



ECONOMIC ANALYSIS OF CRITICAL  
HABITAT DESIGNATION FOR THE  
GROTTO SCULPIN

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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 the grotto sculpin (*Cottus* sp. nov.). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service (Service).
2. The Service proposed to list the grotto sculpin (hereafter “the sculpin”) as endangered on September 27, 2012.<sup>1</sup> In conjunction with the proposed listing, the Service proposed to designate all underground aquatic habitat underlying approximately 94 square kilometers (36 square miles) plus 31 kilometers (19.2 miles) of surface stream as critical habitat across four units for the sculpin.<sup>2</sup> All units are located in Perry County, Missouri, and are considered occupied by the sculpin.
3. Because sculpin habitat may also be affected by activities occurring upstream, we use as the “study area” for the two proposed surface streams (Units 3 and 4) the adjacent area in which relevant Federal agencies are likely to have jurisdiction. For example, for agricultural activities, we consider any adjacent land area participating in programs administered by the Farm Service Agency (FSA) or the Natural Resource Conservation Service (NRCS). For transportation, sand mining, and development projects, we consider the areas in which the U.S. Army Corps of Engineers (Corps) has jurisdiction to issue section 404 Clean Water Act (CWA) permits.

### FRAMEWORK FOR THE ANALYSIS

4. Although no known local statutes or regulations address the sculpin, several Federal and state regulations may protect the species and its habitat. These regulations offer “baseline” protections afforded the sculpin even absent the designation of critical habitat. Key baseline protections include sections 7, 9, and 10 of the Act, the CWA, Missouri Department of Conservation Best Management Practices, and the Missouri Clean Water Law. In addition, some local landowners voluntarily implement conservation efforts that benefit the sculpin. Perry County is also in the process of developing a land and resource management plan that will address sculpin conservation.
5. The discussion of the regulatory baseline in this report provides context for the evaluation of the economic impacts expected to result from the designation of critical habitat, which are the focus of this analysis. These “incremental” economic impacts are those expected to occur solely as a result of critical habitat designation for the sculpin, rather than as a result of baseline protections. In other words, incremental impacts, both positive and

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<sup>1</sup> 2012 Proposed Rule. 77 FR 59488.

<sup>2</sup> *Ibid.*

negative, would not have occurred absent the proposal to designate critical habitat. This information is intended to assist the Secretary of the U.S. Department of the Interior (DOI) in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.<sup>3</sup>

6. We estimate economic impacts from 2013 (expected year of final critical habitat designation) to 2030. This 18-year analysis period reflects the maximum amount of time under which future activities and economic impacts associated with the Proposed Rule can be reliably projected, given available data and information.

#### OVERVIEW OF PROPOSED CRITICAL HABITAT

7. The majority of the proposed critical habitat is located on privately owned land.<sup>4</sup> Much of Unit 1 is located within urbanized areas associated with the City of Perryville. Units 1, 2, and 4 occur adjacent to Interstate 55. Other portions of the proposed critical habitat are primarily used for agriculture. Exhibit ES-1 summarizes land ownership in the proposed designation, and Exhibit ES-2 provides an overview map.
8. Review of the Proposed Rule identified the following economic activities as potential threats to the sculpin and its habitat. We therefore focus the analysis of potential impacts of sculpin conservation on these activities:
  1. **Residential, commercial, and industrial development.** Development may result in increased stormwater runoff and degraded water quality.
  2. **Agricultural and livestock operations.** Agricultural and livestock operations may decrease water quality through erosion, sedimentation, or contamination. In addition, livestock grazing can alter nutrient levels and stream temperature.
  3. **Transportation projects.** Road projects may increase sedimentation and stormwater runoff.
  4. **Sand mining.** Industrial sand mining may destroy sculpin habitat directly and may contribute to contamination and sedimentation.

This analysis also considers impacts to habitat and species management—in particular, the development of a community land and resource management plan to address conservation of the sculpin in Perry County.

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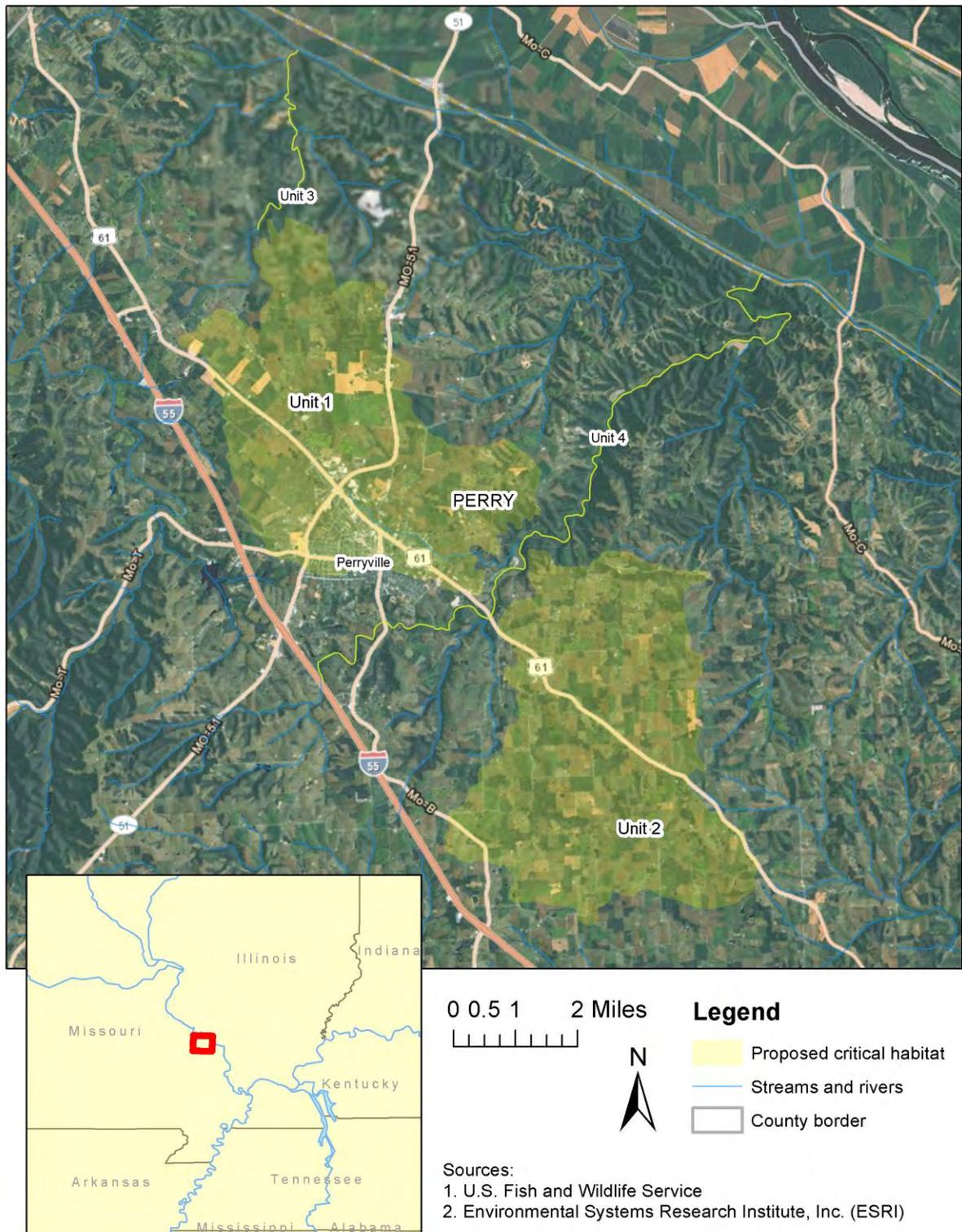
<sup>3</sup> 16 U.S.C. §1533(b)(2)

<sup>4</sup> 2012 Proposed Rule. 77 FR 59506.

## EXHIBIT ES-1. SUMMARY OF LAND OWNERSHIP WITHIN PROPOSED CRITICAL HABITAT

UNIT	LOCATION	PRIVATE OWNERSHIP		STATE, COUNTY, AND CITY OWNERSHIP		TOTAL
		SQUARE MILES	STREAM MILES	SQUARE MILES	STREAM MILES	
1	Central Perryville Karst Area	14	--	4	--	18
2	Mystery-Rimstone Karst Area	19	--	1	--	19
3	Blue Spring Branch	--	4	--	0	4
4	Cinque Hommes Creek	--	14	--	0	14
<b>Total</b>		<b>32</b>	<b>19</b>	<b>4</b>	<b>0</b>	<b>36 sq. mi. 19 mi.</b>
Source: 2012 Proposed Rule. 77 FR 59506.						

EXHIBIT ES-2. OVERVIEW OF PROPOSED CRITICAL HABITAT FOR THE GROTTO SCULPIN



**KEY FINDINGS**

9. The Service anticipates that in most cases conservation efforts recommended through section 7 consultation due to the listing of the species (i.e., to avoid jeopardy) will also avoid adverse modification of critical habitat. In rare instances, the Service has indicated that concern regarding potential adverse modification of critical habitat may generate recommendations for additional conservation; however, at this time, the Service is unable to predict the types of projects that may require different conservation efforts.<sup>5</sup> Thus, impacts occurring under such circumstances are not quantified in this analysis.
10. In addition, the Service has suggested that, in some areas, action agencies may not be aware of the need to consult under the jeopardy standard. The designation of critical habitat could therefore provide new information about species occupancy, leading to an increase in the number of consultations.<sup>6</sup> Communication with potential action agencies indicates that these agencies generally are aware of the presence of the species and the need to consult. As a result, this analysis focuses on quantifying incremental impacts associated with the administrative effort of addressing potential adverse modification of critical habitat in section 7 consultation.
11. Exhibit ES-3 summarizes total forecast incremental impacts assuming a seven percent and three percent discount rate. The key findings are as follows:
  - Low-end total present value impacts anticipated to result from the designation of sculpin critical habitat are approximately \$140,000 over 18 years, assuming a seven percent discount rate (\$180,000 assuming a three percent discount rate). High-end total present value impacts are approximately \$4.0 million, assuming a seven percent discount rate (\$4.1 million assuming a three percent discount rate).
  - In the low-end scenario, all incremental costs are administrative in nature and result from the consideration of adverse modification in section 7 consultations. In the high-end scenario, we also consider potential indirect incremental costs associated with development and implementation of the Perry County land and resource management plan. The true value of incremental costs is expected to fall between these estimates. Due to difficulty determining the portion of costs associated with the Perry County land and resource management plan that are incremental, we are unable to further refine this range at this time.

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<sup>5</sup> U.S. Fish and Wildlife Service. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Grotto Sculpin (*Cottus* sp. nov.)." October 25, 2012. (Page 3)

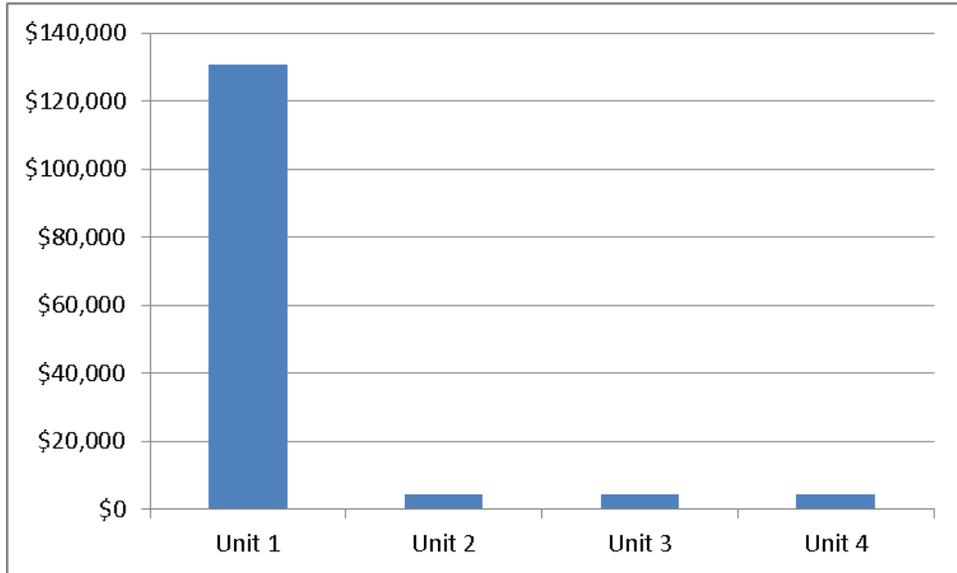
<sup>6</sup> *Ibid.* (Pages 1 and 4-5)

**EXHIBIT ES-3. SUMMARY OF INCREMENTAL IMPACTS BY UNIT, 2013-2030 (2013\$, ASSUMING DISCOUNT RATES OF SEVEN AND THREE PERCENT)**

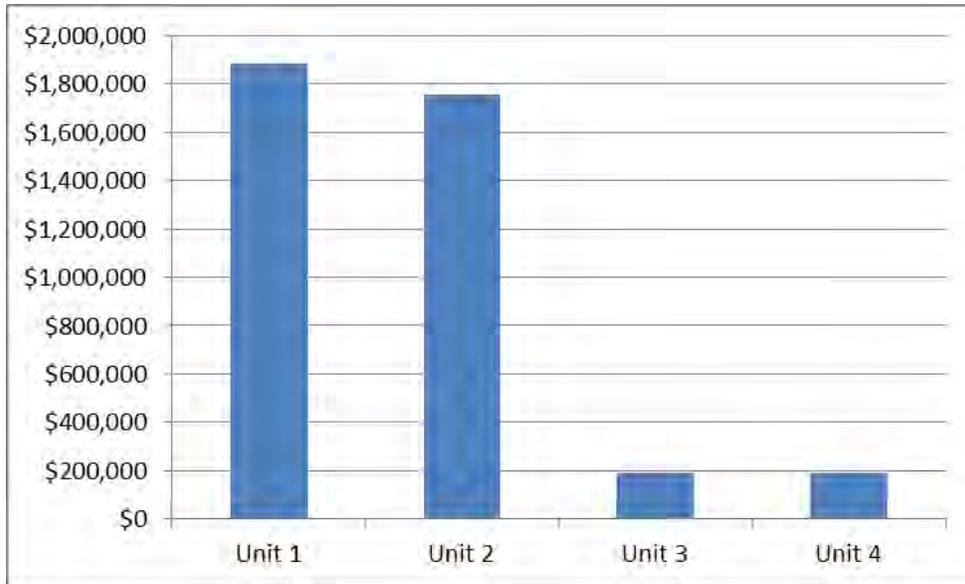
UNIT		PRESENT VALUE IMPACT		ANNUALIZED IMPACT	
		LOW	HIGH	LOW	HIGH
7 percent discount rate					
1	Central Perryville Karst Area	\$130,000	\$1,900,000	\$12,000	\$170,000
2	Mystery-Rimstone Karst Area	\$4,500	\$1,800,000	\$420	\$160,000
3	Blue Spring Branch	\$4,500	\$190,000	\$420	\$18,000
4	Cinque Hommes Creek	\$4,500	\$190,000	\$420	\$18,000
<b>Total</b>		<b>\$140,000</b>	<b>\$4,000,000</b>	<b>\$13,000</b>	<b>\$370,000</b>
3 percent discount rate					
1	Central Perryville Karst Area	\$170,000	\$1,900,000	\$12,000	\$140,000
2	Mystery-Rimstone Karst Area	\$4,500	\$1,800,000	\$320	\$120,000
3	Blue Spring Branch	\$4,500	\$190,000	\$320	\$14,000
4	Cinque Hommes Creek	\$4,500	\$190,000	\$320	\$14,000
<b>Total</b>		<b>\$180,000</b>	<b>\$4,100,000</b>	<b>\$13,000</b>	<b>\$290,000</b>
<b>Note:</b> Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.					

12. Exhibits ES-4 and ES-5 present total incremental impacts by unit for the low-end and high-end scenarios. In these exhibits and the remainder of the report, impacts are presented assuming a seven percent discount rate. Appendix B presents the results applying a three percent discount rate to highlight the sensitivity of the findings to the discount rate assumption. Exhibits ES-4 and ES-5 show that proposed Unit 1 is likely to experience the greatest incremental impacts on a relative basis, in both scenarios.
13. Low-end impacts in proposed Unit 1 are estimated at \$130,000 in present value terms (91 percent of total present value impacts). These impacts result from approximately two formal consultations annually for development projects within the City of Perryville; a portion of two programmatic consultations regarding agricultural and grazing operations; and four formal consultations for transportation projects. In the high-end scenario, impacts also include costs associated with development and implementation of the Perry County land and resource management plan. This plan would recommend, among other things, that vegetated buffers be installed around sinkholes, reducing the amount of land that could be used for crop production. In the high-end scenario, impacts in proposed Unit 1 are estimated at \$1.9 million in present value terms (47 percent of total present value impacts) based on the potential reduction in the value of land resulting from lost crop production within proposed critical habitat converted to buffers.

**EXHIBIT ES-4. LOW-END PRESENT VALUE INCREMENTAL IMPACTS BY UNIT, 2013-2030 (2013\$, DISCOUNTED AT SEVEN PERCENT)**



**EXHIBIT ES-5. HIGH-END PRESENT VALUE INCREMENTAL IMPACTS BY UNIT, 2013-2030 (2013\$, DISCOUNTED AT SEVEN PERCENT)**

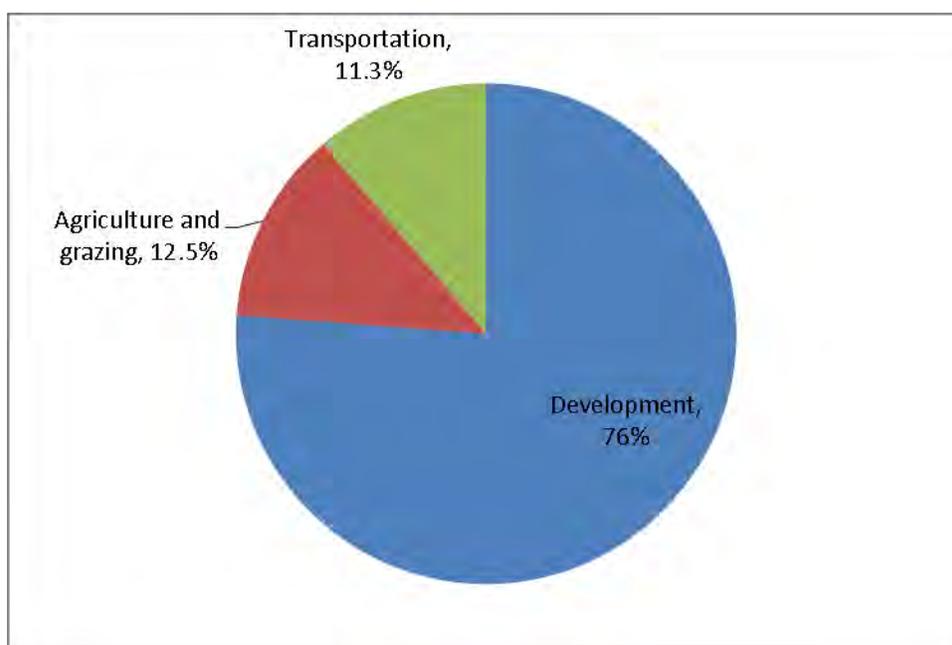


14. In the high-end scenario, similar impacts are also anticipated in Unit 2 (\$1.8 million in present value terms, or 44 percent of total present value impacts). As in Unit 1, these costs result from implementation of the Perry County land and resource management plan. Importantly, development and implementation of the plan is intended to reduce regulatory uncertainty associated with the listing and designation of critical habitat. Thus, if the plan did not exist, costs of uncertain magnitude associated with regulatory

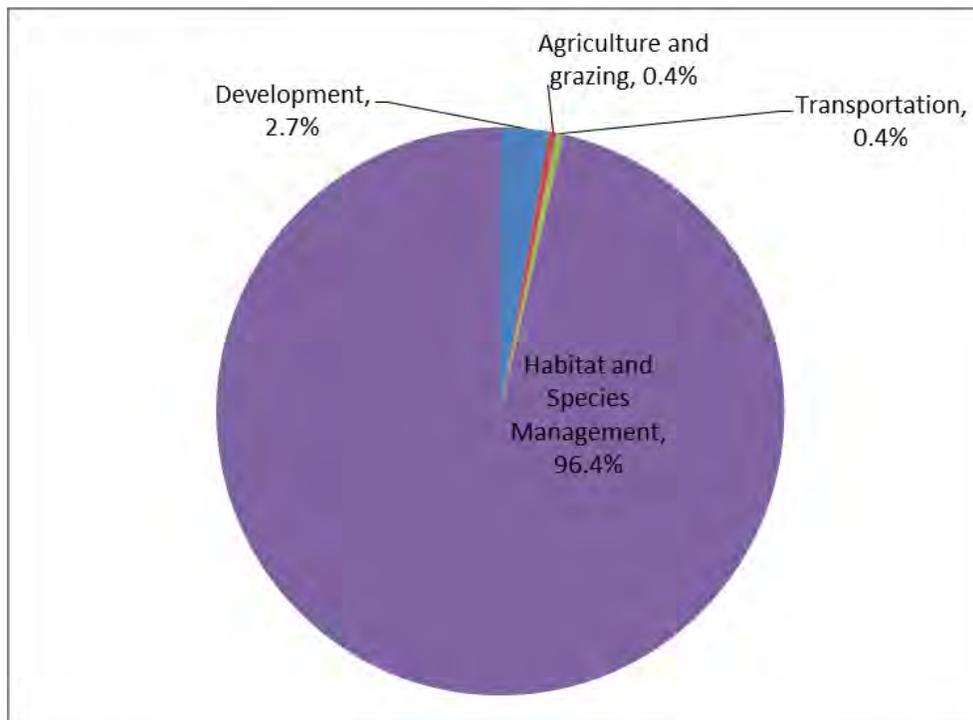
uncertainty could be incurred. In both units, these estimates may overstate the actual impact of critical habitat because some of the project modifications recommended in this plan would also be undertaken to protect the species in the absence of critical habitat.

15. Impacts associated with specific activities are discussed below. Exhibits ES-6 and ES-7 present the breakdown of total incremental impacts by activity for the low-end and high-end scenarios. As shown in the exhibits, consultations associated with development activities account for approximately 76 percent of incremental impacts in the low-end scenario. In the high-end scenario, habitat and species management efforts resulting from implementation of the county plan account for approximately 96 percent of incremental impacts.

**EXHIBIT ES-6. LOW-END PRESENT VALUE INCREMENTAL IMPACTS BY ACTIVITY, 2013-2030  
(2013\$, DISCOUNTED AT SEVEN PERCENT)**



**EXHIBIT ES-7. HIGH-END PRESENT VALUE INCREMENTAL IMPACTS BY ACTIVITY, 2013-2030  
(2013\$, DISCOUNTED AT SEVEN PERCENT)**



**Residential, Commercial, and Industrial Development**

16. Proposed critical habitat for the sculpin includes the increasingly urbanized City of Perryville. To forecast future development projects in the city, we identify all lands that are currently vacant and are not publicly-owned or known to be preserved. We estimate the number of future development projects using data on likely population growth and average project size within the City of Perryville. Incremental impacts associated with consultations for development projects are estimated to be \$110,000 in present value terms, assuming a seven percent discount rate. We do not anticipate that any development will be precluded as a result of the designation.
17. In addition, this analysis discusses qualitatively the potential for economic impacts resulting from regulatory uncertainty or stigma. Representatives of Perry County and the City of Perryville have repeatedly raised concerns that the designation could stigmatize the study area, creating the perception that development will be precluded or that the permitting process will be more difficult. If businesses choose not to develop within the study area due to regulatory uncertainty created by the designation, economic impacts may include a decrease in current land values, as well as distributional impacts such as fewer employment opportunities and decreases in associated regional spending.

**Agriculture and Livestock Operations**

18. Although agricultural and livestock operations generally occur on privately owned land within the study area, these operations may have a Federal nexus for section 7

consultation through federally funded programs of the NRCS and FSA. These agencies conduct statewide programmatic consultations regarding conservation practices for potentially affected species and habitats. Incremental impacts associated with one programmatic consultation for programs implemented by each of these agencies are estimated to be \$18,000 in present value terms, assuming a seven percent discount rate.

#### Transportation Projects

19. Using information from the Missouri Statewide Transportation Improvement Program (STIP) and communication with local planning organizations, this analysis identified four transportation projects with a Federal nexus that are expected to occur within the study area over the next 18 years. Incremental impacts to transportation projects are estimated to be \$16,000 in present value terms, assuming a seven percent discount rate.

#### Sand Mining

20. Sand mining may have a Federal nexus for section 7 consultation through the Corps permitting process. This analysis uses historical data on Corps permits and information from the Missouri Department of Natural Resources Land Reclamation Program to identify potentially affected mining operations. No sand mines currently exist within the study area. Because sand mining is not expected to expand into the proposed designation, we do not forecast any incremental impacts to mining operations.

#### Habitat and Species Management

21. Perry County is currently in the process of developing a land and resource management plan that will address sculpin conservation. Ideally, this plan will reduce some regulatory uncertainty that may result from the listing of the species as endangered or the designation of critical habitat. Development of this plan is, in part, a result of the proposal to designate critical habitat; therefore some portion of these costs may be considered an incremental result of the Proposed Rule. Because we are unable to isolate this incremental portion of costs, we consider a bounding analysis.
22. In the low-end scenario, all costs associated with plan development and implementation are considered baseline. In the high-end scenario, all costs are considered incremental. High-end incremental impacts resulting from plan development and lost land value due to establishment of buffers on agricultural land are estimated to be \$3.9 million in present value terms, assuming a seven percent discount rate. The true value of incremental costs is expected to fall between the low-end and high-end estimates. However, due to difficulty determining the portion of costs associated with the Perry County land and resource management plan that are incremental, we are unable to further refine this range at this time. In addition, this analysis discusses potential distributional impacts that may result from the creation of buffers on agricultural land and the associated reduction in crop production. These potential economic losses to Perry County are estimated at \$960,000 or \$3.0 million, depending on assumptions regarding associated regional spending.

**POTENTIAL BENEFITS**

23. The primary purpose of this rulemaking is to enhance conservation of the sculpin. The published economics literature has documented that social welfare benefits can result from the conservation and recovery of endangered and threatened species. In its guidance to Federal agencies on best practices for preparing economic analyses of proposed rulemakings, the Office of Management and Budget (OMB) acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency's part to conduct new research. Rather than rely on economic measures, the Service believes that the direct benefits of the Proposed Rule are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.
24. In this report, we include a general, qualitative description of the categories of benefits that may result from the designation of critical habitat. Importantly, as described in this Executive Summary, changes in land management or the management of the designated waterways are unlikely to occur as a result of the section 7 consultation process. Some incremental changes in land and water management may result from implementation of the new Perry County land and resource management plan. We are unable to determine the extent to which conservation efforts implemented through the Perry County land and resource management plan would have occurred absent the designation of critical habitat.

**IMPACTS TO SMALL ENTITIES AND THE ENERGY INDUSTRY**

25. Appendix A of this report includes an analysis of the distributional impacts of the proposed designation on small entities. Small entities may participate as third parties in section 7 consultations with the Service on development and transportation projects. We estimate that fewer than two small development-related entities and one small government (the City of Perryville) will be affected in a single year. Impacts represent less than one percent of annual revenues on a per entity basis. Indirect impacts resulting from the implementation of the proposed Perry County land and resource management plan are not considered in the threshold analysis.
26. Appendix A also concludes that, in accordance with Executive Orders 13211 and 13132, as well as Title II of the Unfunded Mandates Reform Act (UMRA), the Proposed Rule is unlikely to have any effect on energy production in the United States; is unlikely to have direct or substantial indirect Federalism implications; and does not place an enforceable duty upon state, local, or Tribal governments, or the private sector.

**KEY SOURCES OF UNCERTAINTY**

27. At the end of Chapter 4, we include a discussion of the key sources of uncertainty and major assumptions affecting the estimation of impacts. The assumptions that are likely to have the most significant effect on the estimated impacts include:
1. The Service is unlikely to request additional project modifications to address adverse modification beyond what is requested to avoid jeopardy;

2. Federal action agencies such as the NRCS, FSA, the Corps, and HUD are aware of the presence of the species and the need to consult with the Service in the baseline;
  3. All future development projects within the City of Perryville will have a Federal nexus; and
  4. Impacts associated with development and implementation of the Perry County land and resource management plan may be considered incremental.
28. The direction of the potential bias introduced by these assumptions is mixed (i.e., in some cases leading to an underestimate and in some cases leading to an overestimate) and in some cases unknown.

## CHAPTER 1 | INTRODUCTION AND BACKGROUND

### 1.1 INTRODUCTION

29. This chapter provides an overview of the proposed critical habitat for the sculpin. We include a description of the species, a summary of publications and legal actions that relate to the current proposal, a summary of land ownership within the current proposal, an overview map of the proposed units, and a summary of threats to the proposed critical habitat. All official definitions and boundaries should be taken from the Proposed Rule.<sup>7</sup>

### 1.2 SPECIES DESCRIPTION

30. The grotto sculpin is a small, cave-dwelling fish that is locally endemic to Perry County, Missouri. The sculpin may grow to be approximately four inches long, and is adapted to living in constant darkness. The sculpin is known to occupy two surface springs and five underground cave systems in Perry County.<sup>8</sup>

### 1.3 PREVIOUS FEDERAL ACTIONS

31. Key milestones in the Federal regulatory history for the sculpin include:

- **Listing:** The sculpin was proposed for listing as endangered under the Act on September 27, 2012.<sup>9</sup>
- **Proposed critical habitat:** In conjunction with the proposed listing on September 27, 2012, the Service proposed to designate all underground aquatic habitat underlying approximately 94 square kilometers (36 square miles) plus 31 kilometers (19.2 miles) of surface stream across four units as critical habitat for the sculpin.<sup>10</sup>

### 1.4 PROPOSED CRITICAL HABITAT DESIGNATION

32. The Proposed Rule would list the sculpin as endangered under the Act and would designate all underground aquatic habitat underlying approximately 36 square miles plus 19 miles of surface stream as critical habitat across four units in Perry County, Missouri. All units, including subsurface habitat, are considered occupied by the sculpin. The majority of the proposed critical habitat is located on privately owned land. However, the

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<sup>7</sup> 2012 Proposed Rule. 77 FR 59488.

<sup>8</sup> 2012 Proposed Rule. 77 FR 59490 and 59505.

<sup>9</sup> 2012 Proposed Rule. 77 FR 59488.

<sup>10</sup> *Ibid.*

proposed units also include small parcels under city, county, and state ownership.<sup>11</sup> Exhibit 1-1 provides a summary of proposed critical habitat land ownership and area by unit. The Service is not currently considering any areas for exclusion under section 4(b)(2) of the Act.

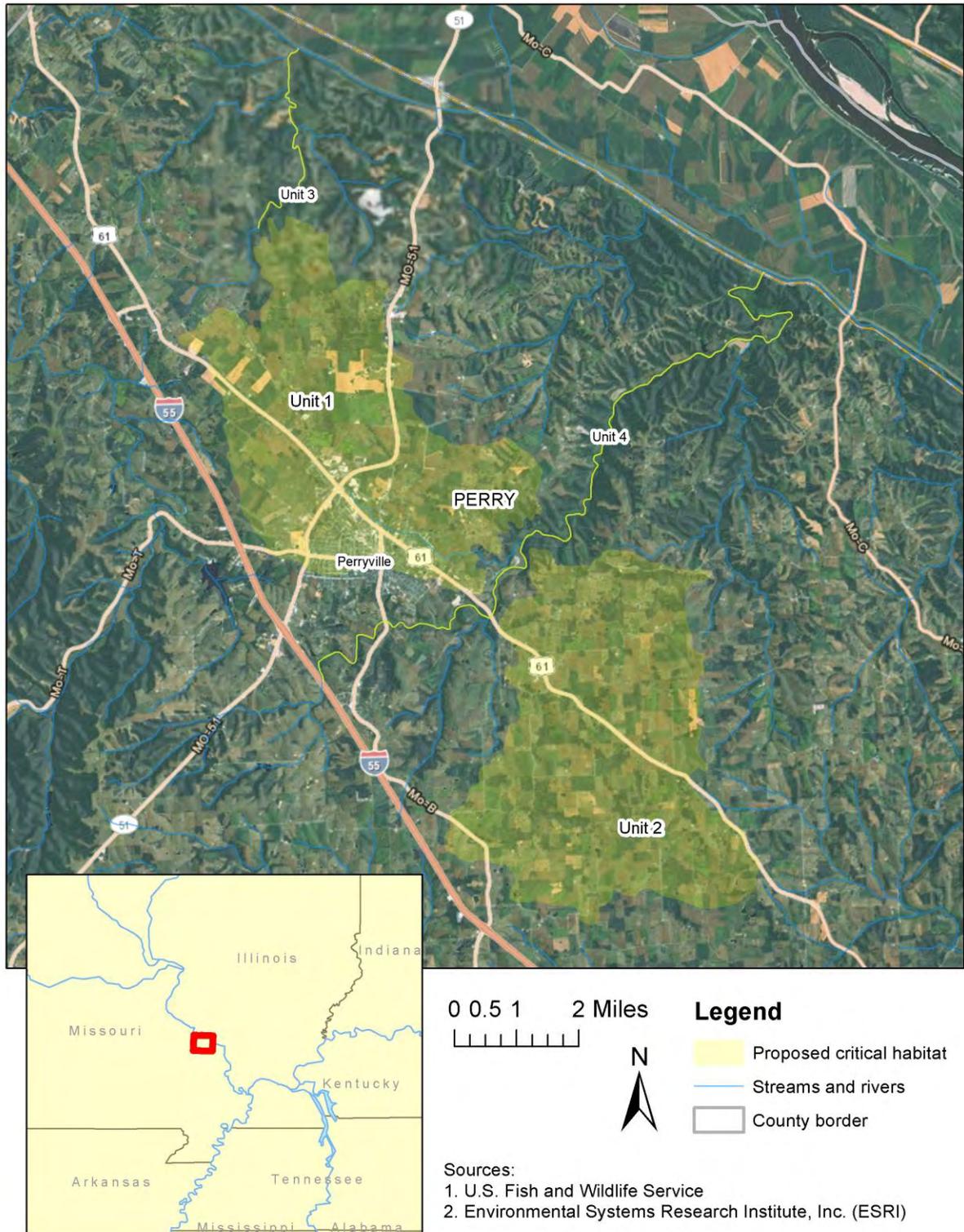
**EXHIBIT 1-1. SUMMARY OF LAND OWNERSHIP WITHIN PROPOSED CRITICAL HABITAT**

UNIT	LOCATION	PRIVATE OWNERSHIP		STATE, COUNTY, AND CITY OWNERSHIP		TOTAL
		SQUARE MILES	STREAM MILES	SQUARE MILES	STREAM MILES	
1	Central Perryville Karst Area	14	--	4	--	18
2	Mystery-Rimstone Karst Area	19	--	1	--	19
3	Blue Spring Branch	--	4	--	0	4
4	Cinque Hommes Creek	--	14	--	0	14
<b>Total</b>		<b>32</b>	<b>19</b>	<b>4</b>	<b>0</b>	<b>36 sq. mi. 19 mi.</b>
<b>Source:</b> 2012 Proposed Rule. 77 FR 59506.						

33. Sculpin habitat, particularly its water quality, may be affected by activities occurring upstream within the watershed. For purposes of this analysis, we use as the “study area” for the two proposed surface streams (Units 3 and 4) the adjacent area in which relevant Federal agencies are likely to have jurisdiction. For example, for agricultural activities, we consider any adjacent land participating in programs administered by the FSA or the NRCS. For transportation, sand mining, and development projects, we consider the areas in which the Corps has jurisdiction to issue section 404 CWA permits.
34. Exhibit 1-2 provides an overview map of the proposed critical habitat. Much of Unit 1 is located within urbanized areas associated with the City of Perryville. Units 1, 2, and 4 occur adjacent to Interstate 55. Other portions of the proposed critical habitat are primarily used for agriculture.

<sup>11</sup> 2012 Proposed Rule. 77 FR 59506.

EXHIBIT 1-2. OVERVIEW OF PROPOSED CRITICAL HABITAT FOR THE GROTTO SCULPIN



## 1.5 ECONOMIC ACTIVITIES CONSIDERED IN THIS ANALYSIS

35. Review of the Proposed Rule identified the following economic activities as potential threats to the sculpin and its habitat within the study area:

- (1) **Residential, commercial, and industrial development.** The potential for additional development constitutes a primary threat to sculpin habitat. Development may result in increased stormwater runoff and degraded water quality from contaminants (in particular, from septic systems).
- (2) **Agricultural and livestock operations.** Agricultural and livestock operations may negatively affect sculpin habitat by decreasing water quality through erosion, sedimentation, and contamination. Agricultural operations routinely contribute to reduced water quality through the release of pesticides and herbicides. In addition, livestock grazing can lead to changes in water quality by altering nutrient levels and stream temperature.
- (3) **Transportation projects.** Road construction and improvement projects may negatively affect water quality within sculpin habitat as a result of increased sedimentation and stormwater runoff. Interstate 55 is located adjacent to proposed critical habitat for the sculpin in Unit 4. Additionally, both Units 1 and 2 are located less than half a mile from the interstate.
- (4) **Sand mining.** Industrial sand mining occurs throughout Perry County to support hydraulic fracturing (“fracking”) operations.<sup>12</sup> Mining activities may degrade sculpin habitat directly or through increased contamination and sedimentation.

## 1.6 ORGANIZATION OF THE REPORT

36. The remainder of this report proceeds through four additional chapters. Chapter 2 discusses the framework employed in the analysis. Chapter 3 describes the baseline protections currently afforded the sculpin. Chapter 4 provides an assessment of potential incremental economic impacts to the activities listed above, as well as species and habitat management and administrative impacts. Chapter 5 describes potential benefits of the proposed critical habitat designation.
37. In addition, this report includes three appendices: Appendix A, which addresses potential impacts to small entities and the energy industry and other statutory requirements; Appendix B, which discusses the sensitivity of results to discount rate, including undiscounted values; and Appendix C, which provides the basis for identifying the incremental effects of critical habitat designation.

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<sup>12</sup> The fracking operations take place in other locations outside of Perry County. The activity of concern in this analysis is the sand mining.

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**CHAPTER 2 | FRAMEWORK FOR THE ANALYSIS**

38. The purpose of this report is to estimate the economic impact of actions taken to protect the sculpin and its habitat. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the species and its habitat within the study area. This analysis employs "without critical habitat" and "with critical habitat" scenarios. The "without critical habitat" scenario represents the baseline for the analysis, considering protections otherwise afforded the sculpin; for example, under the Federal listing and other Federal, state, and local regulations. The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat.
39. This information is intended to assist the Secretary of the U.S. Department of Interior in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.<sup>13</sup> In addition, this information allows the Service to address the requirements of Executive Orders 12866 (as affirmed and supplemented by Executive Order 13563), 12630, and 13211; the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA); and the Unfunded Mandates Reform Act (UMRA).<sup>14</sup>
40. This chapter describes the framework for this analysis. First, we describe case law that led to the selection of the framework applied in this report. Next, we describe in economic terms the general categories of economic effects that are the focus of the impact analysis, including a discussion of both efficiency and distributional effects. This chapter then defines the analytic framework used to measure these impacts in the context of critical habitat regulation and the consideration of benefits. We conclude with a presentation of the information sources relied upon in the analysis.

**2.1 BACKGROUND**

41. The Office of Management and Budget's (OMB) guidelines for conducting an economic analysis of regulations direct Federal agencies to measure the costs of a regulatory action against a baseline, which it defines as the "best assessment of the way the world would

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<sup>13</sup> 16 U.S.C. §1533(b)(2).

<sup>14</sup> Executive Order 12866, Regulatory Planning and Review, September 30, 1993; Executive Order 13563, Improving Regulation and Regulatory Review, January 18, 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*.

look absent the proposed action."<sup>15</sup> In other words, the baseline includes the existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat. Impacts that are incremental to that baseline (i.e., occurring over and above existing constraints) are attributable to the proposed regulation. Significant debate has occurred regarding whether assessing the impacts of the Service's proposed regulations using this baseline approach is appropriate in the context of critical habitat designation.

42. In 2001, the U.S. Court of Appeals for the Tenth Circuit instructed the Service to conduct a full analysis of all of the economic impacts of proposed critical habitat, regardless of whether those impacts are attributable co-extensively to other causes.<sup>16</sup> 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].”<sup>17</sup>

43. 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.<sup>18</sup> For example, in the March 2006 ruling that the August 2004 critical habitat rule for the Peirson's milk-vetch was arbitrary and capricious, the United States District Court for the Northern District of California stated,

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<sup>15</sup> U.S. Office of Management and Budget, “Circular A-4,” September 17, 2003, available at <http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf>

<sup>16</sup> *New Mexico Cattle Growers Assn v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

<sup>17</sup> *Ibid.*

<sup>18</sup> In explanation of their differing conclusion, later decisions note that in *New Mexico Cattle Growers*, the U.S. Court of Appeals for the Tenth Circuit relied on a Service regulation that defined “destruction and adverse modification” in the context of section 7 consultation as effectively identical to the standard for “jeopardy.” Courts had since found that this definition of “adverse modification” was too narrow. For more details, see the discussion of *Gifford Pinchot Task Force v. United States Fish and Wildlife Service* provided later in this section.

“The Court is not persuaded by the reasoning of *New Mexico Cattle Growers*, and instead agrees with the reasoning and holding of *Cape Hatteras Access Preservation Alliance v. U.S. Dep’t of the Interior*, 344 F. Supp 2d 108 (D.D.C. 2004). That case also involved a challenge to the Service’s baseline approach and the court held that the baseline approach was both consistent with the language and purpose of the ESA and that it was a reasonable method for assessing the actual costs of a particular critical habitat designation *Id* at 130. ‘To find the true cost of a designation, the world with the designation must be compared to the world without it.’”<sup>19</sup>

44. More recently, in 2010, the U.S. Court of Appeals for the Ninth Circuit came to similar conclusions during its review of critical habitat designation for the Mexican spotted owl and 15 vernal pool species.<sup>20</sup> Plaintiffs in both cases requested review by the Supreme Court, which declined to hear the cases in 2011.
45. In order to address the divergent opinions of the courts and provide the most complete information to decision-makers, this economic analysis:
  - Describes the baseline protections afforded the sculpin absent critical habitat designation (Chapter 3); and
  - Monetizes the potential incremental impacts precipitated specifically by the critical habitat designation for the species (Chapter 4).
46. Several Courts of Appeal, including the Ninth Circuit and the Fifth Circuit, have invalidated the Service’s regulation defining destruction or adverse modification of critical habitat.<sup>21</sup> At this time the Service is analyzing whether destruction or adverse modification would occur based on the statutory language of the Act itself, which requires the Service to consider whether the agency’s action is likely “to result in the destruction or adverse modification of habitat which is determined by the Service to be critical” to the conservation of the species. To perform this analysis, the Service considers how the proposed action is likely to impact the ability of critical habitat to carry out its intended function and conservation role. To assist us in evaluating these likely impacts, the Service provided information regarding what potential consultations could occur in the critical habitat units for the sculpin and what conservation efforts may be imposed as a result of critical habitat designation. The Service also provided a memorandum characterizing the effects of critical habitat designation over and above those associated with the listing (see Appendix C). A detailed description of the methodology used to define baseline and incremental impacts is provided at the end of this chapter.

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<sup>19</sup> *Center for Biological Diversity v. United States Bureau of Land Management*, 422 F. Supp.2d 1115 (N.D. Cal. 2006).

<sup>20</sup> *Home Builders Association of Northern California v. United States Fish and Wildlife Service*, 616 F.3d 983 (9<sup>th</sup> 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 (9<sup>th</sup> Cir. 2010), cert. denied, 179 L. Ed. 2d 300, 2011 U.S. Lexis 1362, 79 U.S.L.W. 3475 (2011).

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

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## 2.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

47. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the sculpin and its habitat (hereafter referred to collectively as “sculpin 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 sculpin conservation efforts.
48. 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.

### 2.2.1 EFFICIENCY EFFECTS

49. At the guidance of OMB and in compliance with Executive Order 12866 "Regulatory Planning and Review," Federal agencies measure changes in economic efficiency in order to understand how society, as a whole, will be affected by a regulatory action. In the context of regulations that protect sculpin 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.<sup>22</sup>
50. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a Federal land manager may enter into a section 7 consultation with the Service to ensure that a particular activity is not likely to adversely modify critical habitat. The effort required for the consultation is an economic opportunity cost because the landowner or manager's time and effort would have been spent in an alternative activity had the parcel not been included in the designation. When a compliance activity is not expected to significantly affect markets -- that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price -- the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.

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<sup>22</sup> 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. 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. Given the small number of square miles proposed for designation in this case, measurable market impacts are not anticipated. This analysis therefore focuses on compliance costs.

### 2.2.2 DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

52. 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.<sup>23</sup> This analysis considers several types of distributional effects, including impacts on small entities; impacts on energy supply, distribution, and use; and regional economic impacts. It is important to note that these are fundamentally different measures of economic impact than efficiency effects, and thus cannot be added to or compared with estimates of changes in economic efficiency.

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

53. 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.<sup>24</sup> It also assesses the potential for impacts to state, local and Tribal governments and the private sector as required by Title II of UMRA.<sup>25</sup> In addition, in response to Executive Order 13211 "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," this analysis considers the future impacts of conservation efforts on the energy industry and its customers.<sup>26</sup>

#### Regional Economic Effects

54. 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).

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

<sup>24</sup> 5 U.S.C. §5601 *et seq.*

<sup>25</sup> 2 U.S.C. §1531 *et seq.*

<sup>26</sup> Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001.

These economic data provide a quantitative estimate of the magnitude of shifts in jobs and revenues in the local economy.

55. 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.
56. Despite these and other limitations, in certain circumstances regional economic impact analyses may provide useful information about the scale and scope of localized impacts. It is important to remember that measures of regional economic effects generally reflect shifts in resource use rather than efficiency losses. Thus, these types of distributional effects are reported separately from efficiency effects (i.e., not summed). In addition, measures of regional economic impact cannot be compared with estimates of efficiency effects, but should be considered as distinct measures of impact. Given the limited nature of incremental impacts likely to result from this designation, measurable regional impacts are not anticipated, except in the case that agriculture is precluded due to the establishment of vegetated buffers. The potential for such impacts is discussed in Chapter 4.

### **2.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS**

57. This analysis: 1) identifies those economic activities most likely to threaten the sculpin and its habitat; 2) describes the baseline regulatory protection for the species; and 3) monetizes the incremental economic impacts to avoid adverse modification of the proposed critical habitat. This section provides a description of the methodology used by the Service to separately identify baseline protections from the incremental impacts stemming from the designation of critical habitat. This evaluation of impacts in a "with critical habitat" versus a "without critical habitat" framework effectively measures the net change in economic activity associated with the Proposed Rule. The analytic approach used to identify baseline and incremental impacts associated with the sculpin is outlined later in this chapter in Exhibit 2-2 and described in detail in Chapter 4.

#### **2.3.1 IDENTIFYING BASELINE IMPACTS**

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

other factors that have the potential to affect economic costs and benefits, such as the rate of regional economic growth in potentially affected industries.

59. Baseline protections include sections 7, 9, and 10 of the Act, and economic impacts resulting from these protections to the extent that they are expected to occur absent the designation of critical habitat for the species. This analysis describes these baseline regulations. The primary focus, however, is not on baseline costs, since these will not be affected by the proposed regulation. Instead, the focus of this analysis is on monetizing the incremental impacts forecast to result from the proposed critical habitat designation.
- Section 7 of the Act, absent critical habitat designation, requires Federal agencies to consult with the Service to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species. Consultations under section 7 result in administrative costs, as well as impacts of conservation efforts resulting from consultation.
  - Section 9 defines the actions that are prohibited by the Act. In particular, it prohibits the "take" of endangered wildlife, where "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."<sup>27</sup> 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.<sup>28</sup> The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are minimized and mitigated to the maximum extent practicable. The development and implementation of HCPs is considered a baseline protection for the species and habitat unless the HCP is determined to be precipitated by the designation of critical habitat, or the designation influences stipulated conservation efforts under HCPs.

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

60. 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 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

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<sup>27</sup> 16 U.S.C. 1532.

<sup>28</sup> U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at <http://endangered.fws.gov/hcp/>.

critical habitat. In these cases, they are considered incremental impacts and are discussed below.

### 2.3.2 IDENTIFYING INCREMENTAL IMPACTS

61. 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.
62. When critical habitat is designated, section 7 requires Federal agencies to consult on their actions regarding the potential destruction or adverse modification of critical habitat (in addition to considering whether the actions are likely to jeopardize the continued existence of the species). The added administrative costs of including consideration of critical habitat in section 7 consultations, and the additional impacts of implementing conservation efforts (i.e., conservation measures and reasonable and prudent alternatives in the case of an adverse modification finding) resulting from the protection of critical habitat are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental impacts of the rulemaking.
63. Incremental impacts may be the direct compliance costs associated with additional effort for consultations, re-initiated consultations, new consultations occurring specifically because of the designation, and additional conservation efforts that would not have been requested during consultation for the listed species without critical habitat. Additionally, incremental impacts may include indirect impacts resulting from reaction to the potential designation of critical habitat (e.g., implementing sculpin conservation in an effort to avoid designation of critical habitat), triggering of additional requirements under state or local laws intended to protect sensitive habitat, and uncertainty and perceptual effects on markets.

#### Direct Impacts

64. 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.<sup>29</sup>
65. Section 7(a)(2) of the Act requires Federal agencies to consult with the Service whenever activities that they undertake, authorize, permit, or fund may affect a listed species or designated critical habitat. Parties involved in section 7 consultations include the Service, a Federal “action agency,” such as the Corps, and in some cases, a private entity involved in the project or land use activity (“applicant”), such as the recipient of a CWA section 404 permit. If there is an applicant, the action agency (i.e., the agency with the Federal

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<sup>29</sup> The term conservation efforts is intended to broadly capture efforts that stakeholders may undertake for the species, regardless of whether these efforts are explicitly called for in a section 7 consultation.

nexus necessitating the consultation) consults with the Service and also serves as the liaison between the applicant and the Service.

66. During consultation, the Service, the action agency, and the entity applying for Federal funding or permitting (if applicable) communicate in an effort to minimize potential adverse effects to the species and/or to the critical habitat. Communication between these parties may occur via written letters, phone calls, in-person meetings, or any combination of these interactions. The duration and complexity of these interactions depends on a number of variables, including the type of consultation, the species, the activity of concern, and the potential effects to the species and designated critical habitat associated with the proposed activity, the Federal agency, and whether there is a private applicant involved.
67. 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 destroy or adversely modify critical habitat. Regardless of the type of consultation or proposed project, section 7 consultations can require substantial administrative effort on the part of all participants.

#### Administrative Section 7 Consultation Costs

68. As described above, parties involved in section 7 consultations include the Service, the Federal action agency, and in some cases, a third-party applicant. While consultations are required for activities that involve a Federal nexus and may affect a species regardless of whether critical habitat is designated, the designation may increase the effort for consultations in the case that the project or activity in question may affect critical habitat. Administrative efforts for consultation may therefore result in both baseline and incremental impacts.
69. In general, three different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:
1. **Additional effort to address adverse modification in a new consultation** - New consultations taking place after critical habitat designation may require additional effort to address critical habitat issues above and beyond the listing issues. In this case, only the additional administrative effort required to consider critical habitat and any project modification costs incurred solely to address critical habitat impacts are considered incremental impacts of the designation.
  2. **Re-initiation of consultation to address adverse modification** - Consultations that have already been completed on a project or activity (but for which the project or activity is not yet completed) may require re-initiation to address

critical habitat. In this case, the costs of re-initiating the consultation, including all associated administrative and project modification costs, are considered incremental impacts of the designation.

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

70. The administrative costs of these consultations vary depending on the specifics of the project. One way to address this variability is to show a range of possible costs of consultation, as it may not be possible to predict the precise outcome of each future consultation in terms of level of effort. Review of consultation records and discussions with multiple Service field offices resulted in a range of estimated administrative costs of consultation. For simplicity, the average of the range of costs in each category is applied in this analysis (see Exhibit 2-1).

#### Section 7 Conservation Effort Impacts

71. Section 7 consultations considering critical habitat may also result in additional conservation effort recommendations specifically addressing potential destruction or adverse modification of critical habitat. For future consultations considering jeopardy and adverse modification, and for re-initiations of past consultations to consider critical habitat, the economic impacts of conservation efforts undertaken to avoid adverse modification are considered incremental impacts of critical habitat designation. For consultations that are forecast to occur specifically because of the designation, impacts of all associated conservation efforts are assumed to be incremental impacts of the designation. This is summarized below.
  1. **Additional effort to address adverse modification in a new consultation** - Only project modifications above and beyond what would be requested to avoid or minimize jeopardy are considered incremental.
  2. **Re-initiation of consultation to address adverse modification** - Only project modifications above and beyond what was requested to avoid or minimize jeopardy are considered incremental.
  3. **Incremental consultation resulting entirely from critical habitat designation**- Impacts of all project modifications are considered incremental.

## EXHIBIT 2-1. RANGE OF ADMINISTRATIVE CONSULTATION COSTS (2013\$)

CONSULTATION TYPE	SERVICE	FEDERAL AGENCY	THIRD PARTY	BIOLOGICAL ASSESSMENT	TOTAL COSTS
<b>NEW CONSULTATION RESULTING ENTIRELY FROM CRITICAL HABITAT DESIGNATION (TOTAL COST OF A CONSULTATION CONSIDERING BOTH JEOPARDY AND ADVERSE MODIFICATION)</b>					
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
<b>NEW CONSULTATION CONSIDERING ONLY ADVERSE MODIFICATION (UNOCCUPIED HABITAT)</b>					
Technical Assistance	\$430	n/a	\$790	n/a	\$1,200
Informal	\$1,800	\$2,300	\$1,500	\$1,500	\$7,100
Formal	\$4,100	\$4,700	\$2,600	\$3,600	\$15,000
Programmatic	\$12,000	\$10,000	n/a	\$4,200	\$27,000
<b>RE-INITIATION OF CONSULTATION TO ADDRESS ADVERSE MODIFICATION</b>					
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
<b>INCREMENTAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION</b>					
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, 2013, 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.					

**Indirect Impacts**

72. 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.

73. Indirect impacts may include:

- **Habitat Conservation Plans and other Land and Resource Management Plans.** 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. Application for an incidental take permit and completion of an HCP are not required or necessarily recommended by a critical habitat designation. However, in certain situations the new information provided by the proposed critical habitat rule may prompt a landowner to apply for an incidental take permit or otherwise develop a land and resource management plan. For example, a landowner may have been previously unaware of the potential presence of the species on his or her property, and expeditious completion of an HCP or management plan may offer the landowner regulatory relief in the form of exclusion from the final critical habitat designation. In this case, the effort involved in creating the plan and undertaking associated conservation efforts is considered an incremental effect of designation. Chapter 4 discusses potential incremental impacts associated with the development of a Perry County community land and resource management plan.
- **Triggering Other State and Local Laws.** 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. The designation of critical habitat for the sculpin is not anticipated to trigger state and local laws as a result of the widespread awareness of the species and its habitat resulting from existing management strategies.
- **Time Delays.** Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the need to re-initiate the section 7 consultation process and/or compliance with other laws triggered by the designation. To the extent that delays result from the designation, they are considered indirect, incremental impacts of the designation.
- **Regulatory Uncertainty or Stigma.** Government agencies and affiliated private parties who consult with the Service under section 7 may face uncertainty concerning whether project modifications will be recommended by the Service and what the nature of these alternatives will be. This uncertainty may diminish as consultations are completed and additional information becomes available on the effects of critical habitat on specific activities. Where information suggests that this type of regulatory uncertainty stemming from the designation may affect a project or economic behavior, associated impacts are considered indirect, incremental impacts of the designation. In some cases, the public may perceive that critical habitat designation may result in limitations on private property uses above and beyond those associated with anticipated conservation efforts and

regulatory uncertainty described above. Public attitudes about the limits or restrictions that critical habitat may impose can cause real economic effects to property owners, regardless of whether such limits are actually imposed. As the public becomes aware of the true regulatory burden imposed by critical habitat, the impact of the designation on property markets may decrease. Data allowing for the quantification of such effects are generally unavailable.

#### Approach to Identifying Incremental Impacts

74. To inform the economic analysis, the Service provided a memorandum describing its expected approach to conservation for the sculpin following critical habitat designation. Specifically, the Service's memorandum provides information on how the Service intends to address projects during section 7 consultation that might lead to adverse modification of critical habitat as distinct from projects that may jeopardize the species. The Service's memorandum is provided in Appendix C. Exhibit 2-2 illustrates the process used to isolate incremental impacts. We describe this approach to isolating incremental impacts in Chapter 4 of this report.

#### 2.3.3 BENEFITS

75. Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.<sup>30</sup> 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.<sup>31</sup>
76. 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.<sup>32</sup> *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.*

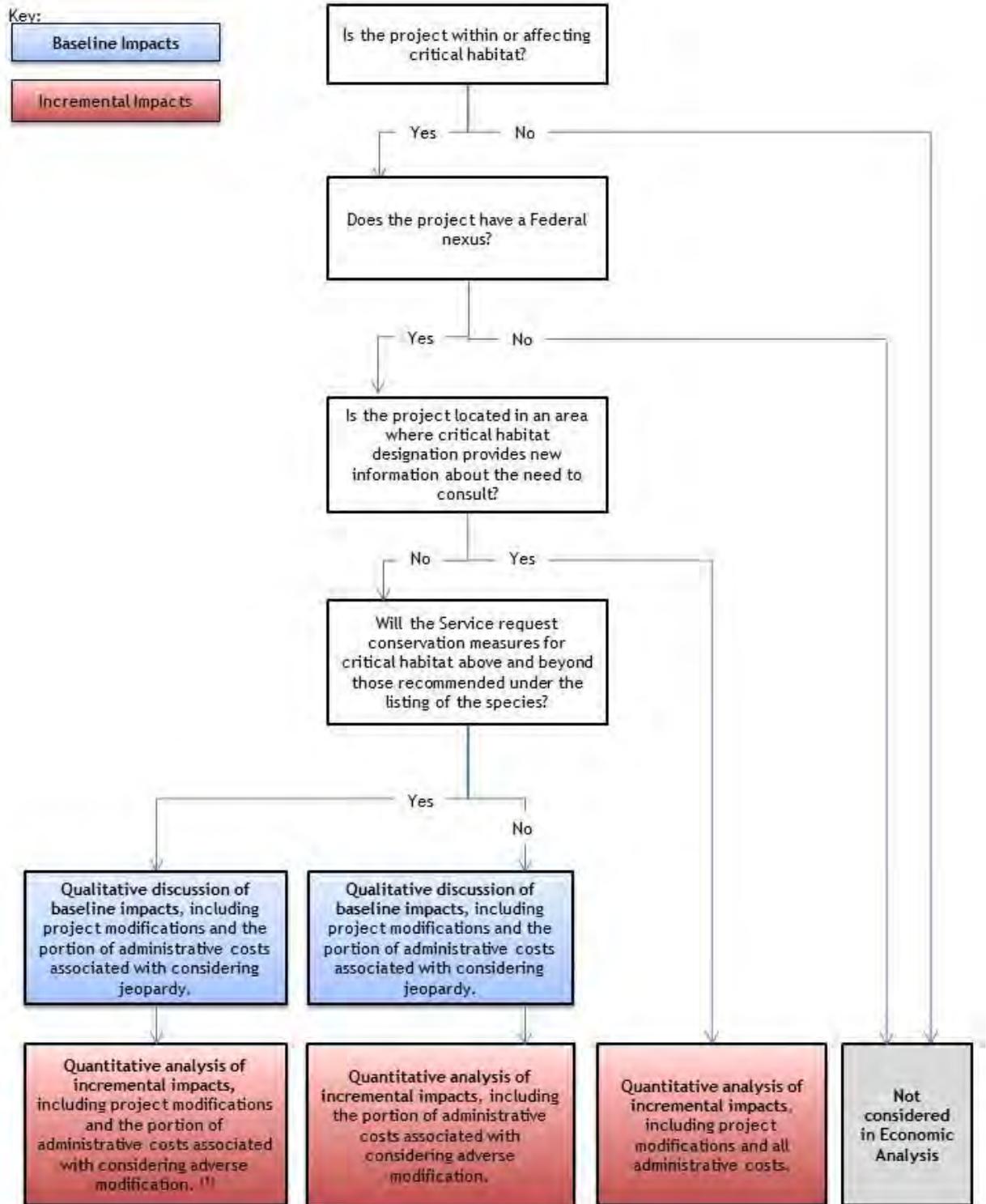
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<sup>30</sup> Executive Order 12866, Regulatory Planning and Review, September 30, 1993.

<sup>31</sup> U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf>

<sup>32</sup> *Ibid.*

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



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

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

#### 2.3.4 GEOGRAPHIC SCOPE OF THE ANALYSIS

78. Economic impacts of sculpin conservation are considered across the entire area proposed for critical habitat designation plus areas adjacent to the surface streams in Units 3 and 4 where a Federal nexus is likely, as defined in Chapter 1. Results are presented by proposed critical habitat unit. Where the impacts of a single project are likely to affect multiple units, those impacts are divided evenly among affected units.

#### 2.3.5 ANALYTIC TIME FRAME

79. Ideally, the time frame of this analysis would be based on the time period over which the critical habitat regulation is expected to be in place. Specifically, the analysis would forecast impacts of implementing this rule through species recovery (i.e., when the rule is no longer required). However, absent specific information on the expected time frame for recovery of the sculpin, this analysis forecasts impacts over a "reasonably foreseeable" time frame. The time frame 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. Forecast impacts will be based on the planning periods for potentially affected projects and will look out over an 18-year time horizon (2013 through 2030, or the planning period for local development). 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."<sup>33</sup>

## 2.4 INFORMATION SOURCES

80. The primary sources of information for this report are communications with and data provided by personnel from the Service, local governments, and other stakeholders. Data on baseline land use were obtained from regional planning authorities. A complete list of references is provided at the end of this document.

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<sup>33</sup> U.S. Office of Management and Budget, February 7, 2011. "Regulatory Impact Analysis: Frequently Asked Questions (FAQs)." Accessed on May 3, 2011 by [http://www.whitehouse.gov/sites/default/files/omb/circulars/a004/a-4\\_FAQ.pdf](http://www.whitehouse.gov/sites/default/files/omb/circulars/a004/a-4_FAQ.pdf).

**CHAPTER 3 | BASELINE PROTECTIONS**

81. This chapter discusses the activities likely to be undertaken to protect the sculpin absent the designation of critical habitat. These species and habitat protections result from implementation of the Act, as well as other Federal, state, and local regulations and management strategies. Any impacts resulting from the protections described in this chapter are considered baseline and thus are not quantified. The qualitative discussion in this chapter provides the context for the incremental analysis in Chapter 4. This chapter proceeds as follows: Section 3.1 begins by describing the baseline protection afforded the species by Federal regulations, including section 7 of the Act; Section 3.2 then describes state protections that may benefit the sculpin and its habitat; finally, Section 3.3 describes local protections and management strategies.

**KEY ISSUES AND CONCLUSIONS OF THE BASELINE ANALYSIS**

The primary protection afforded the sculpin and its habitat absent the designation of critical habitat is the listing of the species under the Act. Other key regulations contributing to baseline protection of the species and its habitat are: the Clean Water Act, laws and practices of the Missouri Department of Conservation and the Missouri Department of Natural Resources, and the development of a land and resource management plan for Perry County.

- **Protections due to the Listing of the Species:** Conservation efforts for the sculpin that may be requested to avoid jeopardizing the species, even absent the designation of critical habitat, may include: modifying development above caves occupied by the sculpin; establishing vegetated buffers around sculpin habitat; and minimizing surface runoff.
- **Other Federal and State Protections:** Multiple Federal and state regulations and practices, including the CWA and practices of the Missouri Department of Conservation and the Missouri Department of Natural Resources, afford some protection to the species and its habitat by protecting surface and groundwater quality.
- **Local Protections:** Although no local regulations or management strategies currently exist specifically to protect the sculpin, private landowners, such as the L-A-D Foundation, have implemented conservation practices that may benefit the species and its habitat. Additionally, Perry County is in the process of developing a community land and resource management plan to formalize local water quality protections and other conservation practices.

### 3.1 FEDERAL PROTECTIONS

82. The primary protection for the sculpin absent the designation of critical habitat is the listing of the species under the Act. In addition, the sculpin and its habitat receive protection from other Federal regulations, such as the CWA. These baseline protections are described below.

#### 3.1.1 ENDANGERED SPECIES ACT

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

- Avoiding construction directly above entrances to occupied caves;
- Establishing vegetated buffers; and
- Minimizing surface runoff.<sup>34</sup>

#### 3.1.2 CLEAN WATER ACT

84. Section 404 of the CWA requires parties to obtain a permit from the Corps prior to discharging dredge or fill material into “waters of the United States.”<sup>35</sup> Jurisdictional waters of the United States are determined by: (1) in the absence of adjacent wetlands, jurisdiction extends to the ordinary high water mark; or (2) when adjacent wetlands are present, jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands; or (3) when the water of the United States consists only of wetlands, jurisdiction extends to the limit of the wetland. Because the sculpin inhabits aquatic environments, the Corps may have jurisdiction over some areas proposed as critical habitat.

85. Corps review of projects for the issuance of section 404 permits requires section 7 consultation with the Service to the extent that the project may affect listed species or critical habitat. As part of the section 404 permitting process, the Corps reviews the potential effects of the proposed action on plant and animal populations and recommends efforts to avoid adverse effects to these populations, in addition to the water or wetlands themselves. In general, conservation efforts include:

- Selecting sites or managing discharges to ensure that habitat remains suitable for indigenous species;

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<sup>34</sup> U.S. Fish and Wildlife Service. Telephone communication on November 8, 2012.

<sup>35</sup> U.S. Code. Title 33, 1344.

- Avoiding sites having unique habitat or other value, including habitat of threatened or endangered species;
- Utilizing habitat development and restoration techniques to minimize adverse impacts and compensate for destroyed habitat;
- Timing discharge to avoid biologically critical time periods; and
- Avoiding the destruction of remnant natural sites within areas already affected by development.<sup>36</sup>

To the extent that these efforts would be undertaken as part of the section 404 permitting process absent the designation of critical habitat, they are considered baseline impacts.

### **3.2 STATE PROTECTIONS**

86. Although the sculpin is not listed under the Missouri State Endangered Species Law, several state programs afford protection to the species and its habitat. These programs generally offer protection to the species indirectly through water conservation efforts. These protections are described below.

#### **3.2.1 MISSOURI DEPARTMENT OF CONSERVATION BEST MANAGEMENT PRACTICES**

87. The sculpin is recognized as a Missouri Species of Conservation Concern by the Missouri Department of Conservation.<sup>37</sup> Conservation efforts specific to the sculpin have not been established. However, the Missouri Department of Conservation has developed best management practices for other karst species, including the Ozark cavefish, as well as the karst habitats inhabited by the sculpin. These conservation efforts include:

- Avoidance of land disturbance in or near sinkholes;
- Minimization of runoff and sedimentation;
- Establishment of vegetated buffers;
- Erosion and sediment control; and
- Proper waste disposal.<sup>38</sup>

These conservation measures may provide water quality benefits to the sculpin and its habitat.

#### **3.2.2 MISSOURI CLEAN WATER LAW**

88. The Missouri Department of Natural Resources implements the Missouri Clean Water Law of 1972, which prevents pollution to waters of the state. This law is intended to avoid impacts to public health and welfare; wildlife, fish, and aquatic life; and domestic, agricultural, industrial, recreational, and other legitimate uses of water. Specifically, the

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<sup>36</sup> 40 CFR Part 230.75.

<sup>37</sup> 2012 Proposed Rule. 77 FR 59496.

<sup>38</sup> U.S. Fish and Wildlife Service. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Grotto Sculpin (*Cottus* sp. nov.)." October 25, 2012. (Page 4)

Missouri Clean Water Law regulates contaminant discharges and the use of agricultural drainage wells. Although these water quality provisions may provide some benefit to the sculpin and its habitat, the extent of the protection is uncertain.<sup>39</sup>

### 3.2.3 MISSOURI DEPARTMENT OF NATURAL RESOURCES PERMITTING REQUIREMENTS

89. The Missouri Department of Natural Resources issues permits for numerous activities that may affect the sculpin and its habitat, including domestic wastewater treatment (septic systems) and sand and gravel mining. Conservation measures typically undertaken during septic system approval include evaluations of geohydrologic and soil conditions.<sup>40</sup> Conservation measures implemented for mining projects include erosion and sediment control, establishment of vegetated buffers, and prohibition of mining below the waterline.<sup>41</sup>

### 3.3 LOCAL PROTECTIONS

90. Currently, no local regulations or management strategies afford protection to the sculpin or its habitat. No water quality ordinances exist in Perry County beyond state-level protections.<sup>42</sup> However, some landowners within the recharge zones of proposed subsurface critical habitat have worked cooperatively with the Missouri Department of Conservation to protect water quality on their lands. For example, lands at Keyhole Spring and Ball Mill Spring in Unit 1 are owned by the L-A-D Foundation, a private organization dedicated to sustainable forest management and protection of natural areas.<sup>43</sup> An additional landowner agreement at Berome Moore Cave in Unit 1 provides protection to the sculpin and its habitat through conservation efforts such as livestock fencing, erosion and runoff control, and species monitoring.<sup>44</sup>
91. Additionally, Perry County is currently in the process of developing a community land and resource management plan that will address conservation of the sculpin and its habitat.<sup>45</sup> Although the plan is not yet finalized, communication with community leaders involved in development of the plan indicates that the plan will formalize numerous existing management strategies and practices. The plan will also introduce new conservation measures. Conservation efforts that may afford some protection to the sculpin include the following, among others:

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<sup>39</sup> 2012 Proposed Rule. 77 FR 59496.

<sup>40</sup> Missouri Secretary of State. Code of State Regulations, Title 10 - Department of Natural Resources, Chapter 6 - Permits. Accessed at <http://www.sos.mo.gov/adrules/csr/current/10csr/10c20-6a.pdf> on January 9, 2013.

<sup>41</sup> Missouri Secretary of State. Code of State Regulations, Title 10 - Department of Natural Resources, Chapter 10 - Permit and Performance Requirements for Industrial Mineral Open Pit and In-Stream Sand and Gravel Operations. Accessed at <http://www.sos.mo.gov/adrules/csr/current/10csr/10c40-10.pdf> on January 9, 2013; and Zeaman, Bill. Missouri Department of Natural Resources, Land Reclamation Program. Telephone and email communication on January 9, 2013.

<sup>42</sup> 2012 Proposed Rule. 77 FR 59497.

<sup>43</sup> 2012 Proposed Rule. 77 FR 59504; and L-A-D Foundation website. Accessed at <http://pioneerforest.org/> on November 28, 2012.

<sup>44</sup> 2012 Proposed Rule. 77 FR 59504.

<sup>45</sup> U.S. Fish and Wildlife Service. Telephone communication on November 8, 2012.

- Allocating \$27,000 annually for sinkhole cleanup and repair within the City of Perryville;
- Displaying educational signage near storm drains and throughout the watershed, emphasizing water quality protection;
- Requiring collection of household grass clippings to avoid increasing sedimentation and nutrient levels in groundwater;
- Requiring retention basins at large industrial developments in order to minimize runoff and water quality contamination;
- Controlling livestock access to water bodies and sensitive habitats; and
- Establishing vegetated buffers and/or fencing around vertical drains on agricultural land to minimize water quality contamination.<sup>46</sup>

92. Because the development of this plan is, in part, a response to the proposal to designate critical habitat, some portion of the administrative costs of plan development and implementation costs of new conservation measures may be considered incremental. These impacts are discussed in Chapter 4.

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<sup>46</sup> Vanderbrugen, Celeste. Perry County Community Plan Facilitator. University of Missouri Extension Office. Telephone communication on January 9, 2013; and Community Plan. Perry County, Missouri. Preliminary draft for USFW for deliberative use. January 14, 2013.

## CHAPTER 4 | INCREMENTAL COSTS

93. In this chapter, we estimate the incremental costs of designating critical habitat for the sculpin. We first describe in detail our approach to isolating incremental impacts. Next, we discuss potential incremental impacts by activity. We then summarize the results of this analysis. Finally, we conclude with a discussion of key sources of uncertainty.

### KEY ISSUES AND CONCLUSIONS OF THE INCREMENTAL ANALYSIS

#### Incremental Impacts of Critical Habitat Designation

- The direct incremental impacts of the proposed critical habitat designation are limited to the administrative cost of considering adverse modification in section 7 consultation.
- Indirect incremental impacts may include costs associated with development and implementation of the Perry County land and resource management plan. Because of uncertainty regarding the portion of these costs that are considered incremental, this analysis applies a bounding approach.
- At the low end, present value incremental administrative impacts are \$140,000 assuming a seven percent real discount rate, or \$13,000 on an annualized basis.
- At the high end, present value incremental costs are \$4.0 million, assuming a seven percent discount rate, or \$370,000 on an annualized basis. This estimate includes administrative costs, the full cost of development of the Perry County land and resource management plan, and the value of agricultural land no longer put to productive use due to implementation of the plan. The true value of incremental costs is expected to fall between the low-end and high-end estimates.

#### Incremental Impacts by Activity

- In the low-end scenario, impacts to development represent approximately 76 percent of overall incremental administrative impacts. Impacts to agricultural and grazing operations represent approximately 13 percent of forecast administrative impacts, and impacts to transportation activities represent approximately 11 percent. In the high-end scenario, impacts resulting from habitat and species management (implementation of the county plan) account for approximately 96 percent of overall impacts.
- No impacts are forecast to sand mining operations because no projects with a Federal nexus were identified within the study area.

#### Incremental Impacts by Unit

- Proposed Unit 1 for the sculpin is forecast to experience the greatest incremental impacts over the 18-year timeframe of this analysis (91 percent in the low-end scenario and 47 percent in the high-end scenario). This finding is driven by impacts associated with development activities in the City of Perryville in the low-end scenario, and by development and implementation of the Perry County land and resource management plan in the high-end scenario. In the high-end scenario, Unit 2 also experiences substantial costs associated with the Perry County land and resource management plan (44 percent of total impacts).

#### 4.1 APPROACH TO ISOLATING INCREMENTAL IMPACTS

94. In developing these estimates, we assume, based on the Service’s memorandum, that the Service is unlikely to request additional conservation efforts to avoid adverse modification beyond those requested to avoid jeopardy of the species in most cases. Specifically, the Service states that for the sculpin, “project descriptions that are modified to minimize impacts to critical habitat will also minimize impacts to individuals, and therefore it is unlikely that [the Service] will be able to differentiate measures implemented solely to minimize impacts to the critical habitat from those implemented to minimize impacts to individuals.”<sup>47</sup> Because all of the proposed critical habitat units are considered occupied by the species, any activities that are likely to adversely modify critical habitat are also likely to jeopardize the species. In addition, because the conditions under which jeopardy and adverse modification may occur are so closely related, the Service believes that they are unlikely to recommend additional project modifications due to the designation of critical habitat.

95. However, this analysis considers the potential for direct incremental impacts under two circumstances. These include:

- The Service notes that “due to the difference in the scope of the critical habitat units and the entire range of this species, in rare instances, [...] [the Service] might determine that a project would not jeopardize the species but would result in adverse modification of critical habitat.”<sup>48</sup>
- In some portions of subsurface habitat, the Service believes that action agencies may not be aware of the need to consult under the jeopardy standard. As a result, the designation of critical habitat may provide new information about the occupancy of the species and could lead to an increase in the number of consultations.<sup>49</sup> In this case, the full costs of section 7 consultation and resulting project modifications would be considered incremental.

Each of these circumstances is discussed in greater detail below.

96. First, the Service has suggested that the types of projects that may require additional conservation efforts to address adverse modification may include activities such as the installation of vertical drains that result in limited sedimentation of aquatic habitat.<sup>50</sup> However, at this time, the Service is unable to predict the rare instances in which these projects could result in adverse modification of critical habitat but not jeopardy to the species. Thus, in this report, we assume that any conservation efforts that are requested during consultation in order to avoid adverse modification would also be requested in the baseline to avoid jeopardy.

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<sup>47</sup> U.S. Fish and Wildlife Service. “Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Grotto Sculpin (*Cottus* sp. nov.).” October 25, 2012. (Page 3)

<sup>48</sup> *Ibid.* (Page 4)

<sup>49</sup> *Ibid.* (Pages 1 and 4-5)

<sup>50</sup> U.S. Fish and Wildlife Service. Telephone communication on November 8, 2012.

97. Second, because the sculpin is not yet listed, agencies have not previously been required to consult with the Service for projects within the study area. It is therefore difficult to determine whether the designation of critical habitat will increase agency awareness. Communication with the NRCS and FSA, two of the agencies most likely to be consulting with the Service in the study area, indicates that the designation is unlikely to have such an effect. Both agencies typically consult with the Service on a programmatic level for the entire state, and thus would be aware of the potential presence of the species throughout its range.<sup>51</sup>
98. In addition, the NRCS develops conservation guidelines with the Service to protect broad categories of species and habitats. According to the NRCS, fish species and karst habitats are already addressed in NRCS conservation guidelines for the areas proposed as critical habitat. Consequently, the NRCS does not anticipate any changes to the section 7 consultation process or associated project modifications due to the designation of critical habitat.<sup>52</sup>
99. In addition to these two agricultural agencies, the Corps and the Department of Housing and Urban Development (HUD) may serve as a Federal nexus for section 7 consultation on projects within the study area. Communication with the Corps, however, indicates that jurisdiction in the study area is limited. The Corps typically does not have jurisdiction over sinkholes, and Corps permits are therefore unlikely to be required for projects occurring in the underground habitat of Units 1 and 2. Within Units 3 and 4, Corps jurisdiction is limited to the ordinary high water mark of the stream bed. In the 22 years since 1991, the Corps has issued approximately 10 permits within proposed Unit 1; two permits within proposed Unit 2; one permit within proposed Unit 3; and two permits within proposed Unit 4.<sup>53</sup> The Corps is aware of the species presence in these areas.<sup>54</sup>
100. Communication with HUD indicates that although the designation of critical habitat may make identifying potentially affected species easier, the agency relies on information published in the Missouri Department of Conservation's Natural Heritage Program database regarding state or federally listed species or species of concern.<sup>55</sup> This database provides a list of species of concern by county. The grotto sculpin is currently included on the list for Perry County.<sup>56</sup> Thus, given the agencies' awareness of the species and the

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<sup>51</sup> Hunt, James. District Conservationist, Natural Resources Conservation Service Cape Girardeau Office. Telephone communication on November 19, 2012; and Ray, Dennis. County Executive Director, Perry County Farm Service Agency. Telephone communication on November 29, 2012.

<sup>52</sup> Hunt, James. District Conservationist, Natural Resources Conservation Service Cape Girardeau Office. Telephone communication on November 19, 2012.

<sup>53</sup> Analysis of data provided by: McClendon, Danny. St. Louis District Regulatory Branch Chief, U.S. Army Corps of Engineers. Email communication on January 17, 2013.

<sup>54</sup> Gramke, Robert, and McClendon, Danny. Missouri Section Regulatory Branch Chief and St. Louis District Regulatory Branch Chief, U.S. Army Corps of Engineers. Telephone communication on January 8, 2013.

<sup>55</sup> Mohr, Paul. Regional Environmental Officer, Region 7, U.S. Department of Housing and Urban Development. Telephone communication on January 18, 2013.

<sup>56</sup> Missouri Department of Conservation Natural Heritage Program. Accessed at <http://mdc.mo.gov/your-property/greener-communities/heritage-program> on January 18, 2013.

need to consult, we do not anticipate an increase in the number of section 7 consultations following critical habitat designation.

101. As a result, based on communication with these four potential action agencies, we assume that the outcome and frequency of section 7 consultation is unlikely to be affected by the presence of critical habitat. Direct incremental impacts will generally be limited to additional administrative costs associated with addressing adverse modification in section 7 consultations.

#### **4.2 INCREMENTAL IMPACTS BY ACTIVITY**

102. In this section, we discuss potential incremental impacts to each activity identified in the Proposed Rule as a potential threat to critical habitat. These activities include residential, commercial, and industrial development; agricultural activities; and transportation projects. We also discuss efforts by Perry County to reduce regulatory uncertainty through the development of a community land and resource management plan and the associated impact of implementing such a plan.

##### **4.2.1 RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL DEVELOPMENT**

103. Development activities threaten sculpin habitat by increasing stormwater runoff and contamination. In residential areas, a primary threat resulting from development is water quality contamination from septic systems. Although development may occur in any of the four proposed units, development is most likely to be associated with the City of Perryville in proposed Unit 1. Between 2000 and 2010, the population of the City of Perryville increased by 7.3 percent. In comparison, the population of Perry County increased by only 4.6 percent over the same time period.<sup>57</sup> Currently, at least six development projects, including commercial projects associated with downtown revitalization, construction of new apartment complexes, and industrial expansion, are in progress in the City of Perryville. Four of these are expected to occur in 2013; the remaining two are likely to occur within 1-2 years.<sup>58</sup>
104. Communication with the Perry County Economic Development Authority indicates that development projects in the City of Perryville often involve Federal funding, such as Community Development Block Grants from HUD.<sup>59</sup> In addition, where the Corps has jurisdiction, development projects may require section 404 CWA permits. However, the Corps has limited jurisdiction within the study area, and has only issued five CWA permits for residential, commercial, or industrial development since 1991. Each of these five projects was located within the City of Perryville.<sup>60</sup> This analysis therefore only

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<sup>57</sup> U.S. Census Bureau. 2000 and 2010 Census. "Profile of General Population and Housing Characteristics: 2010" and "Profile of General Demographic Characteristics: 2000." Accessed via American Factfinder at <http://factfinder2.census.gov/main.html> on January 10, 2013.

<sup>58</sup> Sattler, Scott. Executive Director, Perry County Economic Development Authority. Telephone communication on January 10, 2013.

<sup>59</sup> *Ibid.*

<sup>60</sup> Analysis of data provided by: McClendon, Danny. St. Louis District Regulatory Branch Chief, U.S. Army Corps of Engineers. Email communication on January 17, 2013.

considers future development in the City of Perryville, and assumes that Federal funding is the more likely nexus for section 7 consultation.

105. Potential modifications to development projects stemming from sculpin conservation efforts can affect landowners, consumers, and real estate markets. In general, the Service believes all conservation efforts recommended during section 7 consultation would be recommended absent critical habitat designation. These baseline conservation efforts could include modifying development within certain areas around sculpin habitat; however, the Service has stated that they do not anticipate precluding development in areas proposed as critical habitat.<sup>61</sup> As noted previously, while these impacts may result from the listing of the species, the incremental impacts of critical habitat designation are expected to be limited to the administrative cost of section 7 consultation, since the listing impacts will occur with or without critical habitat designation.
106. To estimate incremental economic impacts, this analysis employs a series of methodological steps. These steps are described briefly below, and results of the analysis are presented in the following section.

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

The first step in evaluating the effect of sculpin conservation on private land development is to identify the amount, type, and location of land within the study area that would likely be developed by 2030 absent the designation of critical habitat. To isolate potentially affected areas, the analysis excludes non-developable areas such as publicly-owned land and privately-owned preserve land.<sup>62</sup> All remaining areas that are currently vacant are considered potentially developable.<sup>63</sup> Publicly available population projections through 2030 are then used to estimate the amount of future growth expected to occur on developable lands within the study area.<sup>64</sup>

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

As noted above, the incremental impacts of the Proposed Rule are expected to be limited to administrative consultation costs. This analysis assumes that all future projects overlapping the study area are likely to have a Federal nexus through either Corps permitting or the use of Federal funds. As a result, we assume that all future development projects will require consultation with the Service under section 7 of the Act. To the extent that projects do not require Corps permits and do not involve Federal funding, this analysis may overstate incremental impacts.

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<sup>61</sup> U.S. Fish and Wildlife Service. Telephone communication on November 8, 2012.

<sup>62</sup> U.S. Geological Survey. Protected Areas Database of the United States (PAD-US). Accessed at <http://gapanalysis.usgs.gov/padus/data/download/> on October 22, 2012.

<sup>63</sup> Missouri Spatial Data Information Service. 2005 Land Use Land Cover data for Perry County. Accessed at <http://msdis.missouri.edu/data/datalist.html> on December 6, 2012.

<sup>64</sup> Southeast Missouri Regional Planning Commission. 2011 City of Perryville Comprehensive Plan. Accessed at <http://www.cityofperryville.com/index.aspx?NID=452> on January 10, 2013.

To translate the geographic area likely to be developed into an expected number of projects, we use data from the City of Perryville zoning ordinance and the Perry County Economic Development Authority on average project size.<sup>65</sup> This information is combined with the administrative costs presented in Chapter 2 to estimate incremental costs of consultation. Only the portion of administrative effort to consider adverse modification of sculpin habitat is considered incremental.

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

The final step is to determine the significance of sculpin-related project modifications relative to regional real estate demand and supply dynamics. The economic impacts may extend beyond the regulated landowners and affect the real estate market, real estate consumers, and the regional economy if: (1) the amount of land not developed as a result of sculpin conservation is high relative to the total developable land in the region (i.e., the listing and designation are expected to produce scarcity in developable land), or (2) other project modification costs are high relative to real estate development value and will impact a significant proportion of developable land. In these cases, landowners and developers may pass the costs of species protection to real estate consumers in the form of high prices. Conversely, if project modification costs are low or if sculpin protection only affects a small fraction of the total developable land supply in a region, then economic effects are likely to be limited to that subset of individual landowners or developers. All conservation efforts recommended by the Service are assumed to occur in the baseline – i.e., in the absence of critical habitat designation – therefore, any effects on the regional real estate market would also be considered baseline impacts.<sup>66</sup> However, in this case, projected development is low relative to available land, and we therefore do not anticipate regional market impacts.

#### Quantitative Results of the Development Analysis

107. Because population projections for the City of Perryville are available through 2030, we consider the potential for development over 18 years from 2013-2030. In order to estimate the acreage potentially affected by the proposed critical habitat designation, the analysis first removes portions of land considered undevelopable—that is, any areas identified by Perry County land cover data as impervious, already developed, bare rock, water, or wetlands.<sup>67</sup> We also exclude areas identified as conserved by the Protected

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<sup>65</sup> City of Perryville. Zoning Ordinance. December 2011. Accessed at [cityofperryville.com/DocumentCenter/View/16](http://cityofperryville.com/DocumentCenter/View/16) on January 16, 2013; and Perry County Economic Development Authority website. Perryville Industrial Park. Accessed at <http://perrycountymmo.org/cgi-bin/p/awtp-pa.cgi?id=perry-county-economic-development-authority&type=4000> on January 16, 2013.

<sup>66</sup> We note that projected development is low relative to available land, and therefore regional impacts in the form of higher prices for consumers are unlikely to result in the baseline scenario.

<sup>67</sup> Missouri Spatial Data Information Service. 2005 Land Use Land Cover data for Perry County. Accessed at <http://msdis.missouri.edu/data/datalist.html> on December 6, 2012.

Areas Database of the United States.<sup>68</sup> We assume all remaining acres are potentially developable.

108. To estimate the proportion of developable land within the City of Perryville that is likely to be developed in the future, this analysis relies on population projections for the year 2030 as reported in the Perryville Comprehensive Plan.<sup>69</sup> We first calculate the expected change in population by 2030. To estimate the number of acres necessary to support this population increase, we divide this projected population change by the current population density in developed areas.<sup>70</sup> This assumes that population density in the City of Perryville will remain constant through 2030. Then, assuming that projected development will be evenly distributed across all available land within the city, we calculate the proportion of developable land that falls within the proposed designation. We apply this proportion to the number of acres expected to be developed to find the number of acres likely to develop within the proposed designation over the analysis period. The results of this analysis suggest that approximately 141 acres are likely to be developed by 2030 within the portion of Perryville proposed as critical habitat.
109. To translate the number of acres of expected development to a rate of future section 7 consultations, we rely on information regarding the average size of development projects within the City of Perryville. Specifically, we use data from the City of Perryville zoning ordinance on mid-size residential and commercial lots and data from the Perry County Economic Development Authority on the acreage of industrial lots at the Perryville Industrial Park.<sup>71</sup> We calculate the average of these two values, resulting in an expected project size of approximately 3.8 acres. To calculate the number of consultations over the timeframe of the analysis, we divide the projected 141 acres of development by the average project size of 3.8 acres. We assume that one formal consultation will occur per project and that the rate of consultation will be constant over the timeframe of the analysis. The results of this analysis suggest that approximately two section 7 consultations on development projects will occur each year. This number is reasonable considering the number of ongoing and planned projects expected to occur in 2013, based on information obtained from the Perry County Economic Development Authority.<sup>72</sup>

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<sup>68</sup> U.S. Geological Survey. Protected Areas Database of the United States (PAD-US). Accessed at <http://gapanalysis.usgs.gov/padus/data/download/> on October 22, 2012.

<sup>69</sup> Southeast Missouri Regional Planning Commission. 2011 City of Perryville Comprehensive Plan. Accessed at <http://www.cityofperryville.com/index.aspx?NID=452> on January 10, 2013.

<sup>70</sup> Average density calculated using current population and an estimate of the number of currently developed acres from the Perryville Comprehensive Plan. The results suggest that, on average, approximately one acre of development is anticipated for each additional population increase of 3.80 people. (Southeast Missouri Regional Planning Commission. 2011 City of Perryville Comprehensive Plan. Accessed at <http://www.cityofperryville.com/index.aspx?NID=452> on January 10, 2013.)

<sup>71</sup> City of Perryville. Zoning Ordinance. December 2011. Accessed at [cityofperryville.com/DocumentCenter/View/16](http://cityofperryville.com/DocumentCenter/View/16) on January 16, 2013; and Perry County Economic Development Authority website. Perryville Industrial Park. Accessed at <http://perrycountymo.org/cgi-bin/p/awtp-pa.cgi?d=perry-county-economic-development-authority&type=4000> on January 16, 2013.

<sup>72</sup> Sattler, Scott. Executive Director, Perry County Economic Development Authority. Telephone communication on January 10, 2013.

110. Exhibit 4-1 presents total incremental impacts to development by unit. The present value total forecast incremental impacts to development within the City of Perryville are estimated to be \$110,000, assuming a seven percent discount rate. On an annualized basis, administrative impacts in the areas proposed for designation are estimated to be \$10,000.

**EXHIBIT 4-1. FORECAST INCREMENTAL IMPACTS ASSOCIATED WITH DEVELOPMENT ACTIVITIES (2013\$, DISCOUNTED AT SEVEN PERCENT)**

UNIT		PRESENT VALUE IMPACT	ANNUALIZED IMPACT
1	Central Perryville Karst Area	\$110,000	\$10,000
2	Mystery-Rimstone Karst Area	\$0	\$0
3	Blue Spring Branch	\$0	\$0
4	Cinque Hommes Creek	\$0	\$0
<b>Total</b>		<b>\$110,000</b>	<b>\$10,000</b>
<b>Note:</b> Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.			

**Consideration of Regulatory Uncertainty and Stigma**

111. As described in Chapter 2, indirect impacts such as regulatory uncertainty and stigma may also result from the designation of critical habitat. This occurs when parties that consult with the Service under section 7 face uncertainty regarding the nature of conservation efforts that may be requested by the Service, or when parties are uncertain whether any section 7 consultation will be necessary. This uncertainty often diminishes as consultations are completed and additional information becomes available on the effects of critical habitat on specific activities. Nevertheless, public attitudes about limits or restrictions on land use can cause real economic effects to property owners, regardless of whether such limits are actually imposed.
112. Stigma has been repeatedly raised as a concern for development projects throughout the study area. Without information on specific projects at risk of choosing not to move forward with prospective development plans, we are unable to quantify economic impacts associated with stigma. Additionally, it is difficult to determine what portion of stigma may be related to the proposed designation of critical habitat above and beyond the proposed listing of the species. However, because stigma has been raised as a potentially significant concern, we describe potential impacts qualitatively.
113. Communication with local government officials indicates that the City of Perryville has historically been distinguished by high growth rates, a strong economy, and low unemployment, in part because of its diverse industrial economy. The proposed designation of sculpin critical habitat encompasses the sole industrial park within the City of Perryville. Four major industries within the city have expanded in recent years, and one purchased an additional 172 acres last year for expansion.<sup>73</sup> According to

<sup>73</sup> Buerck, Brent. City Administrator, City of Perryville. Email communication on January 14, 2013.

communication with the Perry County Economic Development Authority, two ongoing development projects have expressed concern over potential impacts of the Proposed Rule.<sup>74</sup> Both of these projects are associated with international firms that currently have manufacturing facilities in multiple states. As a result, local government officials are concerned that these projects may choose to locate elsewhere as a result of the uncertainty regarding the proposed designation of critical habitat.<sup>75</sup> In addition to the potential decrease in current land values associated with avoidance of critical habitat, a decision to expand outside of Perryville could result in distributional impacts to the city, such as fewer employment opportunities and associated regional spending.<sup>76</sup>

#### 4.2.2 AGRICULTURAL AND LIVESTOCK OPERATIONS

114. Agricultural and livestock operations may decrease water quality through erosion, sedimentation, or contamination. As shown in Exhibit 4-2, much of the study area is considered agricultural land. According to 2005 land use data from the Missouri Spatial Data Information Service, all four proposed units overlap cropland.<sup>77</sup> Agricultural activities in the study area occur primarily on privately owned land. Although agricultural and grazing operations on private lands are not normally federally regulated or permitted, these operations may receive Federal funding. In particular, agricultural operations may receive funding through NRCS programs, such as the Environmental Quality Incentive Program (EQIP), Wildlife Habitat Incentive Program (WHIP), and cost share programs (CSP), or through the Conservation Reserve Program or Direct and Counter Cyclical Payments (DCP) program of the FSA. In these cases, agricultural activities may be subject to section 7 consultation regarding potential effects on listed species and habitats.
115. Through its financial assistance programs, the NRCS provides funds for private farmers to implement conservation-focused practices aimed at improving the natural environment for both agricultural operations and wildlife habitat. These programs are popular within the study area. In Perry County, the NRCS currently has 54 active contracts on more than 16,500 acres. Over the past four years, the NRCS has had an average of 28 contracts per year.<sup>78</sup>

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<sup>74</sup> Sattler, Scott. Executive Director, Perry County Economic Development Authority. Telephone communication on January 10, 2013.

<sup>75</sup> Sattler, Scott. Executive Director, Perry County Economic Development Authority. Telephone communication on January 10, 2013; and Buerck, Brent. City Administrator, City of Perryville. Telephone communication on January 8, 2013.

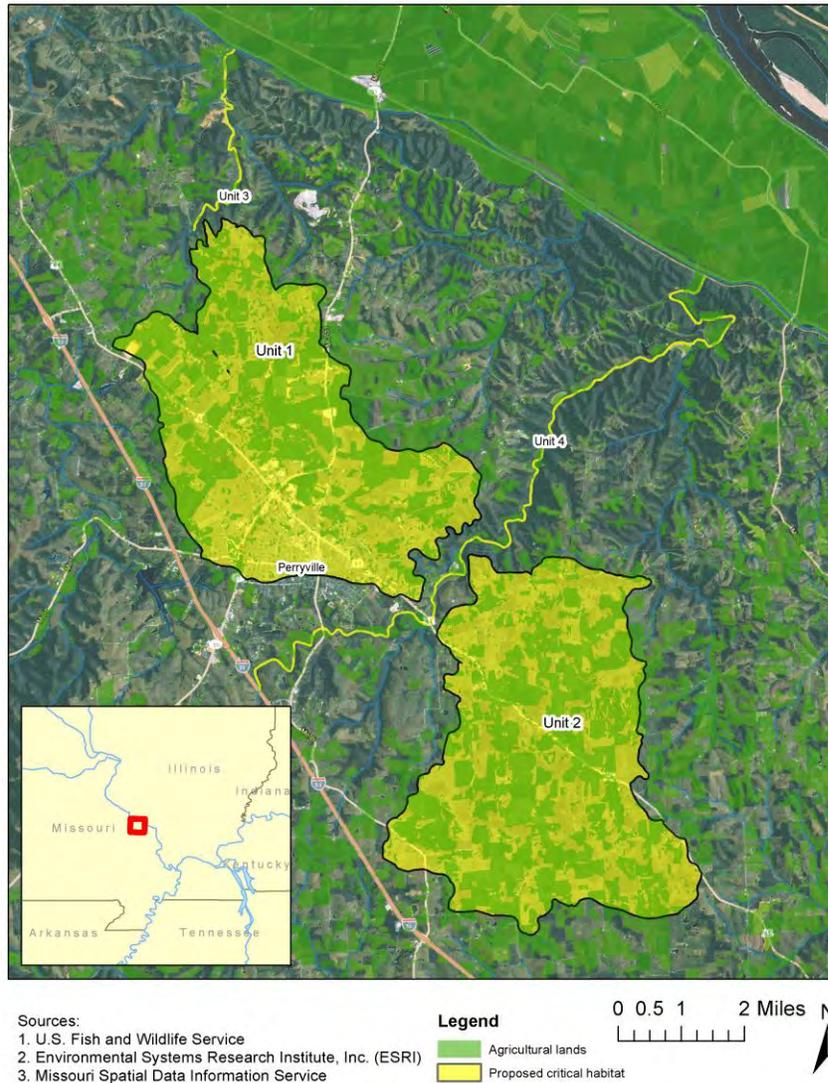
<sup>76</sup> These potential costs represent important distributional impacts that could be incurred by the regional community. We note that from a societal perspective, decisions to expand industrial operations elsewhere could have a countervailing positive effect on the alternative development sites and their surrounding communities.

<sup>77</sup> Missouri Spatial Data Information Service. 2005 Land Use Land Cover data for Perry County. Accessed at <http://msdis.missouri.edu/data/datalist.html> on December 6, 2012.

<sup>78</sup> Hunt, James. District Conservationist, Natural Resources Conservation Service Cape Girardeau Office. Email communication on January 3, 2013.

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**EXHIBIT 4-2. AGRICULTURAL LANDS IN THE VICINITY OF PROPOSED CRITICAL HABITAT**



116. FSA programs are also widespread throughout the study area. More than 900 farms in Perry County participate in the DCP program, which offers regular payments to producers of eligible commodities. Of these participating farms, approximately 100 may be located within the study area. Additionally, approximately 180 farms in the county participate in the Conservation Reserve Program, which offers long-term rental payments to landowners who implement conservation measures on agricultural land. Twelve of these participating farms may be within the study area.<sup>79</sup>
117. Because NRCS and FSA funding serves as a Federal nexus for section 7 consultation, agricultural operations could be affected by the designation of critical habitat for the sculpin. However, communication with the NRCS and FSA indicates that neither agency typically consults with the Service on individual contracts. Therefore, landowners are not

<sup>79</sup> Ray, Dennis. County Executive Director, Perry County Farm Service Agency. Email communication on January 9, 2013.

involved. Instead, both agencies minimize the number of section 7 consultations that must occur by working with the Service at a programmatic level. These consultations often occur in conjunction with meetings of the State Technical Committee.

118. This committee, which includes representatives from state agencies, technical agencies, and agricultural groups, meets approximately three times a year to discuss conservation practices.<sup>80</sup> Together with the Service, the NRCS develops a matrix of conservation measures for particular habitats and categories of species. This matrix provides guidance on the types of practices that may affect species and habitats of concern. The NRCS then pursues practices in its individual contracts that are unlikely to adversely affect those species and habitats.<sup>81</sup>
119. The current conservation matrix identifies karst areas, including the proposed critical habitat for the sculpin, as an area of concern, so it is unlikely that the designation of critical habitat would provide new information about the potential presence of the species throughout its range. Because the NRCS also serves as the technical agency evaluating environmental conditions at each FSA project site, we assume that FSA awareness of the species and its habitat is also not likely to increase following the designation of critical habitat.<sup>82</sup> Additionally, because of the conservation-oriented nature of NRCS projects and the FSA's Conservation Reserve Program, neither agency expects the designation of critical habitat to change implementation of its programs in Perry County.<sup>83</sup> However, the Service has stated that in order to ensure compliance with baseline conservation efforts, it may request additional monitoring and reporting requirements in section 7 consultations associated with these or other programs.<sup>84</sup> Any impacts associated with these additional requirements are likely to result from the listing of the species and are therefore attributed to the baseline.
120. As a result, we do not estimate any incremental impacts associated with changes to NRCS or FSA programs or conservation practices. This analysis does, however, forecast incremental administrative impacts associated with one programmatic section 7 consultation each for the NRCS and FSA. These consultations may occur in conjunction with the first meeting of the State Technical Committee following the designation of critical habitat in 2013. Only the portion of administrative effort to consider adverse modification of sculpin habitat is considered incremental. Because these programs operate throughout the study area, we divide forecast administrative impacts equally among the four proposed units. Forecast impacts are presented by unit in Exhibit 4-3

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<sup>80</sup> Hrdina, Gerald. Chief of Conservation, Farm Service Agency Missouri State Office. Telephone communication on January 2, 2013.

<sup>81</sup> Hunt, James. District Conservationist, Natural Resources Conservation Service Cape Girardeau Office. Telephone communication on November 19, 2012.

<sup>82</sup> Hrdina, Gerald. Chief of Conservation, Farm Service Agency Missouri State Office. Telephone communication on January 2, 2013.

<sup>83</sup> Hrdina, Gerald. Chief of Conservation, Farm Service Agency Missouri State Office. Telephone communication on January 2, 2013; and Hunt, James. District Conservationist, Natural Resources Conservation Service Cape Girardeau Office. Telephone communication on November 19, 2012.

<sup>84</sup> U.S. Fish and Wildlife Service. Telephone communication on February 25, 2013.

below. The present value total incremental impacts to agricultural operations are estimated to be \$18,000 assuming a seven percent discount rate. On an annualized basis, administrative impacts are estimated to be \$1,700.

**EXHIBIT 4-3. FORECAST INCREMENTAL IMPACTS ASSOCIATED WITH AGRICULTURAL AND GRAZING ACTIVITIES (2013\$, DISCOUNTED AT SEVEN PERCENT)**

UNIT		PRESENT VALUE IMPACT	ANNUALIZED IMPACT
1	Central Perryville Karst Area	\$4,500	\$420
2	Mystery-Rimstone Karst Area	\$4,500	\$420
3	Blue Spring Branch	\$4,500	\$420
4	Cinque Hommes Creek	\$4,500	\$420
<b>Total</b>		<b>\$18,000</b>	<b>\$1,700</b>
<b>Note:</b> Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.			

**4.2.3 TRANSPORTATION PROJECTS**

121. Transportation projects may negatively affect sculpin habitat through sedimentation and runoff. We use information from the Missouri Statewide Transportation Improvement Program (STIP) to identify planned projects with Federal funding or Federal oversight. We also contacted the Missouri Department of Transportation (MoDOT) Southeast District Office and the Southeast Missouri Regional Planning Commission to identify additional projects that may occur beyond the current STIP planning period (2013-2017).
122. According to STIP documents, one project within the study area will receive Federal funding in 2014. This is a pavement treatment project on Route 51 into the City of Perryville, located within proposed Unit 1 for the sculpin.<sup>85</sup> Because this project will involve Federal funding, section 7 consultation is likely. Therefore, we forecast one formal consultation in 2014 associated with this project.
123. Communication with MoDOT and the Southeast Missouri Regional Planning Commission identified three additional projects that are likely to receive Federal funding and may be affected by the designation of critical habitat. One project – an industrial bypass to connect Route 51 to Route 61 in Perryville – is likely to occur within two to five years.<sup>86</sup> Concurrently with construction of this bypass, a new road will be built within the City of Perryville to connect the industrial park with the bypass.<sup>87</sup> Both of these

<sup>85</sup> Missouri Department of Transportation. Statewide Transportation Improvement Program 2013-2017, District Construction Schedules for the Southeast District. Accessed at [http://contribute.modot.mo.gov/plansandprojects/construction\\_program/STIP2013-2017/districtconstruct/index.htm](http://contribute.modot.mo.gov/plansandprojects/construction_program/STIP2013-2017/districtconstruct/index.htm) on November 28, 2012.

<sup>86</sup> Buchheit, Chauncy. Executive Director, Southeast Missouri Regional Planning Commission. Telephone communication on January 9, 2013; and Richmond, Tim. Project Manager, Missouri Department of Transport Southeast District Office. Telephone communication on January 3, 2013.

<sup>87</sup> Buchheit, Chauncy. Executive Director, Southeast Missouri Regional Planning Commission. Telephone communication on January 9, 2013.

projects will occur within proposed Unit 1. We forecast one formal consultation for each of these projects in 2015, conservatively assuming that the bypass and adjoining road construction occurs in two years. The third project, which is still in an early stage of planning but is described in the Perryville Comprehensive Plan, will connect Route 61 with Interstate 55. This project is expected to occur within 8-10 years. This project will be located north of Highway T, likely within proposed Unit 1.<sup>88</sup> We forecast one formal consultation for this project in 2021, conservatively assuming that the project occurs in eight years.

124. Additionally, STIP planning documents identify one planned pavement treatment project that will receive Federal funding but will occur less than half a mile outside of proposed Unit 1. This project will occur on Interstate 55 between Highway M and Route 51.<sup>89</sup> Depending on the project footprint, this project could be affected by the designation of critical habitat. However, because pavement treatment is unlikely to involve a substantial project footprint that could lead to overlap with the proposed designation, we do not forecast a section 7 consultation associated with this project.
125. In general, routine road resurfacing occurs frequently throughout the study area. According to communication with MoDOT, however, these projects cannot be predicted more than a year ahead of time and typically occur every 10-20 years for a given road, depending on factors such as traffic patterns and weather. This type of work often involves Federal funding.<sup>90</sup> Major roadways that overlap the study area include Interstate 55, Route 51, Route 61, Highway B, and Highway E. Each of these roadways could require routine resurfacing at least once during the 18-year analysis period. However, because of uncertainty over when or if such maintenance would be required, and whether the projects would receive Federal funding, we do not forecast future section 7 consultations associated with resurfacing.
126. For each of the forecast consultations, only the portion of administrative effort to consider adverse modification of sculpin habitat is considered incremental. Forecast impacts are presented by unit in Exhibit 4-4. The present value total incremental impacts to transportation projects are estimated to be \$16,000 assuming a seven percent discount rate. On an annualized basis, administrative impacts are estimated to be \$1,500.

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<sup>88</sup> *Ibid.*

<sup>89</sup> Missouri Department of Transportation. Statewide Transportation Improvement Program 2013-2017, District Construction Schedules for the Southeast District. Accessed at [http://contribute.modot.mo.gov/plansandprojects/construction\\_program/STIP2013-2017/districtconstruct/index.htm](http://contribute.modot.mo.gov/plansandprojects/construction_program/STIP2013-2017/districtconstruct/index.htm) on November 28, 2012.

<sup>90</sup> Richmond, Tim. Project Manager, Missouri Department of Transport Southeast District Office. Telephone communication on January 3, 2013.

**EXHIBIT 4-4. FORECAST INCREMENTAL IMPACTS ASSOCIATED WITH TRANSPORTATION ACTIVITIES (2013\$, DISCOUNTED AT SEVEN PERCENT)**

UNIT		PRESENT VALUE IMPACT	ANNUALIZED IMPACT
1	Central Perryville Karst Area	\$16,000	\$1,500
2	Mystery-Rimstone Karst Area	\$0	\$0
3	Blue Spring Branch	\$0	\$0
4	Cinque Hommes Creek	\$0	\$0
<b>Total</b>		<b>\$16,000</b>	<b>\$1,500</b>
<b>Note:</b> Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.			

#### 4.2.4 SAND MINING

127. Sand mining may reduce water quality due to contamination and sedimentation, and may destroy instream sculpin habitat directly. Within Perry County, sand mining occurs to support hydraulic fracturing (fracking) activities nationwide.<sup>91</sup> These mining operations require permits from the Missouri Department of Natural Resources Land Reclamation Program. If the mine site is located within waters or wetlands under the jurisdiction of the Corps, a section 404 CWA permit from the Corps is also required.<sup>92</sup>
128. Currently, there are no active sand mining operations within the proposed designation. However, one mine site, the Brewer Quarry, is located adjacent to proposed Unit 1.<sup>93</sup> This site received a permit from the Missouri Department of Natural Resources Land Reclamation Program in 2008.<sup>94</sup> Expansion of this mine site could affect the proposed designation. However, communication with the Missouri Department of Natural Resources indicates that sand mining is not expected to expand into the area proposed as critical habitat for the sculpin.<sup>95</sup>
129. Communication with the Corps further indicates that no Corps permits have been issued for mining activities within the study area since 1991.<sup>96</sup> As a result, we do not forecast any incremental impacts associated with sand mining activities over the analysis period.

<sup>91</sup> U.S. Fish and Wildlife Service. Telephone communication on November 8, 2012.

<sup>92</sup> Gramke, Robert, and McClendon, Danny. Missouri Section Regulatory Branch Chief and St. Louis District Regulatory Branch Chief, U.S. Army Corps of Engineers. Telephone communication on January 8, 2013.

<sup>93</sup> Zeaman, Bill. Missouri Department of Natural Resources, Land Reclamation Program. Telephone and email communication on January 9, 2013.

<sup>94</sup> Missouri Department of Natural Resources Land Reclamation Program. Industrial Mineral Permits by County. Accessed at <http://www.dnr.mo.gov/asp/lrp/impermits/list.asp> on January 8, 2013.

<sup>95</sup> Zeaman, Bill. Missouri Department of Natural Resources, Land Reclamation Program. Telephone and email communication on January 9, 2013.

<sup>96</sup> The current database used by the Corps to maintain permitting records was first used in 1991. As a result, information on permits issued prior to 1991 is not available. (Gramke, Robert, and McClendon, Danny. Missouri Section Regulatory Branch Chief and St. Louis District Regulatory Branch Chief, U.S. Army Corps of Engineers. Telephone communication on January 8,

#### 4.2.5 HABITAT AND SPECIES MANAGEMENT

130. As described in Chapter 3, Perry County is currently developing a community land and resource management plan. This plan focuses on water quality protections that will provide some benefit to the sculpin and its habitat. Communication with leaders involved in plan development suggests that the impetus for development of this plan is the community's concern over both the listing of the sculpin as endangered and the designation of critical habitat.<sup>97</sup> The Service also notes that concerns over both the listing of the species and the designation of critical habitat were raised in public meetings with the community. For example, in discussions regarding the new Perry County land and resource management plan, the Service identified five potential outcomes for the sculpin in the Final Rule:

1. Listing as endangered with critical habitat designation as proposed;
2. Listing as endangered without critical habitat designation;
3. Listing as endangered with some exclusions from critical habitat designation;
4. Listing as threatened (with or without critical habitat); or
5. Not listing the sculpin, and not designating critical habitat.<sup>98</sup>

Leaders involved in plan development specified that, ideally, implementation of the plan would result in the sculpin not being listed and having no critical habitat designated.<sup>99</sup>

131. Because development of this plan is, at least in part, a response to the proposal to designate critical habitat, some portion of the administrative costs of plan development and implementation costs of new conservation efforts may be considered incremental. However, identifying the portion of costs that may be considered incremental is difficult. Although Perry County may have developed a land and resource management plan in response to the listing of the species, even absent the proposal to designate critical habitat (i.e., in the baseline), community leaders are unable to identify what such a plan might have included. Therefore, we are unable to determine what portion of costs associated with plan development and implementation should be attributed solely to the designation of critical habitat.

#### Costs of Plan Development

132. To date, expenditures associated with the time and effort to develop the plan have been approximately \$300,000. The plan is anticipated to be complete by March 2013, and the

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2013; and McClendon, Danny. St. Louis District Regulatory Branch Chief, U.S. Army Corps of Engineers. Email communication on January 17, 2013.)

<sup>97</sup> Vanderbrugen, Celeste. Perry County Community Plan Facilitator. University of Missouri Extension Office. Telephone communication on January 9, 2013.

<sup>98</sup> U.S. Fish and Wildlife Service. Telephone communication on February 25, 2013.

<sup>99</sup> Vanderbrugen, Celeste. Perry County Community Plan Facilitator. University of Missouri Extension Office. Telephone communication on January 9, 2013.

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total cost to Perry County is expected to range between \$600,000 and \$750,000.<sup>100</sup> Because we are unable to isolate the incremental portion of these costs, we consider two scenarios in a bounding analysis. At the low end, we assume that costs associated with the plan are entirely attributable to the listing of the species and are therefore considered baseline impacts. At the high end, we assume that costs associated with the plan are entirely attributable to the designation of critical habitat and are therefore considered incremental. The true value of incremental costs is expected to fall between these estimates. Because this plan addresses the entirety of Perry County, we divide administrative costs equally among the four proposed units.

#### Costs of Plan Implementation

133. In addition to the costs associated with administrative efforts of plan development, costs associated with implementing new conservation efforts may be considered incremental, to the extent that the efforts would not have been implemented absent the designation of critical habitat. Communication with community leaders involved in development of the plan indicates that the plan will include new and expanded conservation practices to protect sculpin habitat, such as increased funding for sinkhole cleanup, creation of buffers around sinkholes on agricultural land, and expansion of educational signage throughout the watershed.<sup>101</sup> Although we are not able to isolate the potential incremental impact of implementing these conservation efforts, some portion of these costs may be considered incremental. Information on the expected cost of implementation for all new or expanded conservation efforts is not available at this time.
134. However, in conjunction with development of the plan, the community developed estimates of worst-case scenario impacts to agricultural activities as a result of requiring vegetated buffers on cropland. Similar buffers – usually 25 to 30 feet in radius – are currently implemented voluntarily or in conjunction with NRCS and FSA programs on some farms. However, County representatives note that some agencies have suggested using larger buffers of up to 100 feet for sculpin conservation purposes.<sup>102</sup> The community's estimates suggest that establishing buffers up to 100 feet around sinkholes may result in the loss of approximately 2,500 acres of cropland within the proposed designation.<sup>103</sup> Because the draft Perry County land and resource management plan currently calls for implementation of smaller, 50-foot-radius buffers in agricultural areas, we adjust the estimate of lost acreage proportionally.<sup>104</sup> This adjustment results in an

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<sup>100</sup> *Ibid.*

<sup>101</sup> Vanderbrugen, Celeste. Perry County Community Plan Facilitator. University of Missouri Extension Office. Telephone communication on January 9, 2013; and Sattler, Scott. Executive Director, Perry County Economic Development Authority. Telephone communication on January 10, 2013.

<sup>102</sup> Wideman, Frank. Natural Resource Engineer. University of Missouri Extension Office. Telephone communication on February 26, 2013.

<sup>103</sup> Wideman, Frank. Natural Resource Engineer. University of Missouri Extension Office. Telephone and email communication on January 16, 2013. Estimates draw on information from USDA National Agricultural Statistics Service and the Missouri Center for Applied Research and Environmental Systems (CARES).

<sup>104</sup> Community Plan. Perry County, Missouri. Preliminary draft for USFW for deliberative use. January 14, 2013.

estimate of 625 acres lost to the creation of 50-foot buffers within proposed critical habitat.

135. This estimate may overstate acreage lost to production by not accounting for existing buffers. As noted above, some farms implement smaller buffers voluntarily or in conjunction with NRCS and FSA programs. According to the National Agricultural Statistics Service, 983 farms operated in Perry County in 2007.<sup>105</sup> Of these, approximately 54 farms currently participate in NRCS programs throughout the county.<sup>106</sup> According to geospatial analysis, the proposed designation accounts for approximately 17 percent of agricultural land in the county.<sup>107</sup> Assuming that participating farms are evenly distributed throughout the county, approximately 171 farms may operate within the proposed designation, and approximately nine of these may participate in NRCS programs.
136. Additionally, approximately 12 to 100 farms participate in FSA programs within the proposed designation.<sup>108</sup> We are unable to determine the number of farms that currently have vegetated buffers around sinkholes, but the information from NRCS and FSA suggests that this number could range from 12 to more than 100. If the number of participating farms is closer to 12, the estimates of acreage lost to buffers may be reasonable. However, if the true number is closer to 100, then this analysis overstates the acreage lost to buffers implemented as a result of the Perry County plan.

#### *Social Welfare Impacts*

137. Economic impacts resulting from the creation of buffers may include the loss of the value of these lands, which represents the loss of all future economic profits from these lands, if these areas are not able to be used for other activities. County representatives estimate that the market value of these lands is approximately \$5,000 per acre.<sup>109</sup> Therefore, if 625 acres are lost to agricultural production due to the creation of 50-foot buffers, the total value of the buffer acres is approximately \$3.1 million.<sup>110</sup> County officials suggest additional acres may also be affected if, for example, farmers switch to less profitable crops as a result of the change in available cropland, or if the remaining parcels are small enough to limit the use of agricultural equipment.<sup>111</sup> We lack the data to quantify this additional impact with a sufficient degree of certainty. Additionally, if alternative

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<sup>105</sup> U.S. Department of Agriculture National Agricultural Statistics Service. Quick Stats 2.0. Accessed at <http://quickstats.nass.usda.gov/> on February 27, 2013.

<sup>106</sup> Hunt, James. District Conservationist, Natural Resources Conservation Service Cape Girardeau Office. Email communication on January 3, 2013.

<sup>107</sup> Missouri Spatial Data Information Service. 2005 Land Use Land Cover data for Perry County. Accessed at <http://msdis.missouri.edu/data/datalist.html> on December 6, 2012.

<sup>108</sup> Ray, Dennis. County Executive Director, Perry County Farm Service Agency. Email communication on January 9, 2013.

<sup>109</sup> Wideman, Frank. Natural Resource Engineer. University of Missouri Extension Office. Telephone and email communication on January 16, 2013.

<sup>110</sup> The estimates originally submitted by Perry County representatives indicate that the implementation of 100-foot buffers would result in a loss of \$12.5 million in land value.

<sup>111</sup> Wideman, Frank. Natural Resource Engineer. University of Missouri Extension Office. Telephone and email communication on January 16, 2013.

productive uses of the land – such as development – are possible, the assumption that the full value of these acres is lost may overstate the economic impact of buffer implementation.

138. Because we are not able to isolate the portion of these impacts that may result from the designation of critical habitat, above and beyond impacts that are likely to result from the listing of the species, we consider a bounding approach, as described above.<sup>112</sup> At the low end, we assume that costs associated with establishment of buffers are entirely attributable to the listing of the species and are therefore considered baseline impacts. At the high end, we assume that these costs are entirely attributable to the designation of critical habitat and are therefore considered incremental. We assume that these land value losses will occur in 2013, immediately following the designation of critical habitat. Because buffers will be implemented in both Units 1 and 2, we divide costs equally between these two proposed units.
139. Forecast impacts associated with development and implementation of the Perry County community plan are presented by unit in Exhibit 4-5. High-end present value incremental impacts are estimated to be \$3.9 million assuming a seven percent discount rate, or \$360,000 on an annualized basis. At the low end, this analysis forecasts no incremental impacts associated with development of the community plan.

**EXHIBIT 4-5. FORECAST INCREMENTAL IMPACTS ASSOCIATED WITH HABITAT AND SPECIES MANAGEMENT (2013\$, DISCOUNTED AT SEVEN PERCENT)**

UNIT		PRESENT VALUE IMPACT		ANNUALIZED IMPACT	
		LOW	HIGH	LOW	HIGH
1	Central Perryville Karst Area	\$0	\$1,800,000	\$0	\$160,000
2	Mystery-Rimstone Karst Area	\$0	\$1,800,000	\$0	\$160,000
3	Blue Spring Branch	\$0	\$190,000	\$0	\$17,000
4	Cinque Hommes Creek	\$0	\$190,000	\$0	\$17,000
<b>Total</b>		<b>\$0</b>	<b>\$3,900,000</b>	<b>\$0</b>	<b>\$360,000</b>
<b>Note:</b> Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.					

<sup>112</sup> In addition, some farmers already undertake such measures voluntarily. Future voluntary efforts have not been subtracted from the total affected acres.

*Distributional Impacts*

140. In addition, distributional impacts may result from the loss of agricultural land due to the establishment of buffers. The establishment of buffers will primarily affect the agricultural sector of the economy. Decreased operations in this industry would also result in secondary effects on related sectors in the study area. Some of these related sectors may be closely associated with the agricultural industry, such as providers of farm equipment; while others may be less closely associated, such as the insurance sector.
141. This analysis relies on regional economic modeling to estimate the economic impacts of these initial and secondary effects. In particular, it utilizes a software package called IMPLAN to estimate the total economic effects of the reduction in economic activity in agricultural industries in Perry County. IMPLAN is commonly used by state and Federal agencies for policy planning and evaluation purposes. The model draws upon data from several Federal and state agencies, including the Bureau of Economic Analysis and the Bureau of Labor Statistics.
142. IMPLAN translates initial changes in expenditures into changes from demand for inputs to affected industries. These effects can be described as direct, indirect, or induced, depending on the nature of the change:
- **Direct effects** represent changes in output attributable to a change in demand or a supply shock. These are specified initially by the modeler (e.g., the change in recreation expenditures on goods and services, by sector);
  - **Indirect effects** are changes in output in industries that supply goods and services to those that are directly affected by the initial change in expenditures; and
  - **Induced effects** reflect changes in household consumption, arising from changes in employment (which in turn are the result of direct and indirect effects). For example, changes in employment in a region may affect the consumption of certain goods and services.

These categories are calculated for all industries to determine the regional economic impact of agricultural restrictions resulting from sculpin conservation activities. In addition to estimating impacts through IMPLAN, this analysis reports values provided by Perry County representatives for comparison. Uncertainty regarding the extent to which agricultural income generates additional, indirect output accounts for the difference between these two estimates.

143. There are two important caveats relevant to the interpretation of IMPLAN model estimates, generally, and within the context of this analysis. The first is that the model is static in nature and measures only those effects resulting from a specific policy change (or the functional equivalent specified by the modeler) at a single point in time. Thus, IMPLAN does not account for posterior adjustments that may occur, such as the subsequent reemployment of workers displaced by the original policy change. In the present analysis, this caveat suggests that the long-run net output and employment effects resulting from agricultural restrictions are likely to be smaller than those estimated in the

model, which implies an upward bias in the estimates. A second caveat to the IMPLAN analysis is related to the model data. The IMPLAN analysis relies upon input/output relationships derived from 1998 data. Thus, this analysis assumes that this historical characterization of the affected counties' economies is a reasonable approximation of current conditions. If significant changes have occurred since 1998 in the structure of the economies of the counties in the study area, the results may be sensitive to this assumption. The magnitude and direction of any such bias are unknown.

144. To estimate the regional economic impact of establishing buffers throughout the proposed designation, we first estimate the direct income loss. According to county representatives, average annual gross income for the two crops grown most frequently in that area - corn and soybeans – is approximately \$800 per acre (weighted average).<sup>113</sup> Assuming that the affected 625 acres are not able to be used for other activities, direct income loss would be \$500,000 annually. According to IMPLAN, this translates to a total regional economic impact of \$960,000. Alternatively, according to communication with county representatives, every dollar of agricultural income should generate approximately six dollars of additional expenditure.<sup>114</sup> Thus, assuming the same direct income loss of \$500,000 described above, Perry County could experience total economic impacts of approximately \$3.0 million.
145. Additional economic impacts could include the loss of county tax revenue and reduced or lost value of remaining parcels of cropland. This could occur if, for example, farmers switch to less profitable crops as a result of the change in available cropland, or if the remaining parcels are small enough to limit the use of agricultural equipment.<sup>115</sup>

#### **4.3 SUMMARY OF INCREMENTAL COSTS ASSOCIATED WITH DESIGNATION OF CRITICAL HABITAT**

146. Exhibit 4-6 presents the total anticipated incremental impacts of critical habitat designation by unit. Present value incremental administrative impacts are estimated at \$140,000 over the 18-year period of this analysis, assuming a seven percent real discount rate. These costs are associated with the additional effort to consider adverse modification as part of future section 7 consultations for development, agriculture, and transportation projects. In addition, incremental costs may be associated with the development and implementation of a community land and resource management plan for Perry County. Because we are unable to isolate the portion of these costs that are incremental from those that would otherwise occur in the baseline, we consider two scenarios—one in which all costs associated with plan development and implementation are considered baseline, and one in which all costs are considered incremental. This high-end scenario results in total present value incremental costs of \$4.0 million over the 18-year period of this analysis, assuming a seven percent discount rate, including the administrative impacts summarized

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<sup>113</sup> Wideman, Frank. Natural Resource Engineer. University of Missouri Extension Office. Telephone and email communication on January 16, 2013.

<sup>114</sup> Wideman, Frank. Natural Resource Engineer. University of Missouri Extension Office. Telephone and email communication on January 16, 2013.

<sup>115</sup> *Ibid.*

above. The true value of incremental costs is expected to fall between the low and high estimates but cannot be determined at this time.

**EXHIBIT 4-6. SUMMARY OF INCREMENTAL IMPACTS BY UNIT, 2013-2030 (2013\$, DISCOUNTED AT SEVEN PERCENT)**

UNIT		PRESENT VALUE IMPACT		ANNUALIZED IMPACT	
		LOW	HIGH	LOW	HIGH
1	Central Perryville Karst Area	\$130,000	\$1,900,000	\$12,000	\$170,000
2	Mystery-Rimstone Karst Area	\$4,500	\$1,800,000	\$420	\$160,000
3	Blue Spring Branch	\$4,500	\$190,000	\$420	\$18,000
4	Cinque Hommes Creek	\$4,500	\$190,000	\$420	\$18,000
<b>Total</b>		<b>\$140,000</b>	<b>\$4,000,000</b>	<b>\$13,000</b>	<b>\$370,000</b>
<p><b>Note:</b> Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.</p>					

**4.4 CAVEATS TO ECONOMIC ANALYSIS OF INCREMENTAL IMPACTS**

147. Exhibit 4-7 summarizes the key assumptions of the economic analysis of incremental impacts, as well as the potential direction and relative scale of bias introduced by these assumptions.
148. In particular, a key uncertainty is the question of whether conservation efforts undertaken to avoid jeopardy of the species will be identical to those undertaken to avoid adverse modification of critical habitat. The Service has stated that conservation efforts to avoid adverse modification may differ in rare instances from those to avoid jeopardy to the sculpin, but such differences are difficult to predict.<sup>116</sup> At this time, the Service is unable to predict specific types of projects that may generate recommendations for additional conservation efforts. This analysis is therefore unable to quantify potential incremental conservation efforts resulting from the designation of critical habitat and may understate the incremental impacts of the Proposed Rule. However, to the extent that the Service requests additional conservation efforts, the impacts are expected to be minor. As described above, the Corps has limited jurisdiction in the study area, and Federal agencies associated with agricultural operations already consider the sculpin and its habitat through conservation-based practices. As a result, development projects receiving Federal funding within the City of Perryville may be affected. Because the Service does not anticipate precluding development as a result of the designation of critical habitat, impacts associated with additional conservation efforts are not anticipated to have a substantial effect on the regional economy. Therefore, the assumption that the Service will not request additional conservation efforts to avoid adverse modification of critical habitat is not anticipated to significantly affect the results of this analysis.

<sup>116</sup> U.S. Fish and Wildlife Service. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Grotto Sculpin (*Cottus* sp. nov.)." October 25, 2012.

## EXHIBIT 4-7. CAVEATS TO THE ECONOMIC ANALYSIS OF INCREMENTAL IMPACTS

ASSUMPTION/ SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
The Service will not require additional project modifications to address adverse modification beyond what is requested to avoid jeopardy, except in rare instances that cannot be predicted at this time.	May result in an <b>underestimate</b> of costs.	<b>Probably minor.</b> To the extent that the Service requests additional project modifications to avoid adverse modification, additional incremental impacts may be incurred for projects with a Federal nexus. As described in the analysis, the Corps has limited jurisdiction in the study area, and Federal agencies associated with agricultural operations already consider sculpin habitat through conservation-based practices. As a result, development projects are most likely to be affected.
Population growth is reflective of development pressure, and is therefore an indicator of the future consultation rate.	<b>Unknown.</b> May result in an overestimate or underestimate of costs.	<b>Probably minor.</b> This assumption affects only the estimated consultation rate. The forecast rate of consultations is reasonable based on the number of currently planned projects.
The typical development project size is 3.8 acres.	<b>Unknown.</b> May result in an overestimate or underestimate of costs.	<b>Probably minor.</b> This assumption affects only the estimated consultation rate. The forecast rate of consultations is reasonable based on the number of currently planned projects.
All development projects within the City of Perryville will have a Federal nexus for section 7 consultation.	May result in an <b>overestimate</b> of costs.	<b>Probably minor.</b> This assumption affects only the estimated consultation rate. The forecast rate of consultations is reasonable based on the number of currently planned projects.
The NRCS and FSA will each participate in one programmatic section 7 consultation associated with agricultural programs following the designation of critical habitat.	May result in an <b>underestimate</b> of costs.	<b>Minor.</b> This assumption affects only estimated incremental administrative costs. Because these agencies consult with the Service on a statewide, programmatic basis, multiple consultations to address sculpin habitat are unlikely.
The designation of critical habitat will not result in changes to conservation practices implemented by the NRCS and FSA.	May result in an <b>underestimate</b> of costs.	<b>Probably minor.</b> Both the NRCS and FSA address sculpin habitat in existing statewide conservation measures. The designation of critical habitat is therefore unlikely to increase awareness of the need to protect the species and its habitat.
Construction of an industrial bypass and associated road in Perryville will occur in 2015.	May result in an <b>overestimate</b> of costs.	<b>Minor.</b> This assumption affects only estimated incremental administrative costs. These projects are expected to occur between 2015 and 2018. Due to the time value of money, the assumption that these projects will occur in 2015 may slightly overstate costs if the projects occur later in the future.
Construction of a connection between Interstate 55 and Route 61 in Perryville will occur in 2021.	May result in an <b>overestimate</b> of costs.	<b>Minor.</b> This assumption affects only estimated incremental administrative costs. This project is expected to occur between 2021 and 2023. Due to the time value of money, the assumption that this project will occur in 2021 may slightly overstate costs if the project occurs later in the future.

ASSUMPTION/ SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
Resurfacing of roadways within proposed critical habitat will not result in section 7 consultation during the analysis period.	May result in an <b>underestimate</b> of costs.	<b>Minor.</b> This assumption affects only estimated incremental administrative costs. Road resurfacing will result in section 7 consultation only if the activity involves Federal funding, which cannot be predicted at this time, or requires a Corps permit. Corps jurisdiction in the study area is limited.
Sand mining activities will not occur within proposed critical habitat during the analysis period.	May result in an <b>underestimate</b> of costs.	<b>Minor.</b> This assumption affects only estimated incremental administrative costs. Historically, sand mining has not occurred within the proposed critical habitat. If mining activities expand into the proposed designation, these activities will result in section 7 consultation only if the operation requires a Corps permit, or otherwise has a Federal nexus.
Costs associated with development of the Perry County community plan may be attributable to either the baseline or incremental scenario.	<b>Unknown.</b> May result in an overestimate or underestimate of costs.	<b>Potentially major.</b> Because we are unable to isolate the portion of costs associated with plan development that is considered incremental, this analysis considers a bounding analysis. At the low end, costs associated with plan development are entirely attributable to the listing of the species (baseline impacts). At the high end, costs associated with the plan are entirely attributable to the designation of critical habitat, and are therefore considered incremental.
Costs associated with implementation of new conservation efforts included in the Perry County community plan may be attributable to either the baseline or incremental scenario.	<b>Unknown.</b> May result in an overestimate or underestimate of costs.	<b>Potentially major.</b> At this time, we are unable to isolate those conservation measures added to the community plan in response to the proposed designation of critical habitat, as distinct from those added to address jeopardy to the species. Information on expected costs of implementation is unavailable at this time. However, community analysis of the potential scale of impacts to agricultural activities suggests that impacts could be significant.
The conservation efforts identified in the Perry County land and resource management plan will be implemented.	May result in an <b>overestimate</b> of costs.	<b>Potentially major.</b> The regulatory mechanism requiring farmers to implement these efforts is unclear. From the draft plan document, it appears that the County intends to offer financial and other incentives (e.g., cost sharing for fencing, an educational campaign) to encourage adoption of the plans' recommendations. Implementation of these conservation efforts depends on the success of these incentives. To the extent that the efforts are not undertaken, impacts may be overstated.
Land value losses due to the implementation of agricultural buffers do not account for existing, smaller buffers.	May result in an <b>overestimate</b> of costs.	<b>Probably minor.</b> The Perry County plan calls for larger buffers than those that are currently implemented through NRCS and FSA programs. Farms with existing buffers may need to expand these buffers to meet the goals of the county plan.

ASSUMPTION/ SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
<p>The IMPLAN model used to estimate regional economic impacts is a static model and does not account for the fact that the economy may adjust.</p>	<p>May result in an <b>overestimate</b> of costs.</p>	<p><b>Potentially major.</b> The regional economic impacts estimated in this analysis are driven by the assumption that all income and market land value associated with affected cropland will be lost. To the extent that these lands can be used for other activities, the Perry County economy may adjust, resulting in decreased regional impacts.</p>

## CHAPTER 5 | ECONOMIC BENEFITS OF CRITICAL HABITAT DESIGNATION

149. As discussed in the previous chapters, this analysis does not anticipate that the designation of critical habitat will result in additional conservation for the sculpin through the section 7 consultation process, except in rare instances that the Service is unable to predict at this time. Some additional conservation efforts may be undertaken as a result of development of a new Perry County land and resource management plan. However, we are unable to isolate those conservation measures added to the community plan in response to the proposed designation of critical habitat, as distinct from those added to address the presence of the species. Absent changes in land or water management, incremental economic benefits to the sculpin are likely to be minimal. The information in this section is provided to offer context for the analysis.
150. The primary intended benefit of critical habitat is to support the conservation of threatened and endangered species. Thus, attempts to develop monetary estimates of the benefits of this proposed critical habitat designation would focus on the public's willingness to pay to achieve the conservation benefits to the sculpin resulting from the designation.
151. Quantification and monetization of species conservation benefits requires information on the incremental changes in the probability of sculpin conservation that are expected to result from the designation. In this case, we refer to the change in conservation probability that is distinct and separate from the change in conservation probability associated with the listing (i.e., the change that results from the specific conservation efforts that would not be undertaken absent the designation). As discussed in Chapter 4, the impacts of the proposed designation are estimated to be largely administrative in nature. Incremental conservation efforts (e.g., project modifications) are anticipated to result from the section 7 consultation process only in rare circumstances and are not quantified for the purposes of this analysis. Incremental conservation efforts included in the new Perry County land and resource management plan, such as the establishment of vegetated buffers, may in some cases be considered indirect impacts of the designation of critical habitat. However, data necessary to quantify potential changes in the probability that the species will be conserved as a result of the critical habitat designation are limited. Even if information about the incremental change in conservation probability that could result from the implementation of potential additional conservation efforts existed,

the published valuation literature does not support monetization of incremental changes in conservation probability for the sculpin.<sup>117</sup>

152. Other potential benefits may be achieved through designation of critical habitat. For example, the public may hold a value for habitat conservation, beyond its willingness to pay for conservation of a specific species. Studies have been undertaken to estimate the public's willingness to pay to preserve wilderness areas, for wildlife management and preservation programs, and for wildlife protection in general. These studies address categories of benefits (e.g., ecosystem integrity) that may be similar to the types of benefits provided by critical habitat, but do not provide values that can be used to establish the incremental values associated with this proposed critical habitat designation (i.e., the ecosystem and species protection measures considered in these studies are too dissimilar from the habitat protection benefits that may be afforded by this designation).
153. Similarly, economists have conducted research on the economic value of ancillary benefits, such as the preservation of open space, which may positively affect the value of neighboring parcels, or maintenance of natural hydrologic functions of an ecosystem, which result in improved downstream water quality. In general, this rule is not anticipated to affect behavior (i.e., it is not expected to generate additional conservation efforts beyond what is requested to avoid jeopardy) except in rare instances that the Service is unable to predict at this time. As a result, these benefits are likely to be minimal. However, to the extent that conservation efforts implemented as a result of the Perry County land and resource management plan are considered incremental, similar benefits may result indirectly from the designation of critical habitat.
154. To estimate the change in water quality resulting from the implementation of erosion controls and the retention of vegetation, the following types of detailed, on-the-ground data would be required as model inputs: the type and density of vegetative cover; precipitation, temperature, and other weather-related data; topography (e.g., steepness of slope); pre-existing water quality conditions (e.g., the amount of total dissolved solids, pH, temperature); and potentially other hydrologic characteristics (e.g., groundwater gradients and flow rates).
155. While some of these data are available; some would need to be generated at a relatively fine level of resolution in order to model the types of incremental changes

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<sup>117</sup> Numerous published studies estimate individuals' willingness to pay to protect endangered species. The economic values reported in these studies reflect various groupings of benefit categories (including both use and non-use values). For example, these studies assess public willingness to pay for wildlife-viewing opportunities, for the option for seeing or experiencing the species in the future, to assure that the species will exist for future generations, and simply knowing a species exists, among other values. Unfortunately, this literature addresses a relatively narrow range of species and circumstances compared to the hundreds of species and habitats that are the focus of the Act. Specifically, existing studies focus almost exclusively on large mammal, bird, and a few fish species, and generally do not report values for incremental changes in species conservation. Importantly for this analysis, no studies estimate the value the public places on preserving cave-dwelling fish such as the sculpin.

in services likely to result from the designation. Furthermore, once we estimated the change in water quality, we would need to either develop a methodology or use a pre-existing tool and compile data to estimate the value of such changes (e.g., avoided water treatment costs; revealed or stated preference studies of willingness to pay for water quality improvements). Such detailed data collection and analysis to estimate the ancillary benefits of the decision to list the sculpin is beyond the scope of this report, which focuses primarily on the incremental effects of critical habitat designation.

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5 U.S.C. §601 *et seq.*

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**APPENDIX A | ADDITIONAL STATUTORY REQUIREMENTS**

1. This appendix addresses the remaining analytical requirements under administrative law and executive order. Section A.1 presents an analysis of impacts to small entities which is conducted pursuant to the Regulatory Flexibility Act, as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 and Executive Order 13272. Section A.2 assesses the effects of the Proposed Rule on state, local, and Tribal governments and the private sector as required by Title II of the Unfunded Mandates Reform Act of 1995. Section A.3 addresses the potential for federalism concerns as required by Executive Order 13132. And Section A.4 considers potential impacts to the energy industry in response to Executive Order 13211, entitled, “Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use.”
2. The analyses of impacts in this appendix rely on the estimated incremental impacts resulting from the proposed critical habitat designation. The incremental impacts of the rulemaking are most relevant for these analyses because they reflect costs that may be avoided or reduced based on decisions regarding the composition of the Final Rule.

**A.1 SBREFA ANALYSIS**

3. When a Federal agency proposes regulations, the RFA requires the agency to prepare and make available for public comment an analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small governmental jurisdictions as defined by the RFA).<sup>118</sup> No initial regulatory flexibility analysis is required if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the RFA to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have significant economic impact on a substantial number of small entities. To assist in this process, this appendix provides a screening level analysis of the potential for sculpin critical habitat to affect small entities.
4. To ensure broad consideration of impacts on small entities, the Service has prepared this small business analysis without first making the threshold determination in the Proposed Rule regarding whether the proposed critical habitat designation could be certified as not having a significant economic impact on a substantial number of

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<sup>118</sup> 5 U.S.C. §601 *et seq.*

small entities. This small business analysis will therefore inform the Service's threshold determination.

#### A.1.1 BACKGROUND AND FRAMEWORK FOR THE THRESHOLD ANALYSIS

5. This analysis is intended to improve the Service's understanding of the potential effects of the Proposed Rule on small entities and to identify opportunities to minimize these impacts in the Final Rule. The Act requires the Service to designate critical habitat for threatened and endangered species to the maximum extent prudent and determinable. Section 4(b)(2) of the Act requires that the Service designate critical habitat "on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impacts, of specifying any particular area as critical habitat." This section grants the Secretary of the Interior discretion to exclude any area from critical habitat if (s)he determines "the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat." However, the Secretary may not exclude an area if it "will result in the extinction of the species."
6. Three types of small entities are defined in the RFA:
  - **Small Business** - Section 601(3) of the RFA defines a small business as having the same meaning as small business concern under section 3 of the Small Business Act. This includes any firm that is independently-owned and operated and is not dominant in its field of operation. The Small Business Administration (SBA) has developed size standards to carry out the purposes of the Small Business Act, and those size standards can be found in 13 CFR 121.201. The size standards are matched to North American Industry Classification System (NAICS) industries. The SBA definition of a small business applies to a firm's parent company and all affiliates as a single entity.
  - **Small Governmental Jurisdiction** - Section 601(5) defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000. Special districts may include those servicing irrigation, ports, parks and recreation, sanitation, drainage, soil and water conservation, road assessment, etc. When counties have populations greater than 50,000, those municipalities of fewer than 50,000 can be identified using population reports. Other types of small government entities are not as easily identified under this standard, as they are not typically classified by population.
  - **Small Organization** - Section 601(4) defines a small organization as any not-for-profit enterprise that is independently-owned and operated and not dominant in its field. Small organizations may include private hospitals, educational institutions, irrigation districts, public utilities, agricultural co-ops, etc.

7. The courts have held that the RFA/SBREFEA requires Federal agencies to perform a regulatory flexibility analysis of forecast impacts to small entities that are directly regulated. In the case of *Mid-Tex Electric Cooperative, Inc., v. Federal Energy Regulatory Commission (FERC)*, FERC proposed regulations affecting the manner in which generating utilities incorporated construction work in progress in their rates. The generating utilities that expected to be regulated were large businesses; however, their customers -- transmitting utilities such as electric cooperatives -- included numerous small entities. In this case, the court agreed that FERC simply authorized large electric generators to pass these costs through to their transmitting and retail utility customers, and FERC could therefore certify that small entities were not directly impacted within the definition of the RFA.<sup>119</sup>
8. Similarly, *American Trucking Associations, Inc. v. Environmental Protection Agency (EPA)* addressed a rulemaking in which EPA established a primary national ambient air quality standard for ozone and particulate matter.<sup>120</sup> The basis of EPA's RFA/SBREFEA certification was that this standard did not directly regulate small entities; instead, small entities were indirectly regulated through the implementation of state plans that incorporated the standards. The court found that, while EPA imposed regulation on states, it did not have authority under this rule to impose regulations directly on small entities and therefore small entities were not directly impacted within the definition of the RFA.
9. Following the court decisions described above, this analysis considers only those entities directly regulated by the Proposed Rule. The regulatory mechanism through which critical habitat protections are realized is section 7 of the Act, which requires Federal agencies, in consultation with the Service, to insure that any action authorized, funded, or carried by the Agency is not likely to adversely modify critical habitat. Therefore, under a strict interpretation of the definition of a "directly regulated entity," only Federal action agencies are subject to a regulatory requirement (i.e., to avoid adverse modification) as the result of the designation. Because Federal agencies are not small entities, under this interpretation, the Service may certify that the proposed critical habitat rule will not have a significant economic impact on a substantial number of small entities.
10. We acknowledge, however, that in some cases, third-party proponents of the action subject to permitting or funding may participate in a section 7 consultation and thus may be indirectly affected. While these entities are not directly regulated, the Service has requested information regarding the potential number of third parties participating in consultations on an annual basis in order to ensure a robust examination of the effects of this proposed rule. Below, we provide that information. We also provide information to assist the Service in determining whether these

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<sup>119</sup> *Mid-Tex Electric Cooperative, INC. V. Federal Energy Regulatory Commission*, 773 F. 2d 327 (D.C. Cir. 1985).

<sup>120</sup> *American Trucking Association vs. EPA*, 175 F. 3d 1027, 1044 (D.C. Cir. 1999).

entities are likely to be “small,” and whether the number of potentially affected small entities is “substantial.”<sup>121</sup>

#### A.1.2 RESULTS OF THE THRESHOLD ANALYSIS

11. As described in Chapter 4, we anticipate section 7 consultations will address the following activities:
- **Development:** We anticipate that approximately two development projects per year will undergo section 7 consultation. The relevant action agencies are HUD and the Corps; however, the third party project proponents may also participate in the consultation process.
  - **Agriculture and Grazing:** We anticipate that FSA and NRCS will each participate in one programmatic consultation with the Service in 2013. No third parties are expected to participate in these consultations, and impacts are limited to the administrative costs of undertaking the consultation. In other words, incremental project modifications that would be implemented by farmers or ranchers are not expected to result from these consultations. Thus, small entities are not expected to be affected.
  - **Transportation:** We anticipate that four formal consultations will be undertaken during the timeframe of the analysis. At most, two will occur in a single year (2015). Third party participants will most likely include MoDOT, which is not a small entity. However, for the purposes of this analysis, we assume that the City of Perryville may also be involved.

Chapter 4 also describes the potential indirect costs associated with the development of a land and resource conservation plan by the Perry County. If implemented, the plan could impose costs on small entities, including the City of Perryville and farmers. However, this plan is not subject to section 7 consultation, and thus the potential impacts are not considered in this threshold analysis.

12. Following RFA and SBREFA, the purpose of this threshold analysis is to determine if the critical habitat designation will have a significant economic impact on a substantial number of small entities. Importantly, the impacts of the rule must be *both* significant *and* affect a substantial number of small entities to prevent certification of the rule. If a substantial number of small entities are affected by the critical habitat designation, but the per-entity economic impact is not significant, the Service may certify. Likewise, if the per-entity economic impact is likely to be significant, but the number of affected entities is not substantial, the Service may also certify. To assist the Service in making this determination, this analysis presents information on both the number of small entities that may be affected and the magnitude of the expected impacts.

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<sup>121</sup> The RFA does not provide quantitative thresholds to defining the terms “substantial” and “significant.” In its guidance to Federal agencies on complying with the RFA, SBA provides qualitative descriptions of these terms, leaving the Agencies with discretion to interpret these terms on a case-by-case basis.

**Residential, Commercial, and Industrial Development**

13. Across the study area, 53 businesses are engaged in residential, commercial, and industrial development.<sup>122</sup> All 53 of these businesses have annual revenues at or below the relevant small business thresholds for their respective NAICS codes, and thus are considered small (see Exhibit A-1).
14. To determine how many entities may be affected by the designation, we conduct a bounding analysis.
- At the low-end, we assume that a single developer bears all costs associated with forecast consultations in each year.
  - At the high-end, we assume that one small entity is affected per forecast consultation. This assumption may overestimate the number of affected entities because a small developer may own multiple projects that each undergo separate section 7 consultations in the same year.

The analysis forecasts a total of approximately 37 formal section 7 consultations, or two per year. Therefore, at the low-end we assume that one small developer incurs all administrative costs associated with the proposed critical habitat designation for the sculpin in a given year. At the high-end we assume that each small developer incurs costs associated with no more than one consultation per year.

15. We assume that third parties incur approximately \$880 in administrative costs per consultation (see Exhibit 2-1). Assuming the average small entity has annual revenues of approximately \$6.2 million, the per-entity cost to participate in a single consultation represents approximately 0.01 percent of annual revenues.<sup>123</sup> If both consultations occurring in a given year are undertaken by the same developer, then the cost to participate in these consultations represents approximately 0.03 percent of annual revenues. The assumption that all costs accrue to one developer likely overstates the impact; thus, we estimate incremental impacts to small developers of less than 0.03 percent of annual revenues. Results of this analysis are presented in Exhibit A-2.
16. For development activities, potential impacts to small development firms may also be overstated because much or all of the costs of sculpin conservation efforts may ultimately be borne by current landowners in the form of lower prices paid for the land at the time of development. Many of these landowners may be individuals or families that are not legally considered to be businesses. No NAICS code exists for landowners, and the SBA does not provide a definition of a small landowner.

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<sup>122</sup> To estimate the number of businesses in this industry, the analysis relies on six separate NAICS codes: New Single Family Housing Construction (NAICS 236115), New Multifamily Housing Construction (NAICS 236116), New Housing Operative Builders (236117), Land Subdivision (NAICS 237210), Industrial Building Construction (NAICS 236210), and Commercial and Institutional Building (NAICS 236220).

<sup>123</sup> Annual revenues are estimated by averaging revenue data for the six development NAICS codes obtained from Risk Management Association (RMA), *Annual Statement Studies: Financial Ratio Benchmarks 2012 to 2013*, 2012.

Transportation

17. Administrative impacts to transportation projects are expected to be largely incurred by Federal and state agencies. These entities are not considered small.<sup>124</sup> However, this analysis forecasts section 7 consultations associated with roads and projects that may be funded in part by the City of Perryville. The City of Perryville has a population of 8,225, and is therefore considered a small governmental jurisdiction.<sup>125</sup>
18. As described in Chapter 4, this analysis forecasts four formal consultations associated with transportation projects in the City of Perryville. Of these, two are expected to occur in the same year, and therefore represent the largest potential impact that the City of Perryville may incur in one year. Third-party administrative costs for these two simultaneous consultations total approximately \$1,500. This impact represents less than 0.01 percent of the annual revenue for the City of Perryville.<sup>126</sup> Results of this analysis are presented in Exhibit A-2.

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<sup>124</sup> In its guidance on preparing analyses in compliance with the RFA/SBREFEA, the EPA states that, "for the purposes of the RFA, States and Tribal governments are not considered small governments but rather as independent sovereigns." U.S. Environmental Protection Agency. "Regulatory Flexibility Act/Small Business Regulatory Enforcement Fairness Act (RFA/SBREFEA). What is a "small government?" Accessed at <http://www.epa.gov/sbrefa/government.htm> on August 10, 2005.

<sup>125</sup> U.S. Census Bureau, State and County Quickfacts. Accessed at <http://quickfacts.census.gov/qfd/index.html> on January 11, 2013.

<sup>126</sup> Annual Budget, Fiscal Year 2012-13. City of Perryville, Missouri. Accessed at [cityofperryville.com/Archive.aspx?ADID=52](http://cityofperryville.com/Archive.aspx?ADID=52) on January 15, 2013.

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

ACTIVITY	INDUSTRY (NAICS CODES)	SMALL ENTITY SIZE STANDARD	TOTAL NUMBER OF ENTITIES IN COUNTY <sup>1</sup>	NUMBER OF SMALL ENTITIES IN COUNTY <sup>2</sup>	PERCENT SMALL ENTITIES IN COUNTY
Development	New Single-Family Housing Construction (236115)	\$33.5 million	43	43	100%
	New Multifamily Housing Construction (236116)		4	4	100%
	New Housing Operative Builders (236117)		1	1	100%
	Industrial Building Construction (236210)		0	0	n/a
	Commercial and Institutional Building (236220)		3	3	100%
	Land Subdivision (237210)	\$7.0 million	2	2	100%
<b>Development Total</b>			53	53	100%
<p><b>Source:</b> Dialog search of File 516, Dun and Bradstreet, "Duns Market Identifier," on January 18, 2013.</p> <p><b>Notes:</b></p> <p>1. The total number of entities in the study area was calculated by querying the Dun and Bradstreet database to identify the number of entities in the relevant NAICS codes for each industry across Perry County.</p> <p>2. The total number of small entities in the study area was calculated by querying the Dun and Bradstreet database to identify the number of entities falling under the small entity size standard for the relevant NAICS code as developed by the Small Business Administration.</p>					

## EXHIBIT A-2. RFA/SBREFA THRESHOLD ANALYSIS RESULTS SUMMARY

ACTIVITY	TYPE OF IMPACT	AFFECTED ENTITIES	SMALL ENTITIES AFFECTED IN A SINGLE YEAR <sup>1</sup>	% OF SMALL ENTITIES <sup>2</sup>	IMPACTS EXCLUDING FEDERAL COSTS <sup>3</sup>	IMPACTS PER ENTITY	ANNUAL REVENUES PER SMALL ENTITY <sup>4</sup>	IMPACTS AS % OF ANNUAL REVENUES
Development	Administrative costs only	New Single-Family Housing Construction (236115); New Multifamily Housing Construction (236116); New Housing Operative Builders (236117); Industrial Building Construction (236210); Commercial and Institutional Building (236220); Land Subdivision (237210)	2	3.8%	\$1,800	\$880 - \$1,800	\$6.2 million	0.01% - 0.03%
Transportation	Administrative costs only	City of Perryville	1	unknown	\$1,500	\$1,500	\$22 million	< 0.01%

**Notes:**

- Detailed analysis presented in this Appendix.
- Calculated as the number of small entities affected divided by the number of small entities in the study area from Exhibit A-1.
- This estimate excludes the additional incremental costs of consultation that would be borne by the Federal action agency and the Service. These costs are not relevant to this screening analysis as these entities (Federal agencies) are not small. Costs are estimated as described in Chapter 4.
- For development, weighted average annual revenues are estimated using Risk Management Association (RMA), *Annual Statement Studies: Financial Ratio Benchmarks 2012 to 2013*, 2012. Revenue levels are discussed in greater detail in the text of this Appendix.

**A. 2 UMRA ANALYSIS**

19. Title II of UMRA requires agencies to assess the effects of their regulatory actions on state, local, and Tribal governments and the private sector.<sup>127</sup> 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 adopted. The provisions of Section 205 do not apply when they are inconsistent with applicable law.
20. 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, may be 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.”<sup>128</sup> Therefore, this rule does not place an enforceable duty upon state, local, or Tribal governments, or the private sector.

**A. 3 FEDERALISM IMPLICATIONS**

21. Executive Order 13132, entitled “Federalism,” requires the Service to develop an accountable process to ensure “meaningful and timely input by state and local officials in the development of regulatory policies that have federalism implications.”<sup>129</sup> “Policies that have federalism implications” are defined in the Executive Order to include regulations that have “substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government.”<sup>130</sup> Under Executive Order 13132, the Service may not issue a regulation that has federalism implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by state and local governments, or the Service consults with state and local officials early in the process of developing the regulation.

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<sup>127</sup> 2 U.S.C. 1531 et seq.

<sup>128</sup> 2012 Proposed Rule. 77 FR 59510-59511.

<sup>129</sup> 64 FR 43255.

<sup>130</sup> *Ibid.*

22. This Proposed Rule does not have direct federalism implications. The designation of critical habitat directly affects only the responsibilities of Federal agencies. As a result, the Proposed Rule does not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government, as specified in the Order.
23. State or local governments may be indirectly affected by the proposed designation if they require Federal funds or formal approval or authorization from a Federal agency as a prerequisite to conducting an action. In these cases, the state or local government agency may participate in the section 7 consultation as a third party. As discussed in Chapter 4, one of the key conclusions of the incremental analysis is that we do not expect critical habitat designation to generate additional requests for project modification in any of the proposed critical habitat units. Direct incremental economic impacts of the designation will likely be limited to additional administrative costs to the Service, Federal agencies and third parties of considering critical habitat as part of the forecast section 7 consultations. Therefore, the proposed designation of critical habitat is also not expected to have substantial direct impacts on state or local governments.

#### **A.4 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY**

24. 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.”<sup>131</sup>
25. The Office of Management and Budget provides guidance for implementing this Executive Order, outlining nine outcomes that may constitute “a significant adverse effect” when compared with the regulatory action under consideration:
- Reductions in crude oil supply in excess of 10,000 barrels per day (bbls);
  - Reductions in fuel production in excess of 4,000 barrels per day;
  - Reductions in coal production in excess of 5 million tons per year;
  - Reductions in natural gas production in excess of 25 million Mcf per year;
  - Reductions in electricity production in excess of 1 billion kilowatt-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;

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<sup>131</sup> 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>.

- 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.<sup>132</sup>

26. As presented in Chapter 4, the designation of critical habitat for the sculpin is not anticipated to result in any impacts to the energy industry.

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<sup>132</sup> *Ibid.*

**APPENDIX B | SENSITIVITY OF RESULTS TO DISCOUNT RATE**

1. This appendix first summarizes the incremental impacts calculated assuming a three percent discount rate. We provide these exhibits to demonstrate the sensitivity of our results to the discount rate selected, and they can be compared with similar exhibits in the Executive Summary and Chapter 4 that present results assuming a seven percent discount rate. We also present the stream of undiscounted costs.

**EXHIBIT B-1. SUMMARY OF INCREMENTAL IMPACTS BY UNIT, 2013-2030 (2013\$, DISCOUNTED AT THREE PERCENT)**

UNIT		PRESENT VALUE IMPACT		ANNUALIZED IMPACT	
		LOW	HIGH	LOW	HIGH
1	Central Perryville Karst Area	\$170,000	\$1,900,000	\$12,000	\$140,000
2	Mystery-Rimstone Karst Area	\$4,500	\$1,800,000	\$320	\$120,000
3	Blue Spring Branch	\$4,500	\$190,000	\$320	\$14,000
4	Cinque Hommes Creek	\$4,500	\$190,000	\$320	\$14,000
<b>Total</b>		<b>\$180,000</b>	<b>\$4,100,000</b>	<b>\$13,000</b>	<b>\$290,000</b>

**Note:** Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.

**EXHIBIT B-2. FORECAST INCREMENTAL IMPACTS ASSOCIATED WITH DEVELOPMENT ACTIVITIES (2013\$, DISCOUNTED AT THREE PERCENT)**

UNIT		PRESENT VALUE IMPACT	ANNUALIZED IMPACT
1	Central Perryville Karst Area	\$140,000	\$10,000
2	Mystery-Rimstone Karst Area	\$0	\$0
3	Blue Spring Branch	\$0	\$0
4	Cinque Hommes Creek	\$0	\$0
<b>Total</b>		<b>\$140,000</b>	<b>\$10,000</b>

**Note:** Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.

**EXHIBIT B-3. FORECAST INCREMENTAL IMPACTS ASSOCIATED WITH AGRICULTURAL AND GRAZING ACTIVITIES (2013\$, DISCOUNTED AT THREE PERCENT)**

UNIT		PRESENT VALUE IMPACT	ANNUALIZED IMPACT
1	Central Perryville Karst Area	\$4,500	\$320
2	Mystery-Rimstone Karst Area	\$4,500	\$320
3	Blue Spring Branch	\$4,500	\$320
4	Cinque Hommes Creek	\$4,500	\$320
<b>Total</b>		<b>\$18,000</b>	<b>\$1,300</b>

**Note:** Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.

**EXHIBIT B-4. FORECAST INCREMENTAL IMPACTS ASSOCIATED WITH TRANSPORTATION ACTIVITIES (2013\$, DISCOUNTED AT THREE PERCENT)**

UNIT		PRESENT VALUE IMPACT	ANNUALIZED IMPACT
1	Central Perryville Karst Area	\$18,000	\$1,300
2	Mystery-Rimstone Karst Area	\$0	\$0
3	Blue Spring Branch	\$0	\$0
4	Cinque Hommes Creek	\$0	\$0
<b>Total</b>		<b>\$18,000</b>	<b>\$1,300</b>
<b>Note:</b> Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.			

**EXHIBIT B-5. FORECAST INCREMENTAL IMPACTS ASSOCIATED WITH HABITAT AND SPECIES MANAGEMENT (2013\$, DISCOUNTED AT THREE PERCENT)**

UNIT		PRESENT VALUE IMPACT		ANNUALIZED IMPACT	
		LOW	HIGH	LOW	HIGH
1	Central Perryville Karst Area	\$0	\$1,800,000	\$0	\$120,000
2	Mystery-Rimstone Karst Area	\$0	\$1,800,000	\$0	\$120,000
3	Blue Spring Branch	\$0	\$190,000	\$0	\$13,000
4	Cinque Hommes Creek	\$0	\$190,000	\$0	\$13,000
<b>Total</b>		<b>\$0</b>	<b>\$3,900,000</b>	<b>\$0</b>	<b>\$270,000</b>
<b>Note:</b> Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.					

**EXHIBIT B-6. UNDISCOUNTED INCREMENTAL IMPACTS ASSOCIATED WITH DEVELOPMENT ACTIVITIES (2013-2030, 2013\$)**

UNIT		EACH YEAR 2013-2030
1	Central Perryville Karst Area	\$10,207
2	Mystery-Rimstone Karst Area	\$0
3	Blue Spring Branch	\$0
4	Cinque Hommes Creek	\$0
<b>Total</b>		<b>\$10,207</b>

**EXHIBIT B-7. UNDISCOUNTED INCREMENTAL IMPACTS ASSOCIATED WITH AGRICULTURAL AND GRAZING ACTIVITIES (2013-2030, 2013\$)**

UNIT		2013	EACH YEAR 2014-2030
1	Central Perryville Karst Area	\$4,513	\$0
2	Mystery-Rimstone Karst Area	\$4,513	\$0
3	Blue Spring Branch	\$4,513	\$0
4	Cinque Hommes Creek	\$4,513	\$0
<b>Total</b>		<b>\$18,050</b>	<b>\$0</b>

**EXHIBIT B-8. UNDISCOUNTED INCREMENTAL IMPACTS ASSOCIATED WITH TRANSPORTATION ACTIVITIES (2013-2030, 2013\$)**

UNIT		2013	2014	2015	EACH YEAR 2016-2020	2021	EACH YEAR 2022-2030
1	Central Perryville Karst Area	\$0	\$5,000	\$10,000	\$0	\$5,000	\$0
2	Mystery-Rimstone Karst Area	\$0	\$0	\$0	\$0	\$0	\$0
3	Blue Spring Branch	\$0	\$0	\$0	\$0	\$0	\$0
4	Cinque Hommes Creek	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total</b>		<b>\$0</b>	<b>\$5,000</b>	<b>\$10,000</b>	<b>\$0</b>	<b>\$5,000</b>	<b>\$0</b>

**EXHIBIT B-9. UNDISCOUNTED INCREMENTAL IMPACTS ASSOCIATED WITH HABITAT AND SPECIES MANAGEMENT (2013-2030, 2013\$)**

UNIT		LOW SCENARIO	HIGH SCENARIO	
		EACH YEAR 2013-2030	2013	EACH YEAR 2014-2030
1	Central Perryville Karst Area	\$0	\$1,750,000	\$0
2	Mystery-Rimstone Karst Area	\$0	\$1,750,000	\$0
3	Blue Spring Branch	\$0	\$187,500	\$0
4	Cinque Hommes Creek	\$0	\$187,500	\$0
<b>Total</b>		<b>\$0</b>	<b>\$3,875,000</b>	<b>\$0</b>

**APPENDIX C**

**INCREMENTAL EFFECTS MEMORANDUM**

# United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Columbia Ecological Services Field Office  
101 Park DeVille Drive, Suite A  
Columbia, Missouri 65203-0057  
Phone: (573) 234-2132 Fax: (573) 234-2181



October 25, 2012

## Memorandum

TO: Industrial Economics, Incorporated; Cambridge, Massachusetts (Attention: Claire Santoro)

FROM: Amy Salveter, Field Supervisor *AS*

SUBJECT: Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Grotto Sculpin (*Cottus* sp. nov.)

### Introduction

The purpose of this document is to identify the incremental economic impacts associated with the proposed designation of critical habitat for grotto sculpin (*Cottus* sp. nov.). These incremental economic impacts may occur in situations where it is our biological opinion that actions under Section 7 consultation would result in an adverse modification to proposed critical habitat. There would be incremental administrative costs for the Service and Federal action agencies associated with additional analyses. In addition, we recognize that this critical habitat designation may trigger the section 7 consultation process where entities previously would have been otherwise unaware that consultation was necessary. We do not consider this lack of awareness here.

For actions subject to consultation through a Federal nexus or action (e.g., Federal funds), a jeopardy analysis for the species would look at the magnitude of a project's impacts relevant to the population(s) across the entire range. Furthermore, the jeopardy analysis would focus on effects to the species' reproduction, numbers, or distribution. In contrast, an adverse modification analysis would focus on a project's impacts to the physical features (primary constituent elements), or other habitat characteristics in areas determined by the Secretary to be essential for the conservation of the species, and analyze impacts to the capability of the critical habitat unit to maintain its conservation role and function for the species. Determining the economic impacts of critical habitat designation involves evaluating the "without critical habitat"

baseline versus the “with critical habitat” scenario. 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.

The long-term probability of the survival and recovery of the grotto sculpin is dependent on the protection of existing population sites; the maintenance of ecological functions within these sites, including connectivity within and between sites in close geographic proximity to one another; and keeping these areas free of major habitat disturbance or degradation. We have assumed that all proposed critical habitat is occupied and that connectivity is necessary for seasonal movements and recolonization should a fish kill occur.

## The Species

### GROTTO SCULPIN (*Cottus* sp. nov.)

The four proposed critical habitat units, encompassing the underground aquatic habitat underlying approximately 23,219 acres (16,819 hectares) and 19.2 miles (30.8 kilometers) of surface streams, for the grotto sculpin are considered essential to the conservation of this species and are currently occupied by the grotto sculpin. We have identified areas that contain the habitat features essential to the long-term conservation of the species. Units 1 and 2 are non-Federal lands under predominately private ownership, with only small portions of the land area owned by municipalities. Units 3 and 4 are stream channels in non-Federal lands.

Units currently occupied by the grotto sculpin were determined using location information from the Missouri Department of Conservation and University of Central Arkansas. Critical habitat boundaries were identified based on recharge area delineations of cave systems, extent of bedrock layers that support karst topography, survey information on species locations, and personal communications with species experts. The grotto sculpin occupies cave streams, springs, resurgences, and surface streams and is known from only five cave systems and two surface streams in the sinkhole plain of Perry County, Missouri. Based on the specific physical and biological features identified (appropriate substrate; prey availability; interconnected aquatic habitats; adequate water flow, temperature, and quality), we developed the following primary constituent elements (PCEs).

- (i) *Channel stability.* Geomorphically stable stream bottoms and banks (stable horizontal dimension and vertical profile) with riffles, runs, pools, and transition zones between these stream features.
- (ii) *Consistent water flow.* In-stream flow regime with an average daily discharge between 0.07 and 150 cubic feet per second (cfs), inclusive of surface runoff, cave streams, resurgences, springs, and occupied surface streams and all interconnected karst areas with flowing water.
- (iii) *Water quality.*
  - a) Water temperature between 12.8–16.7 °C (55–62 °F), dissolved oxygen 4.5 milligrams or greater per liter, and turbidity of an average monthly reading of no more than 200 Nephelometric Turbidity Units for a duration not to exceed 4 hours

- b) Water quality standards for contaminants should follow guidelines established by the Missouri Department of Natural Resources (Missouri Department of Natural Resources 2009, Tables 19-26), except for ammonia and copper that should be below levels established by Wang et al. (2007, pp. 2048, 2055) for juvenile freshwater mussels. Contaminants identified by Fox et al. (2010, pp. 8835-8840) should be at or below levels established by Missouri Department of Natural Resources (2009, Tables 19-26).
- (iv) *Appropriate substrate.* Bottom substrates consisting of a mixture of sand, gravel, pebble, cobble, solid bedrock, larger cobble and rocks for cover, with low amounts of sediments.
- (v) *Energy input.* Energy input from naturally occurring organic sources that provide habitat for the prey base that is needed by different life stages of the grotto sculpin.
- (vi) *Connectivity.* Connected underground and surface aquatic habitats that provide for all life stages of the grotto sculpin, with sufficient water levels to facilitate movement of individuals among habitats.

### Consultation History

To date, no section 7 consultations have occurred for the grotto sculpin because this species is not yet listed under the Endangered Species Act (Act). Six conferences have occurred since the species was a candidate for listing. Species lists that included the grotto sculpin were generated for two communication tower projects. Technical assistance was provided on draft state water quality policy and the expansion of an existing chrome-plating plant. Informal conferences were completed for the development of an apartment complex and a biomass plant. Projects addressed through technical assistance and informal conference were of medium complexity and involved staff time necessary to determine site-specific information on species status and potential project impacts, develop recommendations to avoid or minimize potential impacts, and draft written responses to the appropriate lead agency.

### Incremental Economic Costs

Project descriptions that are modified to minimize impacts to critical habitat will also minimize impacts to individuals, and therefore it is unlikely that we will be able to differentiate measures implemented solely to minimize impacts to the critical habitat from those implemented to minimize impacts to individuals. A jeopardy analysis would focus on effects to the species' reproduction, numbers, or distribution. An adverse modification analysis would focus on a project's impacts to the physical and biological features (PCEs), or other habitat characteristics in areas determined by the Secretary to be essential for the conservation of the species, and analyze impacts to the capability of the critical habitat unit to maintain its conservation role and function for the species.

When consulting under section 7 of the Act in designated critical habitat, independent analyses are made for jeopardy and adverse modification. In consultations involving projects that might impact populations of the grotto sculpin, any adverse modification decision would likely be coincident to a jeopardy determination for the same action. Therefore, the incremental costs in these consultations will likely be limited to administrative costs. However, due to the difference in the scope of the critical habitat units and the entire range of this species, in rare instances, even

after measures to minimize and compensate for impacts of a project are pursued, we might determine that a project would not jeopardize the species but would result in adverse modification of critical habitat. Any costs of implementing reasonable and prudent alternatives associated with such a consultation would be incremental costs beyond those attributable to this species being listed.

Other than potential impact to surface streams that would require a Federal permit under the Army Corps of Engineers' jurisdiction, we expect few activities on non-Federal lands to have a Federal nexus (*e.g.*, Federal funding or permits) that allow for U.S. Fish and Wildlife Service (Service) involvement through the section 7 process and require conservation measures. Exceptions might include highway maintenance and construction activities involving the Federal Highway Administration, commercial or industrial development associated with municipalities involving the Department of Housing and Urban Development, and agricultural assistance programs under the Farm Services Administration or the National Resources Conservation Service).

Whereas no Best Management Practices (BMPs) have been defined specifically for the grotto sculpin, the Service recommends to project proponents measures similar to those developed by the Missouri Department of Conservation for the Ozark cavefish, karst habitats, and streams and rivers. These measures include avoidance of land disturbance in or near sinkholes, minimization of run-off and sedimentation from construction activities, establishment of at least a 100-foot vegetated buffer around sinkholes, erosion and sediment control, and proper disposal of chemicals and garbage. Best Management Practices for the Ozark cavefish ([http://mdc.mo.gov/sites/default/files/resources/2010/08/9563\\_6503.pdf](http://mdc.mo.gov/sites/default/files/resources/2010/08/9563_6503.pdf)), karst (<http://mdc4.mdc.mo.gov/Documents/111.pdf>), and streams and rivers (<http://mdc4.mdc.mo.gov/Documents/79.pdf>) are available online.

Of particular concern when analyzing impacts to the PCEs is the extent and location of a project within a critical habitat unit. Projects that 1) significantly impact the features essential for the survival of the species (see the PCEs above) or 2) isolate habitat segments within a critical habitat unit might result in adverse modification if the impacts affect the ability of that unit to continue to function and support occupancy.

If we determine that an adverse modification finding might be likely, we would outline reasonable and prudent conservation measures that would minimize potential impacts to sensitive karst habitats, mainly through the implementation of established BMPs for karst habitats.

In summary, although the outcomes of individual consultations under section 7 of the Act will vary, we believe a reasonable method to determine the potential incremental impacts of this proposed critical habitat designation is to address the likelihood of the following:

- In areas where uncertainty exists over whether the grotto sculpin is currently present at a specific site and there is resultant uncertainty as to whether a proposed project is likely to adversely affect the species, the existence of critical habitat may make this point moot and result in section 7 consultation and associated costs where it could potentially

otherwise be avoided. This is especially true because some individuals, especially juveniles, migrate seasonally between underground and surface habitats; it might be difficult to determine the level of occupancy at the specific time a project is proposed to occur.

- In rare instances, a project would not jeopardize the species but would result in adverse modification of critical habitat. The costs of implementing reasonable and prudent alternatives would be attributable to critical habitat.

