⁸ USBR does not anticipate that its activity in this area will be significantly different from activities reflected in the consultation record (the two formal consultations on maintaining spring flow).²⁹ Because USBR's actions were intended to improve aquatic habitat by maintaining adequate stream flows for two previously listed co-occurring species, it is unlikely that these actions would negatively impact the six invertebrates or their critical habitat. Furthermore, the Service has stated that any project modifications it would recommend to avoid adverse modification of critical habitat would already be requested due to the listing of the six invertebrates. Therefore, this analysis does not forecast any incremental project modification costs associated with USBR habitat management at Phantom Lake Spring.
48. We anticipate two formal consultations over 20 years, based on the historical consultation record, related to USBR management of lands at Phantom Lake Spring. Potential incremental administrative impacts resulting from future section 7 consultations that consider adverse modification of six invertebrate critical habitat related to USBR species and habitat management are estimated in Section 2.5.

2.4.4 THE NATURE CONSERVANCY

49. The Nature Conservancy manages Diamond Y Springs Preserve and East Sandia Springs for long term habitat conservation and protection of the functional integrity of surface water systems to benefit rare aquatic species and communities within the preserves. TNC pursues conservation to enhance and restore wetland and stream flows benefitting the federally-endangered Leon Springs pupfish, Pecos gambusia, and Pecos assiminea, and the threatened Pecos sunflower. The area includes designated critical habitat for the Leon Springs pupfish, the Pecos assiminea, and the Pecos sunflower.
50. Ongoing habitat management actions at Diamond Y and East Sandia Springs include efforts to control the reinvasion of salt cedar (*Tamarix ramosissima*) via manual and prescribed fire methods; building of fire breaks; biological inventory and monitoring; and coordination efforts with oil and gas companies to reduce and prevent the likelihood of groundwater contamination within the spring.³⁰ These measures, already occurring in the baseline, also benefit the six invertebrate critical habitat proposed at the Diamond Y Spring and East Sandia Spring Units.

²⁷ Written communication with the Service on August 3, 2012.

²⁸ U.S. Fish and Wildlife Service. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Six West Texas Invertebrates," August 27, 2012.

²⁹ Personal communication with Yvette Paroz, Albuquerque Office of the USBR, on October 5, 2012.

³⁰ Personal communication with John Karges, Conservation Biologist, The Nature Conservancy, West Texas Office, May 23 and 29, 2007.

51. TNC's actions are not subject to a Federal nexus and are therefore unlikely to result in section 7 consultation. TNC does not expect to modify its conservation objectives outside of the section 7 process due to the proposed designation. Therefore, this analysis does not anticipate incremental project modification impacts related to habitat management at the Diamond Y and Sandia Springs Units. Furthermore, TNC does not anticipate any future section 7 consultations will occur related to its actions.

2.5 SUMMARY OF INCREMENTAL ADMINISTRATIVE COSTS

52. Total incremental costs of administrative efforts resulting from section 7 consultations on the six invertebrates are approximately \$41,000 over 20 years (\$3,600 on an annualized basis), assuming a seven percent discount rate. No incremental project modifications are expected to result from the designation of critical habitat. As confirmed in the Service's incremental memorandum regarding the six invertebrates, it is unlikely that the introduction of critical habitat will alter the outcome of section 7 consultations and thereby lead to a change in management practices.³¹

53. This analysis estimates potential future administrative impacts based on the historical rate of consultation on co-occurring listed species in areas proposed for critical habitat as discussed in the previous sections. Exhibit 2-2 summarizes the historical rate of consultation, broken out by activity, lead Federal agency, and critical habitat unit.

³¹ U.S. Fish and Wildlife Service, Field Supervisor, Austin ESFO. "Memorandum to Jennifer Baxter, Industrial Economics, Inc., Subject: Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Six West Texas Invertebrates," August 27, 2012..

EXHIBIT 2-2. HISTORICAL CONSULTATIONS SINCE 1992, BY CRITICAL HABITAT BY UNIT

CRITICAL HABITAT UNIT	ACTIVITIES	LEAD AGENCY	NUMBER OF CONSULTATIONS		
			FORMAL	INFORMAL	TECHNICAL ASSISTANCE
San Solomon Spring Unit	Recreation, Species and Habitat Management, Utilities	FWS, TPWD	3	6	1.7
Giffin Spring Unit	None	None	0	0	0
East Sandia Spring Unit	Water Management ¹	NRCS, Reeves County Water Improvement District #1, other local water authorities, U.S. Environmental Protection Agency, FERC, DOE, DOD ²	1	4.7	1.7
Phantom Lake Spring Unit	Species and Habitat Management	FWS, USBR	3	1.3	1
Diamond Y Spring Unit	Recreation, Agriculture, Transportation, Oil and Gas Development, Utilities, Military Operations, Species and Habitat Management	FWS, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, DOE, FERC, U.S. Department of Defense ²	2	10	1.7
TOTAL			9	22	6²

Source: Written communication with the Service on August 3, 2012.

Notes:

1. Although past consultations have occurred related to water management activities affecting co-occurring species, as discussed in Section 2.2, conversations with the Service and local water authorities indicate that no such consultations will occur in the future due to the listing or designation of critical habitat for the six invertebrates. Therefore, forecast consultations and the resulting administrative costs do not match the historical consultation record.
2. U.S. Army Corps of Engineers and U.S. Environmental Protection Agency have previously consulted informally with the Service on water management issues, and the U.S. Department of Defense has previously conducted a technical assistance effort with the Service on military operations potentially affecting co-occurring listed species, resulting in no project modifications. However, conversations with the Service indicate that no further consultation with these agencies will occur in the future. Sections 2.2 to 2.4 describe five total historical technical assistance efforts, while this table reports six. The technical assistance not mentioned in the text was related to military operations on the Peyote Army Air Fields. According to the Service, because no military lands are proposed for critical habitat, future military actions are unlikely to result in further consultations.

54. To forecast future consultations, we begin with the historical consultation rate presented in Exhibit 2-2 and make some adjustments as discussed in the preceding sections. The number of forecast consultations is presented by unit in Exhibit 2-3. For certain consultations where the exact location was unknown or was spread over multiple units, we split the number of consultations across the affected units equally. We multiply the expected number of consultations in each unit by estimated per-consultation administrative costs. Per-consultation administrative costs are presented in Appendix B, Exhibit B-1. Total incremental administrative impacts are presented in Exhibit 2-4.

EXHIBIT 2-3. FORECAST CONSULTATIONS OVER 20 YEARS, BY CRITICAL HABITAT BY UNIT

CRITICAL HABITAT UNIT	ACTIVITIES	NUMBER OF CONSULTATIONS		
		FORMAL	INFORMAL	TECHNICAL ASSISTANCE
San Solomon Spring	Recreation, Species and Habitat Management, Utilities	2 ²	3 ³	1 ⁴
Giffin Spring	None	0	0	0
East Sandia Spring	Water Management ¹	0 ⁵	3 ⁶	1 ⁷
Phantom Lake Spring	Species and Habitat Management	3	1 ⁸	0 ⁸
Diamond Y Spring	Recreation, Agriculture, Oil and Gas Development, Utilities, Species and Habitat Management	2	8 ⁹	1 ¹⁰
TOTAL		7	15	3

Sources: written communication with the Service on August 3, 2012; personal communication with Abel Balleza, Manager, Reeves County Water Improvement District #1, on October 9, 2012; personal communication with Paul Weatherby, Manager, Middle Pecos Groundwater Conservation District, on September 20, 2012; personal communication with John Jones, Manager, Culberson County Groundwater Conservation District, on October 10, 2012; personal communication with Mark Lockwood, Natural Resources Coordinator and State Conservation Biologist, TPWD, on September 20, 2012; personal communication with Russell Castro, State Wildlife Biologist, NRCS Texas, on October 5, 2012.

Notes:

1. Although past consultations have occurred related to water management activities affecting co-occurring species, as discussed in Section 2.2, conversations with the Service and local water authorities indicate that no such consultations will occur in the future due to the listing or designation of critical habitat for the six invertebrates. Therefore, forecast consultations and the resulting administrative costs do not match the historical consultation record.
2. Adjustments to consultation forecast based on conversations with stakeholders: one formal consultation related to the HCP was dropped from the forecast consultation rate for this unit.
3. Adjustments to consultation forecast based on conversations with stakeholders: one informal consultation related to TPWD actions, one informal consultation related to water management, and one consultation related to species management were dropped from the forecast consultation rate for this unit.
4. Adjustments to consultation forecast based on conversations with stakeholders: two technical assistance efforts occurring partially in this unit related to TPWD activity were dropped from the forecast consultation rate for this unit.
5. Adjustments to consultation forecast based on conversations with stakeholders: one formal consultation related to water management carried out by NRCS was dropped from the forecast consultation rate for this unit.
6. Adjustments to consultation forecast based on conversations with stakeholders: five informal consultations occurring partially within this unit related to species management and water management were dropped from the forecast consultation rate for this unit.
7. Adjustments to consultation forecast based on conversations with stakeholders: two technical assistance efforts occurring partially in this unit related to TPWD activity were dropped from the forecast consultation rate for this unit.
8. Adjustments to consultation forecast based on conversations with stakeholders: one informal consultation and one technical assistance effort occurring partially in this unit related to TPWD activity was dropped from the forecast consultation rate for this unit.
9. Adjustments to consultation forecast based on conversations with stakeholders: two informal consultations occurring in this unit related to TPWD activity and species management were dropped from the forecast consultation rate for this unit.
10. Adjustments to consultation forecast based on conversations with stakeholders: two technical assistance efforts occurring partially in this unit related to TPWD activity were dropped from the forecast consultation rate for this unit.

EXHIBIT 2-4. INCREMENTAL IMPACTS, BY CRITICAL HABITAT BY UNIT (2012 DOLLARS)

CRITICAL HABITAT UNIT	7%		3%	
	PRESENT VALUE	ANNUALIZED	PRESENT VALUE	ANNUALIZED
San Solomon Spring Unit	\$9,900	\$880	\$13,000	\$880
Giffin Spring Unit	\$0	\$0	\$0	\$0
East Sandia Spring Unit	\$4,300	\$380	\$5,800	\$380
Phantom Lake Spring Unit	\$9,900	\$870	\$13,000	\$870
Diamond Y Spring Unit	\$17,000	\$1,500	\$23,000	\$1,500
TOTAL	\$41,000	\$3,600	\$55,000	\$3,600
Notes: 1. Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits. Present value calculated as of year 2013. 2. We assume the full cost of consultation will be incurred for each forecast consultation, including potential administrative impacts to third parties. While the consultation history indicates that some consultations may be internal Service consultations not involving a third party, we conservatively assume that all consultations will include third parties.				

CHAPTER 3 | ECONOMIC BENEFITS

55. This chapter describes potential economic benefits of critical habitat designation for the six invertebrates. It first describes the categories of economic benefit that may derive from the conservation of species and their habitat, and discusses the research methods that economists employ to quantify these benefits. It then describes the available literature that addresses the economic value of invertebrate populations. Next, this chapter summarizes the conservation efforts described in Chapter 2, linking these efforts with potential ancillary economic benefits that may derive from their implementation. Given data limitations, we do not quantify potential baseline and incremental benefits.
- 3.1 CATEGORIES OF BENEFIT RELATING TO SPECIES AND HABITAT CONSERVATION**
56. The primary goal of listing a species is to preserve the species from extinction. Various economic benefits, measured in terms of social welfare or regional economic performance, may also result from species and habitat conservation. The benefits of species and habitat conservation can be placed into two broad categories: (1) those associated with the primary goal of species conservation, and (2) those that derive from the habitat conservation efforts to achieve this primary goal.
57. Because a purpose of the Act is to provide for the conservation of endangered and threatened species, the benefits of actions taken under the Act are often measured in terms of the value placed by the public on species preservation (e.g., avoidance of extinction, and/or increase in a species' population). Such social welfare values for a species may reflect both use and non-use values for the species. Use values derive from a direct use for a species, such as commercial harvesting or recreational wildlife-viewing opportunities. Non-use values are not derived from direct use of the species, but instead reflect the utility the public derives from knowledge that a species continues to exist (e.g., existence or bequest values).
58. As a result of actions taken to preserve endangered and threatened species, such as habitat management, various other benefits may accrue to the public. Conservation efforts for species and habitat may result in improved environmental quality, which in turn may have collateral human health or recreational use benefits. In addition, conservation efforts undertaken for the benefit of a threatened or endangered species may enhance shared habitat for other wildlife. Such benefits may be a direct result of modifications to projects, or may be collateral to such actions. For example, ensuring the quality and quantity of ground and surface water available for invertebrate habitat may enhance the habitat of other aquatic species.

59. Economists apply a variety of methodological approaches in estimating both use and non-use values for species and for habitat improvements, including stated preference and revealed preference methods. Stated preference techniques include the contingent valuation method and conjoint analysis or contingent ranking methods. In simplest terms, these methods employ public opinion survey techniques, asking respondents to state what they would be willing to pay for a resource or for programs designed to protect that resource. A substantial literature has developed that describes the application of this technique to the valuation of natural resource assets.
60. More specific to use values for species or habitats, revealed preference techniques examine individuals' behavior in markets in response to changes in environmental or other amenities (i.e., people "reveal" their value by their behavior). For example, travel cost models are frequently applied to value access to recreational opportunities, as well as to value changes in the quality and characteristics of these opportunities. Basic travel cost models are rooted in the idea that the value of a recreation resource can be estimated by analyzing the travel and time costs incurred by individuals visiting the site. Another revealed preference technique is hedonic analysis, which is often employed to determine the effect of specific site characteristics on property values.

3.2 DIRECT VALUE OF INVERTEBRATE POPULATIONS

61. The extent to which the six invertebrates possess or generate economic value is difficult to characterize. The Proposed Rule for the six invertebrates indicates that there are no known commercial or recreational uses for the six invertebrates and collection of the species for educational or scientific purposes is very limited.³² Literature searches completed for this analysis identified no reports or articles characterizing the direct economic value (use or non-use) of the six invertebrate species or any other related freshwater gastropod or amphipod species in Texas.
62. Nonetheless, it is possible to assign certain features of economic value to the continued existence of the six invertebrates based on public interest in wildlife and biodiversity, and the importance of the species to the broader spring ecosystem.
63. Finally, the six invertebrates may provide direct benefits in their role as an ecological indicator species. Biologists have observed that springsnail populations often signal the health of freshwater habitats.³³ Likewise, because reductions in groundwater flow influence their populations, springsnail species provide a reliable indicator of declining water table levels.³⁴

³² U.S. Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants; Endangered Status for Six West Texas Aquatic Invertebrate Species and Designation of Critical Habitat; Proposed Rule. 77 FR 49602 et seq. August 16, 2012.

³³ "Western Springsnails on the Brink of Extinction," The Xerces Society for Invertebrate Conservation, July 28, 2004; accessed online at <http://www.xerces.org/2004/07/28/western-springsnails-on-the-brink-of-extinction/> on December 18, 2009.

³⁴ "Endangered Species Act Protection Sought for 42 Great Basin Spring Snail Species," Center for Biological Diversity, February 17, 2009; accessed online at http://www.biologicaldiversity.org/news/press_releases/2009/great-basin-spring-snails-02-17-2009.html on December 18, 2009.

64. Because no incremental project modifications or changes in land or water management practices are anticipated to result from the designation of critical habitat, it is unlikely that designation of critical habitat will influence the nature or magnitude of the direct benefits associated with six invertebrates conservation. Hence, the benefits described above are likely baseline rather than incremental.

3.3 ANCILLARY BENEFITS OF INVERTEBRATE CONSERVATION EFFORTS

65. The public may realize a separate set of indirect benefits as a result of the efforts associated with six invertebrates conservation under the baseline. Exhibit 3-1 summarizes baseline conservation efforts and the indirect benefits they may provide. Key indirect benefits include the following:
- Improved groundwater quality associated with TNC’s cooperation with the oil and gas industry may help avert future drinking water treatment costs.
 - Improved groundwater and surface water quality could also benefit human health through reduced drinking water exposures and could reduce exposures through contact recreation (e.g., swimming).
 - Improved surface water quality could improve the quality and availability of recreational opportunities; for instance, anglers could realize recreational fishing benefits because of improved catch rates.
 - Conservation of groundwater resources achieved through reduced irrigation withdrawals may improve the overall aesthetic quality of nearby spring habitat. This may yield social welfare gains measureable through increased willingness-to-pay to visit the affected conservation areas for recreation.
 - To the extent that aesthetic improvements or improved water quality lead to an increase in visitation to affected conservation areas, the economy and employment may benefit from increased regional spending.
66. Furthermore, many of the conservation efforts undertaken for the six invertebrates may also produce improvements to ecosystem health that are shared by other, coexisting species. For example, ensuring spring and stream flows for the invertebrates will benefit other listed and unlisted aquatic species sharing the habitat. The maintenance or enhancement of use and non-use values for these other species, or for biodiversity in general, may result from invertebrate conservation efforts.

EXHIBIT 3-1. INVERTEBRATE CONSERVATION EFFORTS AND POTENTIAL INDIRECT BENEFITS

CONSERVATION EFFORT	CRITICAL HABITAT UNITS AFFECTED	POTENTIAL ASSOCIATED BENEFITS
Groundwater protection efforts through cooperation between TNC and oil and gas developers	<ul style="list-style-type: none"> • Diamond Y and East Sandia Springs 	<ul style="list-style-type: none"> • Improved groundwater quality may help reduce costs of treating municipal and private water withdrawals. • Improved groundwater quality may help avoid human health impacts associated with contaminated drinking water. • Improved groundwater quality may improve the habitat of coexistent species and enhance recreational activity associated with those species.
Limitation on groundwater withdrawals for irrigation and recreation	<ul style="list-style-type: none"> • All units 	<ul style="list-style-type: none"> • Protection of groundwater quantity may enhance spring environments and thereby improve the habitat of coexistent species and enhance recreational activity associated with those species. • Conservation of groundwater resources may avert long-term water shortages in the region.

67. As reviewed in Chapter 2, all of the conservation efforts pursued on behalf of the six invertebrates are done in response to baseline requirements or conservation agreements, i.e., none are implemented as a result of critical habitat designation. Consistently, the benefits characterized here are baseline in nature.

REFERENCES

2 U.S.C. 1501, et seq.

5 U.S.C. §§601 et seq.

16 U.S.C. §1533(b)(2).

“Balmorhea State Park,” accessed on October 1, 2012 at <http://www.tpwd.state.tx.us/state-parks/balmorhea>.

“Endangered Species Act Protection Sought for 42 Great Basin Spring Snail Species,” Center for Biological Diversity, February 17, 2009; accessed online at http://www.biologicaldiversity.org/news/press_releases/2009/great-basin-spring-snails-02-17-2009.html on December 18, 2009.

Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights, March 15, 1988.

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

Executive Order 12866, Regulatory Planning and Review, September 30, 1993 (as amended by Executive Order 13563 (2011)).

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

OMB, “Circular A-4,” September 17, 2003, available at http://www.whitehouse.gov/omb/circulars_a004_a-4.

Pub Law No. 104-121.

Texas Parks and Wildlife Department, Natural Resources Program, State Parks Division. “Low-Effect Habitat Conservation Plan for Balmorhea State Park Management Plan,” September 2008.

U.S. Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants; Endangered Status for Six West Texas Aquatic Invertebrate Species and Designation of Critical Habitat; Proposed Rule. 77 FR 49602 et seq. August 16, 2012.

U.S. Fish and Wildlife Service, Field Supervisor, Austin ESFO. “Memorandum to Jennifer Baxter, Industrial Economics, Inc., Subject: Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Six West Texas Invertebrates,” August 27, 2012.

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Veni, G. and Associates. 1991. Delineation and preliminary hydrogeologic investigation of the Diamond Y Spring, Pecos County, Texas. Final Report to The Nature Conservancy, San Antonio, TX.

“Western Springsnails on the Brink of Extinction,” The Xerces Society for Invertebrate Conservation, July 28, 2004; accessed online at <http://www.xerces.org/2004/07/28/western-springsnails-on-the-brink-of-extinction/> on December 18, 2009.

Written and personal communication with:

- Abel Balleza, Manager, Reeves County Water improvement District #1, on October 9, 2012.
- Paul Weatherby, Manager, Middle Pecos Groundwater Conservation District, on September 20, 2012.
- Jason Wrinkle, Desert Program Manager, The Nature Conservancy, Texas Chapter, on September 19, 2012.
- John Jones, Manager, Culberson County Groundwater Conservation District, on October 10, 2012.
- John Karges, Conservation Biologist, The Nature Conservancy, West Texas Office, May 23 and 29, 2007.
- Mark Lockwood, Natural Resources Coordinator and State Conservation Biologist, TPWD, on September 20, 2012.
- Russell Castro, State Wildlife Biologist, NRCS Texas, on October 5, 2012.
- The Service on September 7, 2012.
- The Service on August 3, 2012.
- Yvette Paroz, Albuquerque Office of the USBR, on October 5, 2012.

APPENDIX A | ADDITIONAL STATUTORY REQUIREMENTS

A.1 IMPACTS TO SMALL ENTITIES

68. When a Federal agency proposes a regulation, 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).³⁵ 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 a rule.
69. The likely costs of the proposed designation result from the additional administrative effort associated with addressing critical habitat in future section 7 consultations. These costs are primarily incurred by Federal agencies, specifically, the Service and the relevant Action agency. However, in some cases, a third-party entity may participate in the consultation process. It is possible that a third party could be a small entity as defined by the RFA.
70. In Chapter 2, we anticipate the Service will conduct approximately 7 formal, 15 informal, and 3 technical assistance consultations considering the designation, for a total of 25 consultations, over the next 20 years. Assuming the consultations are equally likely to occur in any year, this results in fewer than two consultations a year. Based on the consultation history, most consultations are unlikely to involve a third party. Therefore, fewer than two small entities, if any, could be affected each year. The incremental cost per third-party entity of participating in a consultation is likely to range from \$260 to \$2,100 (see Exhibit B-1 in Appendix B).

A.2 POTENTIAL IMPACTS TO GOVERNMENTS

71. Title II of UMRA requires agencies to assess the effects of their regulatory actions on State, local, and Tribal governments and the private sector.³⁶ Under Section 202 of UMRA, the Service must prepare a written statement, including a cost-benefit analysis, for rules that may result in the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector, of \$100 million or more in any one year. If a written statement is needed, Section 205 of UMRA requires the Service to identify and consider a reasonable number of regulatory alternatives. The Service must adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule, unless the Secretary publishes an explanation of why that alternative was not

³⁵ 5 U.S.C. §601 *et seq.*

³⁶ 2 U.S.C. 1531 *et seq.*

adopted. The provisions of Section 205 do not apply when they are inconsistent with applicable law.

72. As stated in the Proposed Rule, “the designation of critical habitat does not impose a legally binding duty on non-Federal Government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, maybe indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency”³⁷ Therefore, this rule does not place an enforceable duty upon State, local, or Tribal governments, or the private sector.

A.3 TAKINGS

73. Executive Order 12630, “Governmental Actions and Interference with Constitutionally Protected Property Rights,” issued march 15, 1988, requires agencies to adhere to certain principals in rulemakings that have takings implications and provide certain information to OMB for any actions with identified takings implications. Section 2(a) of the Executive Order defines takings implications to include any “regulations that propose or implement licensing, permitting, or other requirements or limitations on private property use, or that require dedications or exactions from owners of private property.”
74. As described in Chapter 2, the incremental effects of the proposed designation are limited to additional administrative costs of consultation. Activities taking place on private property are not likely to be affected. Thus, the proposed rulemaking is unlikely to have takings implications.

A.4 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY

75. 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.”³⁸
76. The Office of Management and Budget provides guidance for implementing this Executive Order, outlining nine outcomes that may constitute “a significant adverse effect” when compared with the regulatory action under consideration:

³⁷ U.S. Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants; Endangered Status for Six West Texas Aquatic Invertebrate Species and Designation of Critical Habitat; Proposed Rule. 77 FR 49637. August 16, 2012.

³⁸ 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>.

- 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.³⁹

77. As described in Sections 2.2 and 2.5, the proposed critical habitat designation for the six invertebrates is anticipated to result in minimal consultations related to natural gas pipelines. We do not anticipate incremental impacts to these projects beyond the administrative costs of addressing the adverse modification standard in section 7 consultation. Given the small number of projects affected, the proposed designation is not anticipated to increase the cost of energy production or distribution in the United States in excess of one percent. Thus, none of the nine threshold levels of impact listed above is exceeded.

³⁹ Ibid.

APPENDIX B | FRAMEWORK

78. The purpose of this report is to estimate the economic impact of actions taken to protect the six invertebrates and their habitat. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the species and their habitat within 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 afforded the six invertebrates absent critical habitat designation, including listing under the Act 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 six invertebrates.
79. According to section 4(b)(2) of the Act, the Service must consider the economic impacts, impacts to national security, and other relevant impacts of designating any particular area as critical habitat. An area may be excluded from designation as critical habitat if the benefits of exclusion (i.e., the impacts that would be avoided if an area were excluded from the designation) outweigh the benefits of designation so long as exclusion of the area will not result in extinction of the species. **The purpose of the economic analysis is to provide information 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.**⁴⁰ In addition, this information allows the Service to address the requirements of E.O.s 12866 (as amended by 13563), 13211, and 12630, the RFA, as amended by SBREFA, and UMRA.⁴¹
80. This chapter describes the framework for this analysis. The chapter first provides a background of case law that led to the selection of the framework applied in this report. We then describe in economic terms the general categories of economic effects that are the focus of the impact analysis, including a discussion of both efficiency and distributional effects. This chapter then defines the analytic framework used to measure these impacts in the context of critical habitat regulation and the consideration of benefits. It concludes with a description of the information sources relied upon in the analysis.

⁴⁰ 16 U.S.C. §1533(b)(2).

⁴¹ Executive Order 12866, Regulatory Planning and Review, September 30, 1993 (as amended by Executive Order 13563 (2011)); Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights, March 15, 1988; Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001; 5 U.S.C. § 601 et seq; Pub Law No. 104-121; and 2 U.S.C. 1501, et seq.

B.1 BACKGROUND

81. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the species and their habitat within the proposed critical habitat area. The 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."⁴² 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.

82. 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.⁴³ 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].⁴⁴

83. 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.⁴⁵ For example, in the March 2006 ruling that the August 2004 critical habitat rule for the Peirson's milk-

⁴² OMB, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars_a004_a-4.

⁴³ *New Mexico Cattle Growers Assn. v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

⁴⁴ *Ibid.*

⁴⁵ *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.'⁴⁶

84. More 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.⁴⁷ Plaintiffs in both cases requested review by the Supreme Court, which declined to hear the cases in 2011.
85. In order to address the divergent opinions of the courts and provide the most complete information to decision-makers, this economic analysis will employ “without critical habitat” and “with critical habitat” scenarios:
- The "**without critical habitat**" scenario represents the **baseline** for the analysis, considering protections already afforded the six invertebrates. The baseline for this analysis is the state of regulation, absent designation of critical habitat that provides protection to the species under the Act, as well as under other Federal, State and local laws and conservation plans. The baseline includes sections 7, 9, and 10 of the Act to the extent that they are expected to apply absent the designation of critical habitat for the species. The analysis will qualitatively describe how baseline conservation for the six invertebrates is currently implemented across the proposed designation in order to provide context for the incremental analysis (Chapter 2).
 - The "**with critical habitat**" scenario describes and monetizes the **incremental** impacts due specifically to the designation of critical habitat for the species. The incremental six invertebrates conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat. This report focuses on the incremental analysis (Chapter 2, Section 2.5).
86. 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

⁴⁶ *Center for Biological Diversity v. United States Bureau of Land Management* 422 F. Supp.2d 1115 (N.D. Cal. 2006).

⁴⁷ *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).

modifications may be imposed as a result of critical habitat designation over and above those associated with the listing.⁴⁸ 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.⁴⁹ Under the statutory provisions of the Act, the Service determines destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the affected critical habitat would remain functional to serve its intended conservation role for the species.

87. A detailed description of the methods used to define baseline and incremental impacts is provided in Section B.3.

B.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

88. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the six invertebrates and their habitat (hereinafter referred to collectively as “six invertebrates 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 six invertebrates conservation efforts.
89. 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.

B.2.1 EFFICIENCY EFFECTS

90. 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

⁴⁸ 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.

⁴⁹ *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, 378 F.3d 1059 (9th Circuit 2004).

context of regulations that protect six invertebrates 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.⁵⁰

91. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a Federal land manager may enter into a 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.
92. 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.
93. This analysis begins by measuring impacts associated with efforts undertaken to protect the six invertebrates and their habitat. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. However, if the cost of conservation efforts is expected to significantly impact markets, the analysis will consider potential changes in consumer and/or producer surplus in affected markets. As described in Chapter 2, in the case of the six invertebrates, conservation efforts are not anticipated to significantly affect markets; therefore, this report focuses on compliance costs.

B.2.2 DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

94. 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.⁵¹ 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

⁵⁰ 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>.

⁵¹ OMB, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars_a004_a-4.

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, Governments and Energy Supply, Distribution, and Use

95. 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.⁵² It also assesses the potential for impacts to State, local, and Tribal governments and the private sector as required by Title II of UMRA.⁵³ Finally, 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.⁵⁴

Regional Economic Effects

96. 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.
97. 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.
98. 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.

⁵² 5 U.S.C. §§601 *et seq.*

⁵³ 2 U.S.C. 1531 *et seq.*

⁵⁴ Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001.

99. Impacts associated with six invertebrates conservation efforts reflect increased administrative effort to participate in section 7 consultations. As described in the remainder of this report, critical habitat designation is not expected to affect the levels of economic activity occurring within the region. Therefore, measurable impacts of the type typically assessed with input-output models are not anticipated.

B.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

100. This analysis: 1) identifies those economic activities most likely to threaten the six invertebrates and their 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 methods used to separately identify baseline protections from the incremental impacts stemming from the proposed designation of critical habitat for the six invertebrates. 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.

B.3.1 IDENTIFYING BASELINE IMPACTS

101. The baseline for this analysis is the existing state of regulation, absent the designation of critical habitat, including the listing of the species under the Act, as well as protection under other Federal, State and local laws and guidelines. This "without critical habitat designation" scenario also considers a wide range of additional factors beyond the compliance costs of regulations that provide protection to the listed species. As recommended by OMB, the baseline incorporates, as appropriate, trends in market conditions, implementation of other regulations and policies by the Service and other government entities, and trends in other factors that have the potential to affect economic costs and benefits, such as the rate of regional economic growth in potentially affected industries.
102. Baseline protections include sections 7, 9, and 10 of the Act, and economic impacts resulting from these protections to the extent that they are expected to occur absent the designation of critical habitat for the species. This analysis describes these baseline regulations and, where possible, provides examples of the potential magnitude of the costs of these baseline protections. The primary focus, however, is not on baseline costs, since these will not be affected by the proposed regulation. Instead, the focus of this analysis is on monetizing the incremental impacts forecast to result from the proposed critical habitat designation.
- Section 7 of Act, even absent critical habitat designation, requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species. 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."⁵⁵ 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.⁵⁶ 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.

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

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

B.3.2 IDENTIFYING INCREMENTAL IMPACTS

104. This analysis quantifies the potential incremental impacts of this rulemaking. The focus of the incremental analysis is to determine the impacts on land uses and activities from the designation of critical habitat that are above and beyond those impacts resulting from existing required or voluntary conservation efforts being undertaken due to other Federal, State, and local regulations or guidelines.
105. 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.

⁵⁵ 16 U.S.C. 1532.

⁵⁶ U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at <http://endangered.fws.gov/hcp/>.

Direct Impacts

106. The direct, incremental impacts of critical habitat designation stem from the consideration of the potential for destruction or adverse modification of critical habitat during section 7 consultations. The two categories of direct, incremental impacts of critical habitat designation are: 1) the administrative costs of conducting section 7 consultation; and 2) implementation of any conservation efforts requested by the Service through section 7 consultation to avoid potential destruction or adverse modification of critical habitat.
107. Section 7(a)(2) of the Act requires Federal agencies to consult with the Service whenever activities that they undertake, authorize, permit, or fund may affect a listed species or designated critical habitat. In some cases, consultations will involve the Service and another Federal agency only, such as the U.S. Army Corps of Engineers (Corps). Often, they will also include a third party involved in projects that involve a permitted entity, such as the recipient of a CWA section 404 permit.
108. During a consultation, the Service, the Action agency, and the entity applying for Federal funding or permitting (if applicable) communicate in an effort to minimize potential adverse effects to the species and/or to the proposed critical habitat. Communication 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.
109. Section 7 consultations with the Service may be either informal or formal. *Informal consultations* consist of discussions between the Service, the Action agency, and the applicant concerning an action that may 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 recommendations 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.

Administrative Section 7 Consultation Costs

110. Parties involved in section 7 consultations include the Service, a Federal "action agency," and in some cases, a private entity involved in the project or land use activity. The action agency (i.e., the Federal nexus necessitating the consultation) serves as the liaison with the Service. While consultations are required for activities that involve a Federal nexus and may 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.

111. In general, three different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:
1. **Additional effort to address adverse modification in a new consultation -** New consultations taking place after critical habitat designation may require additional effort to address critical habitat issues above and beyond the listing issues. In this case, only the additional administrative effort required to consider critical habitat is considered an incremental impact of the designation.
 2. **Re-initiation of consultation to address adverse modification -** Consultations that have already been completed on a project or activity may require re-initiation to address critical habitat. In this case, the costs of re-initiating the consultation, including all associated administrative and project modification costs are considered incremental impacts of the designation.
 3. **Incremental consultation resulting entirely from critical habitat designation** Critical habitat designation may trigger additional consultations that may not occur absent the designation (e.g., for an activity for which adverse modification may be an issue, while jeopardy is not, or consultations resulting from the new information about the potential presence of the species provided by the designation). Such consultations may, for example, be triggered in critical habitat areas that are not occupied by the species. All associated administrative and project modification costs of incremental consultations are considered incremental impacts of the designation.
112. The administrative costs of these consultations vary depending on the specifics of the project. One way to address this variability is to show a range of possible costs of consultation, as it may not be possible to predict the precise outcome of each future consultation in terms of level of effort. Review of consultation records and discussions with Service field offices resulted in a range of estimated administrative costs of consultation.
113. Exhibit B-1 provides the incremental administrative consultation costs applied in this analysis. To estimate the fractions of the total administrative consultation costs that are baseline and incremental, the following assumptions are applied.
- The greatest effort will be associated with consultations that consider both jeopardy and adverse modification. 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 to designate critical habitat.
 - Efficiencies exist when considering both jeopardy and adverse modification at the same time (e.g., in staff time saved for project review and report writing), and therefore incremental administrative costs of considering adverse modification in consultations precipitated by the listing result in the least incremental effort, roughly 25 percent of the cost of the entire consultation.⁵⁷ 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

⁵⁷ *Ibid.*

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 B-1. INCREMENTAL ADMINISTRATIVE CONSULTATION COSTS (2012 DOLLARS)

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	\$1,100	n/a	\$1,600
Informal	\$2,500	\$3,100	\$2,100	\$2,000	\$9,500
Formal	\$5,500	\$6,200	\$3,500	\$4,800	\$20,000
Programmatic	\$17,000	\$14,000	n/a	\$5,600	\$36,000
RE-INITIATION OF CONSULTATION TO ADDRESS ADVERSE MODIFICATION					
Technical Assistance	\$290	n/a	\$530	n/a	\$810
Informal	\$1,200	\$1,600	\$1,000	\$1,000	\$4,800
Formal	\$2,800	\$3,100	\$1,800	\$2,400	\$10,000
Programmatic	\$8,300	\$6,900	n/a	\$2,800	\$18,000
ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION					
Technical Assistance	\$140	n/a	\$260	n/a	\$410
Informal	\$610	\$780	\$510	\$500	\$2,400
Formal	\$1,400	\$1,600	\$880	\$1,200	\$5,000
Programmatic	\$4,200	\$3,500	n/a	\$1,400	\$9,000
Source: IEC analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2011, and a review of consultation records from several Service field offices across the country conducted in 2002.					
Notes:					
1. Estimates are rounded to two significant digits and may not sum due to rounding.					
2. Estimates reflect average hourly time required by staff.					

114. To determine appropriate costs per consultation, we consulted Service biologists who participate in section 7 consultation.⁵⁸ Other relevant stakeholders could not comment on the level of administrative effort involved in section 7 consultation.

⁵⁸ Personal communication with the Service on September 7, 2012.

Section 7 Conservation Effort Impacts

115. 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 forecast 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.
116. To inform the economic analysis, the Service provided a memorandum describing its expected approach to conservation for the six invertebrates following critical habitat designation.⁵⁹ Specifically, this memorandum provides information on how the Service intends to address projects that might lead to adverse modification of critical habitat as distinct from projects that pose jeopardy to the species. In the memorandum, the Service states:
- It is likely that the incremental effects of the proposed designated critical habitat for the six West Texas aquatic invertebrates will be very limited because:
- (1) There are very few possible future Federal actions that would require section 7 consultation for these species or their critical habitat, as indicated by the past record of consultations for other co-occurring listed species;
 - (2) Most of the section 7 consultations for other co-occurring listed species were for recovery actions and none resulted in jeopardy or adverse modification determinations;
 - (3) We have no information indicating that there will be an increase in the number or nature of future section 7 consultations following the designation of critical habitat; and

⁵⁹ U.S. Fish and Wildlife Service. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical habitat for Six West Texas Invertebrates." August 27, 2012. See Appendix C.

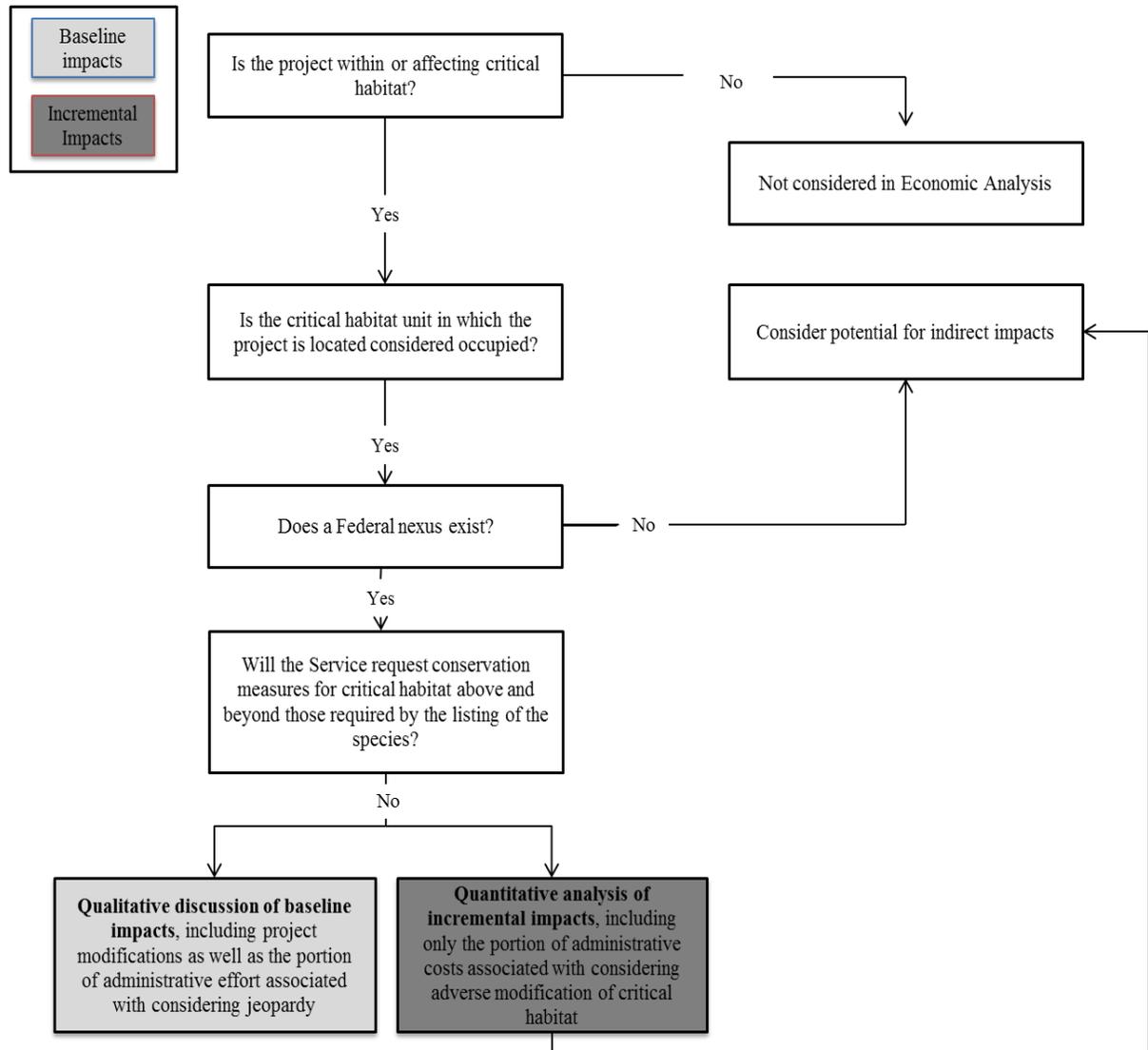
(4) For any future section 7 consultations, no additional conservation measures are likely to be required to avoid adverse modification beyond any measures that would be required to avoid jeopardy because:

- (a) All proposed critical habitat areas are occupied by the species; and
- (b) We cannot foresee a difference between future actions that could result in jeopardy and those that could result in adverse modification of critical habitat. This is because the six invertebrate species are so closely associated with their aquatic habitat.⁶⁰

117. In other words, very little activity is expected to occur that might affect the six invertebrates and their critical habitat. Furthermore, due to the close ties between the survival of these six invertebrate species and the quality of their habitat, any conservation efforts the Service requests to avoid adverse modification of critical habitat will most likely match those requested to avoid jeopardy. The Service anticipates that the conservation efforts it would recommend to avoid jeopardy to any one of the species would be the same conservation efforts it would recommend to avoid adverse modification of critical habitat for any of the other six invertebrate species.
118. In addition, while each of the six invertebrate species does not occur in each of the five units, every unit is occupied by at least three of the invertebrate species. Consequently, we anticipate that critical habitat designation will not generate additional requests for project modification in any of the proposed critical habitat units.
119. As a result, this analysis finds that the incremental economic impacts of the critical habitat designation will likely be limited to additional administrative costs to the Service, Federal agencies and private third parties of considering critical habitat as part of section 7 consultation.
120. Exhibit B-2 summarizes the decision framework employed to support the conclusion that critical habitat designation is unlikely to generate additional conservation for the six invertebrates.

⁶⁰ *Ibid.*

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



Indirect Impacts

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

Habitat Conservation Plans

122. Under section 10 of the Act, landowners seeking an incidental take permit must develop an HCP to counterbalance the potential harmful effects that an otherwise lawful activity may have on a species. As such, the purpose of the habitat conservation planning process is to ensure that the effects of incidental take are adequately avoided or minimized. Thus, HCPs are developed to ensure compliance with section 9 of the Act and to meet the requirements of section 10 of the Act.
123. Balmorhea State Park developed an HCP, finalized in September 2008, which considers other co-occurring listed species present at San Solomon Spring.⁶¹ This HCP addresses potential impacts resulting from water management and recreational activities occurring at Balmorhea State Park. The HCP also addresses species and habitat management actions related to the man-made cienaga habitat, constructed by the Service and TPWD. Officials at TPWD do not anticipate revision of the HCP due to the designation of critical habitat for the six invertebrates.⁶²

Other State and Local Laws

124. 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.
125. In California, for example, the California Environmental Quality Act (CEQA) requires that lead agencies, public agencies responsible for project approval, consider the environmental effects of proposed projects that are considered discretionary in nature and not categorically or statutorily exempt. In some instances, critical habitat designation may trigger CEQA-related requirements. This is most likely to occur in areas where the critical habitat designation provides clearer information on the importance of particular

⁶¹ Texas Parks and Wildlife Department, Natural Resources Program, State Parks Division. "Low-Effect Habitat Conservation Plan for Balmorhea State Park Management Plan," September 2008.

⁶² Personal communication with Mark Lockwood, Natural Resources Coordinator and State Conservation Biologist, TPWD, on September 20, 2012.

areas as habitat for a listed species. In addition, applicants who were “categorically exempt” from preparing an EIR under CEQA may no longer be exempt once critical habitat is designated. In cases where the designation triggers the CEQA significance test or results in a reduction of categorically exempt activities, associated impacts are considered to be an indirect, incremental effect of the designation.

126. In the case of six invertebrates critical habitat, no indirect, incremental effects are anticipated in association with State and local regulation. Private groundwater pumping and water management carried out by local GCDs are not subject to a Federal nexus and are largely unregulated by Texas State law.

Additional Indirect Impacts

127. In addition to the indirect effects of compliance with other laws or triggered by the designation, project proponents, land managers and landowners may face additional indirect impacts, including the following:
- **Time Delays** - Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the need to reinitiate the section 7 consultation process and/or compliance with other laws triggered by the designation. To the extent that delays result from the designation, they are considered indirect, incremental impacts of the designation.
 - **Regulatory Uncertainty** - The Service conducts each section 7 consultation on a case-by-case basis and issues a biological opinion on formal consultations based on species-specific and site-specific information. As a result, government agencies and affiliated private parties who consult with the Service under section 7 may face uncertainty concerning whether project modifications will be recommended by the Service and what the nature of these modifications will be. This uncertainty may diminish as consultations are completed and additional information becomes available on the effects of critical habitat on specific activities. Where information suggests that this type of regulatory uncertainty stemming from the designation may affect a project or economic behavior, associated impacts are considered indirect, incremental impacts of the designation.
 - **Stigma** - In some cases, the public may perceive that critical habitat designation may result in limitations on private property uses above and beyond those associated with anticipated project modifications and regulatory uncertainty described above. Public attitudes about the limits or restrictions that critical habitat may impose can cause real economic effects to property owners, regardless of whether such limits are actually imposed. All else equal, a property that is designated as critical habitat may have a lower market value than an identical property that is not adjacent to a stream designated as critical habitat due to perceived limitations or restrictions. As the public becomes aware of the true regulatory burden imposed by critical habitat, the impact of the designation on property markets may decrease. To the extent that potential stigma effects on markets are probable and identifiable, these impacts are considered indirect, incremental impacts of the designation.

Indirect impacts may also result from critical habitat providing new information regarding where project proponents should consult regarding potential impacts on the species or habitat. Because the listing of the species and the critical habitat designation are being proposed coincidentally, it is difficult to determine whether the critical habitat designation specifically generates the understanding of the areas in which the species are present. In other words, it is unclear whether the critical habitat designation will generate improved understanding above and beyond that provided by the listing of where project proponents should consult with the Service.

B.3.3 BENEFITS

128. Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.⁶³ OMB's Circular A-4 distinguishes two types of economic benefits: *direct benefits and ancillary benefits*. Ancillary benefits are defined as favorable impacts of a rulemaking that are typically unrelated, or secondary, to the statutory purpose of the rulemaking.⁶⁴
129. 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.⁶⁵ *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.*
130. 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. As we do not expect a change in management practices due to this proposed critical habitat designation, the analysis does not anticipate any direct or ancillary economic benefits.

⁶³ Executive Order 12866, Regulatory Planning and Review, September 30, 1993.

⁶⁴ OMB, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars_a004_a-4.

⁶⁵ *Ibid.*

B.3.4 GEOGRAPHIC SCOPE OF THE ANALYSIS

131. As described in Chapter 1, this analysis evaluates impacts of critical habitat designation on activities within or affecting the proposed critical habitat area. Due to the limited geographical extent of the proposed critical habitat, this analysis considered impacts to all land parcels overlapping the proposed designation and attempted to contact all potentially affected landowners.

B.3.5 ANALYTIC TIME FRAME

132. 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). Recent guidance from OMB indicates that “if a regulation has no predetermined sunset provision, the agency will need to choose the endpoint of its analysis on the basis of a judgment about the foreseeable future.”⁶⁶ The “foreseeable future” for this analysis includes, but is not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public. Forecasted impacts will be based on the planning periods for potentially affected projects and will look out over a 20-year time horizon for most activities. OMB supports this time frame stating that “for most agencies, a standard time period of analysis is ten to 20 years, and rarely exceeds 50 years.”⁶⁷ Therefore, this analysis considers economic impacts to activities over a 20-year period from 2013 (expected year of final critical habitat designation) through 2032.

B.4 INFORMATION SOURCES

133. The primary sources of information for this report are communications with, and data provided by, personnel from the Service, State and local government agencies, and other stakeholders. In particular, the incremental effects memorandum provided by the Service and follow-on communication with relevant Federal and State regulatory agencies (see Appendix C). In addition, this analysis relies upon the Service’s section 7 consultation record for other co-occurring listed species, including some consultations that additionally consider these six invertebrate species as candidate species. A complete list of references is provided at the end of the main text of this document.

⁶⁶ U.S. Office of Management and Budget, February 7, 2011. “Regulatory Impact Analysis: Frequently Asked Questions (FAQs).” Accessed on October 10, 2012 at http://www.whitehouse.gov/omb/circulars_a004_a-4.

⁶⁷ *Ibid.*

EXHIBIT B-3. CALCULATING PRESENT VALUE AND ANNUALIZED IMPACT

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

$$PV_c = \sum_t^T \frac{C_t}{(1+r)^{t-2013}}$$

C_t = cost of six invertebrates critical habitat conservation efforts in year t

r = discount rate^b

Impacts for each activity in each unit are also expressed as annualized values. Annualized values are calculated to provide comparison of impacts across activities with varying forecast periods (T). For this analysis, development activities employ a forecast period of 20 years, 2013 through 2032. Annualized future impacts (APV_c) are calculated by the following standard formula:

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

N = number of years in the forecast period (in this analysis, 30 years)

^a To derive the present value of future impacts to development activities, t is 2013 and T is 2032.

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

APPENDIX C | INCREMENTAL EFFECTS MEMORANDUM

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United States Department of the Interior

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AUG 27 2012

Memorandum

To: Jennifer Baxter, Industrial Economics, Inc.

From: Field Supervisor, Austin ESFO 

Subject: Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Six West Texas Aquatic Invertebrates

Introduction

The document provides information for an economic analysis of the proposed designation for critical habitat for six species of aquatic invertebrates that occur in west Texas. The six west Texas aquatic invertebrate species are: Phantom Cave snail (*Pyrgulopsis texana*), Phantom springsnail (*Tryonia cheatumi*), diminutive amphipod (*Gammarus hyalleloides*), Diamond Y Spring snail (*Pseudotryonia adamantina*), Gonzales springsnail (*Tryonia circumstriata*), and Pecos amphipod (*Gammarus pecos*).

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

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

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



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Background

In total, approximately 181.7 hectares (450.6 acres) are being proposed for designation as critical habitat in four units for these six species. The proposed critical habitat is located in Pecos, Reeves, and Jeff Davis counties, Texas. Tables 1 and 2 list the areas proposed for designation for each species.

TABLE 1. Proposed critical habitat units for Phantom Cave snail, Phantom springsnail, and diminutive amphipod. Area estimates reflect all land within critical habitat unit boundaries.

Critical Habitat Unit	Land Ownership by Type	Size of Unit in Hectares (Acres)
San Solomon Spring	State–Texas Parks and Wildlife Department	1.8 (4.4)
Giffin Spring	Private	0.7 (1.7)
East Sandia Spring	Private–The Nature Conservancy	1.2 (3.0)
Phantom Lake Spring	Federal–Bureau of Reclamation	0.02 (0.05)
Total		3.7 (9.2)

TABLE 2. Proposed critical habitat unit for Diamond Y Spring snail, Gonzales springsnail, and Pecos amphipod. Area estimate reflects all land within critical habitat unit boundaries.

Critical Habitat Unit	Land Ownership by Type	Size of Unit in Hectares (Acres)
Diamond Y Spring Complex	Private–The Nature Conservancy	178.6 (441.4)
Total		178.6 (441.4)

All of the areas proposed for designation are currently occupied by three of the species proposed for listing as endangered (as noted for Tables 1 and 2). These areas represent the entire currently occupied range of the three relevant species for each proposed unit. All of the areas are being proposed under section 5(A)(i) of the Act because they are within the geographic areas occupied by the species. No areas are being proposed under section 5(A)(ii) outside the geographic area occupied by the species.

Baseline Analysis (without Critical Habitat)

The following discussion describes the existing regulatory circumstances that are anticipated without critical habitat designation. In the baseline scenario, section 7 of the Act requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of the listed species.

How is jeopardy defined and determined for these species?

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

Because of the biology and life history characteristics of the six west Texas aquatic invertebrates, in order to reach a conclusion of jeopardy under section 7 consultation, a proposed Federal action would have to make their habitat unsuitable to support the invertebrates. The ability of these species to persist is very closely tied to the quality of their habitats. These species are completely reliant upon aquatic habitat conditions for all their physiological function (e.g., breathing underwater) and normal behaviors (e.g., breeding and feeding). They have limited ability to move beyond their immediate locations. Therefore, any action that substantially reduces habitat quality (by altering either the quality or quantity of water or the stream banks and associated vegetation) will reduce the number of individuals and populations. We can foresee no future actions that could significantly impact the individuals of the species independent of the habitat. And, conversely, we can foresee no future actions that could substantially impact the habitat without also appreciably reducing survival and recovery of the species. We do not have sufficient information at this time to determine exact needs of the species in terms of water quality parameters or spring flow rates. However, we can reasonably assume that if these conditions (adequate water quality and quantity) are impacted severely, the species chances of survival will decrease and their opportunity for recovery will decrease as well. Therefore, any proposed Federal activity that is likely to severely impact the water quality of spring flow quantities could result in jeopardy.

There are no known threats at this time that would affect just the individuals of the species because they are so closely tied to their aquatic habitat. All of the threats to the species that have been identified in the proposed rule are related to impacts to the aquatic habitat.

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

Concurrent with the proposed designation of critical habitat, the six aquatic invertebrates have been proposed for listing as endangered under the Act. Listing provides opportunity for conservation and protection under sections 6, 7, 9, and 10 of the Act. These include cooperative actions with States, consultations with Federal agencies for actions that may affect the species, prohibitions against take without a special permit, and cooperative habitat protections with other entities and landowners.

Conservation Plans and EffortsThe lands owned by The Nature Conservancy (Diamond Y Spring Preserve and East Sandia Spring Preserve) have ongoing conservation management and protections for the lands (contacts: *Jason Wrinkle, TNC, 432-345-6773, jwrinkle@tnc.org; John Karges, TNC, 210-301-5618; jkarges@tnc.org*). However, neither area is managed under a formal management plan nor does the management at either site protect the habitat from threats identified in the listing proposal, such as groundwater loss or exposure to contaminants from oil and gas activities on or outside the preserve.

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The Texas Parks and Wildlife Department has a Habitat Conservation Plan (HCP) for the management activities at Balmorhea State Park (San Solomon Springs) (contacts: *Mark Lockwood, Natural Resources Program, Fort Davis, 432-426-3897, mark.lockwood@tpwd.state.tx.us; Tom Johnson, Park Manager, 432-375-2370, tom.johnson@tpwd.state.tx.us*). The proposed area of critical habitat at San Solomon Spring is all within this Park. This area is being considered for possible exclusion from critical habitat designation on the basis of the protections provided in the HCP. However, the HCP does not address the most significant threat to the species—the loss of habitat due to declining groundwater and resulting declining spring flows.

State or Local Protections

These species are not currently listed as threatened or endangered by the State of Texas, and no other protections are afforded by the State. The proposed rule also discusses local groundwater regulations and State regulations for oil and gas activities; however, neither provides any substantive protections from the identified threats to the species. In addition, neither of these activities have a Federal nexus that would trigger section 7 consultation, and neither can be shown to cause take of the species such that a section 10 permit and HCP would be pursued.

Federal Regulations and Acts

There are no Federal laws and regulations that are known to provide benefits to these aquatic invertebrates. The Clean Water Act and its implementing regulations provide protections for some aquatic habitats, but there are no known likely proposed actions that are expected to trigger Clean Water Act permits in the areas proposed for designation as critical habitat.

Other Listed Species

A number of species listed as threatened or endangered under the Act also occur within the aquatic habitats where the aquatic invertebrates are found (Table 3). As a result, the aquatic invertebrates receive some benefits from actions intended to protect the species already listed.

TABLE 3. Other listed species co-occurring in habitats of the proposed west Texas aquatic invertebrates.

Other Listed Species	Status*	Listed Since	Species Occurrence (Diamond Y or San Solomon Spring Systems)
Pecos gambusia (fish)	E	1983	All springs
Pecos sunflower	T w/CH	1999	Diamond Y Spring System and East Sandia Spring
Pecos assiminea (snail)	E w/CH	2005	Diamond Y Spring System and East Sandia Spring
Leon Springs pupfish	E w/CH	1985	Diamond Y Spring System
Comanche Springs pupfish	E	1981	San Solomon Spring System

* E=endangered; T=threatened; w/CH=with designated critical habitat

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Diamond Y Spring currently has critical habitat designated for the Pecos sunflower, Pecos assimineia, and Leon Springs pupfish. East Sandia Spring has critical habitat designated for the Pecos sunflower and the Pecos assimineia.

Federal Management

The area proposed for critical habitat at Phantom Lake Spring is owned and managed by the U.S. Bureau of Reclamation (Reclamation) (contact: *Yvette Paroz, Albuquerque Area Office, (505) 462-3581, yparoz@usbr.gov*). The small area of Federal land around Phantom Lake Spring is now owned and managed by Reclamation exclusively to protect the aquatic habitat at the spring for the benefit of the endemic species (two listed fishes and the three invertebrate species, formally candidates, now proposed for listing). Reclamation's ongoing management activities to secure the aquatic habitat at Phantom Lake Spring should be considered part of the baseline because Reclamation's actions will provide some benefits to the species with or without critical habitat designation. This is because of the presence of the two already listed fishes and, in the future, the three newly listed invertebrates (assuming the species are listed as proposed). Section 7 consultations have occurred in the past as part of the efforts to save the habitat at Phantom Lake Spring by enlarging the spring pool and pumping water from within the cave to the spring pool. None of the activities undertaken by Reclamation address the primary threat to the species for groundwater management.

Some Federal agencies and other project proponents that are likely to consult with the Service under section 7 without critical habitat

In the baseline scenario, section 7 of the Act requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of the six aquatic invertebrates.

We project that there are very few Federal activities in the area that are likely to trigger section 7 consultation. Since these species have not been listed in the past, there are no past section 7 consultation histories concerning the species. However, we can use the consultation history for the other listed species (fishes, snail, and sunflower) that occur in the same areas as an indication of possible future consultations. Some of these consultations included consideration of the invertebrate species now proposed for listing.

Nine formal section 7 consultations in the past have included the listed species at the Diamond Y Spring and San Solomon Spring systems (Table 4), and none of them resulted in a jeopardy determination. Of those nine, six of the consultations were for implementing endangered species recovery activities with either the Reclamation or the Service. One of the three other consultations was with the U.S. Department of Agriculture, Natural Resources Conservation Service, for the agricultural assistance programs for downstream farmers related to potential impacts to the fishes during water diversion for irrigation. There were no effects envisioned for the invertebrates because they do not occur very far downstream of the spring source and are, therefore, not affected by the agricultural activities. A second consultation was for the

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Balmorhea State Park HCP, and the third one was a recent large-scale utility right-of-way HCP with minimal involvement in this area.

TABLE 4. Section 7 formal consultations for San Solomon and Diamond Y Spring systems.

Fiscal Year	Activity Code	Activity Title	Lead Agency
1992	21450-1992-F-0240	Phantom Springs Refugium	Bureau of Reclamation
1998	21450-1998-F-1318	Diamond Y Spring Restoration	Fish and Wildlife Service
1998	21450-1998-F-1333	Balmorhea Lake Renovation	Fish and Wildlife Service
2000	21450-2000-F-0067	Phantom Lake Spring Habitat Enhancement	Bureau of Reclamation
2003	21450-2003-F-0480	Reeves County Water Improvement District #1	Natural Resources Conservation Service
2004	21450-2004-F-0286	Phantom Lake Spring Pumping System	Fish and Wildlife Service
2009	21450-2009-F-0063	Section 6 Grant TX E-90-1, Design for Habitat for Comanche Springs Pupfish	Fish and Wildlife Service
2009	TE-183172-0	Balmorhea State Park Management HCP	Fish and Wildlife Service
2011	21450-2011-F-0184	Oncor Electric Delivery LLC, HCP	Fish and Wildlife Service

Some of the Federal agencies and projects that may go through the section 7 consultation process in the future whether or not critical habitat is designated include the following:

- (1) U.S. Bureau of Reclamation (conservation management activities at Phantom Lake Spring).
- (2) U.S. Fish and Wildlife Service (recovery actions; issuance of section 10 enhancement of survival permits, habitat conservation plans, and safe harbor agreements; Partners for Fish and Wildlife program projects).
- (3) Federal Highway Administration via Texas Department of Transportation (bridge construction and maintenance, limited opportunity, perhaps State Highway 18 in Pecos County).

We could have future consultations with Reclamation and intra-Service consultations for ongoing and future recovery actions. We do not know if Texas Department of Transportation has any future plans regarding State Highway 18 that may require consultation. We do not anticipate further consultation with Natural Resources Conservation Service.

Service administrative effort for section 7 consultations without critical habitat

As a result of the very low number of formal consultations for these areas with other previously listed species (9 over the past 20 years), we anticipate a very small amount of administrative effort will be expended in the future for conducting section 7 consultations under the baseline without critical habitat. The only possible consultation that may need to be reinitiated after these species are listed would be with Reclamation for the ongoing operation and maintenance of the spring pool at Phantom Lake Spring.

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What types of project modifications are currently recommended or will likely be recommended by the Service to avoid jeopardy (i.e., the continued existence of the species)?

We have no history of recommending project modifications to avoid jeopardy for other species in the areas where these species occur because of a lack of Federal activities that might impact them and no consultations in the past that resulted in jeopardy determinations. If there were such activities in the future, we would likely recommend project modifications that would maintain necessary conditions related to water quality and spring flow quantity to avoid jeopardy.

Incremental Effects Analysis (with Critical Habitat)

The following discussion describes the regulatory circumstances that are anticipated with the proposed critical habitat designation. In the incremental scenario, section 7 of the Act requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not adversely modify any designated critical habitat.

How is adverse modification defined and determined for these species?

Once critical habitat is designated in these areas, section 7 of the Act requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat. The key factor related to evaluating potential adverse modification is whether, with implementation of the proposed Federal action, the affected critical habitat will continue to have the capability to serve its intended conservation role for the species. From section 3(3) of the Act: The terms "conserve," "conserving," and "conservation" mean to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided under the Act are no longer necessary. Thus, designation of critical habitat helps ensure that proposed project actions will not result in the adverse modification of habitat to the point that the species will not achieve recovery.

The six west Texas aquatic invertebrates are completely reliant upon aquatic habitat conditions for all their physiological functions (e.g., breathing underwater) and normal behavior to allow for breeding and feeding. And they have limited ability to move beyond their immediate locations. Therefore, any action that substantially reduces habitat quality (by altering either the quality or quantity of water or the stream banks and associated vegetation) in any of the proposed designated critical habitat units may reach an adverse modification under section 7 consultation. With only four proposed critical habitat units for the San Solomon species, substantial impacts to any of the four units may constitute adverse modification. With only one proposed critical habitat unit for the Diamond Y species, substantial impacts to that unit would likely constitute adverse modification.

As stated above, we do not have sufficient information at this time to determine exact needs of the species in terms of water quality parameters or spring flow rates. However, we can reasonably assume that if these conditions (adequate water quality and quantity, stream banks, and vegetation) are impacted severely, the intended conservation function of the critical habitat unit could be lost, resulting in adverse modification. Also as stated above under the Baseline discussion, because the biology and life-history characteristics of these species are so closely tied to their habitat, it seems highly unlikely to reach a conclusion of adverse modification without

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also reaching jeopardy under section 7 consultation for a proposed Federal action that substantially impacted habitat conditions in the springs.

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

We can foresee no likely Federal activities in the future that would result in section 7 consultations with the designation of critical habitat beyond those that would occur with the listing of the species (see explanation above, *How is adverse modification defined and determined for these species?*). The same agencies and project proponents may possibly consult under adverse modification as those that would under the baseline conditions. We believe the agencies that might undergo consultation will be the same agencies that have already consulted on projects in these areas due to the presence of other listed species. We anticipate no new project proponents or additional activities that would require consultation due to critical habitat designation. This is because all of the proposed critical habitat areas are currently occupied by the species, the species is very closely dependent upon its aquatic habitat, and there are very few Federal actions expected in the area where the critical habitat is proposed.

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

Because these species are so closely tied to the specific aquatic habitat conditions associated with the outflow from springs, and because all of the significant threats they face are related to potential impacts to habitat, we can forecast only very small additional administrative efforts to address critical habitat beyond those that might occur as part of the baseline for listing the species.

What project proponents are likely to pursue HCPs under section 10 after the designation of critical habitat?

It is unlikely that any additional entities will pursue HCPs after these species are listed. Balmorhea State Park already has an HCP that covers their management actions, and the three invertebrates were included as covered species in their HCP. It is possible, but unlikely, that The Nature Conservancy could pursue an HCP in the future for their limited land management activities at Diamond Y Spring Preserve. However, they have never done so in the past despite the presence of previously listed species because they do not plan to undertake activities that would cause take to the existing listed species nor would they be likely to plan activities that would take the invertebrates proposed for listing. Therefore, it would be unlikely that The Nature Conservancy would desire to spend the effort to pursue an HCP.

The private land included in the proposed Giffin Spring Unit could pursue an HCP, but we have no reason to believe the landowner would do so. This is because the landowner is not likely to engage in activities that would result in take of the species and has not shown any desire to pursue an HCP in the past.

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Similarly, the local groundwater districts that manage groundwater withdrawals in the supporting aquifers (or their individual members) for both spring systems could conceivably pursue an HCP for their water use. However, we have no reason to believe these entities would do so because it is not clear that their actions would result in take of the species, and they have not shown any indication to pursue an HCP in the past.

Oil and gas exploration, extraction, transportation, and processing near Diamond Y Spring could result in another potential participant in an HCP. However, as with water users, we have no reason to believe oil and gas companies would pursue an HCP because of the absence of need to authorize take of listed species. Since they have not shown any indication to pursue an HCP in the past for the existing listed species, we do not anticipate that they would do so in the future on behalf of the invertebrates.

What types of project modifications might the Service make during a section 7 consultation to avoid destruction or adverse modification of critical habitat that are different than those for avoiding jeopardy?

Although we do not currently have a regulatory definition of adverse modification, we rely on the statutory definition in light of the *Gifford Pinchot* ruling that provides some guidance in distinguishing different standards for determination of jeopardy and adverse modification. Adverse modification is considered a higher standard of preventing substantial loss of the conservation value of the critical habitat segment to help achieve recovery of the species.

In the case of these invertebrates, no additional project modifications as a result of designating critical habitat are predictable because:

- (1) All areas proposed for critical habitat are occupied by the species;
- (2) The invertebrates are intimately tied to their aquatic habitats such that any potential project modifications to avoid adverse modification of critical habitat are most likely also going to be required to avoid jeopardizing the species; and
- (3) There are no future Federal actions envisioned at this time that are likely to have substantial impacts to either the individuals of the species or their proposed critical habitat, which is supported by the lack of Federal actions in the consultation history regarding the co-occurring, already listed species.

Conclusion

In summary, it is likely that the incremental effects of the proposed designated critical habitat for the six west Texas aquatic invertebrates will be very limited because:

- (1) There are very few possible future Federal actions that would require section 7 consultation for these species or their critical habitat, as indicated by the past record of consultations for other co-occurring listed species;
- (2) Most of the section 7 consultations for other co-occurring listed species were for recovery actions and none resulted in jeopardy or adverse modification determinations;
- (3) We have no information indicating that there will be an increase in the number or nature of future section 7 consultations following the designation of critical habitat; and

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- (4) For any future section 7 consultations, no additional conservation measures are likely to be required to avoid adverse modification beyond any measures that would be required to avoid jeopardy because:
- (a) All proposed critical habitat areas are occupied by the species; and
 - (b) We cannot foresee a difference between future actions that could result in jeopardy and those that could result in adverse modification of critical habitat. This is because the six invertebrate species are so closely associated with their aquatic habitat.

Therefore, we anticipate the incremental effects of critical habitat are likely to be limited to a small increase in administrative costs to Federal action agencies (only Reclamation) and the Service while conducting section 7 consultations required for any applicable future actions.

We appreciate the opportunity to provide this information for you. If you have any questions or request clarification of any the items described here, please do not hesitate to call Nathan Allan at 512-490-0057, extension 237.

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