



ECONOMIC ANALYSIS OF CRITICAL
HABITAT DESIGNATION FOR THE
TUMBLING CREEK CAVESNAIL

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prepared for:

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LIST OF ACRONYMS AND ABBREVIATIONS

Act	Endangered Species Act
CSP	Conservation Stewardship Program
Corps	U.S. Army Corps of Engineers
DOI	U.S. Department of the Interior
Foundation	Tumbling Creek Cave Foundation
HCP	Habitat Conservation Plan
Iec	Industrial Economics, Incorporated
LRMP	Land Resource Management Plan
MODOT	Missouri Department of Transportation
OMB	U.S. Office of Management and Budget
RFA	Regulatory Flexibility Act
SBREFA	Small Business Regulatory Enforcement Fairness Act
Service	U.S. Fish and Wildlife Service
USFS	U.S. Forest Service

EXECUTIVE SUMMARY

1. The purpose of this report is to evaluate the potential economic impacts associated with the designation of critical habitat for the Tumbling Creek cavesnail (*Antrobia culveri*). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service (Service).
2. This final economic analysis analyzes the proposed designation as described in the Proposed Rule. This analysis does not reflect changes to the proposed critical habitat designation made in the Final Rule. Consequently, description of the habitat designation in the final rule may differ from maps and figures presented in this analysis.¹
3. The Service emergency listed the Tumbling Creek cavesnail (hereafter “cavesnail”) on December 27, 2001 because of water degradation in Tumbling Creek and a precipitous decline in cavesnail populations. The species was subsequently listed as endangered on August 14, 2002, and a Recovery Plan was published on September 22, 2003. At the time, critical habitat was not designated in order to allow the Service to concentrate its resources on immediate protections needed for the conservation of the species.
4. On August 11, 2008, the Institute for Wildlife Protection and Crystal Grace Rutherford filed a lawsuit against the Service for the failure to designate critical habitat for the cavesnail. In a court-approved settlement agreement, the Service agreed to submit a new prudency determination, as well as a proposed designation if critical habitat was found to be prudent. The Proposed Rule was published on June 23, 2010, identifying 25 acres in a single unit as proposed critical habitat for the cavesnail.²
5. This analysis first describes existing plans, regulations, and ongoing conservation efforts that provide protection to the cavesnail and its habitat. For example, the voluntary conservation efforts being undertaken by landowners and the Tumbling Creek Cave Foundation. These are “baseline” protections accorded the cavesnail even absent the designation of critical habitat.
6. The discussion of the regulatory baseline provides context for the evaluation of economic impacts expected to result from critical habitat designation, which are the focus of this analysis. These “incremental” economic impacts are those not expected to occur absent the designation of critical habitat for the cavesnail. This information is intended to assist the Secretary of the U.S. Department of the Interior (DOI) in determining whether the

¹ For a detailed discussion of public comments on the draft economic analysis and associated responses, refer to the responses to public comment section of the final rule.

² Proposed Rule, 75 FR 35751, June 23, 2010.

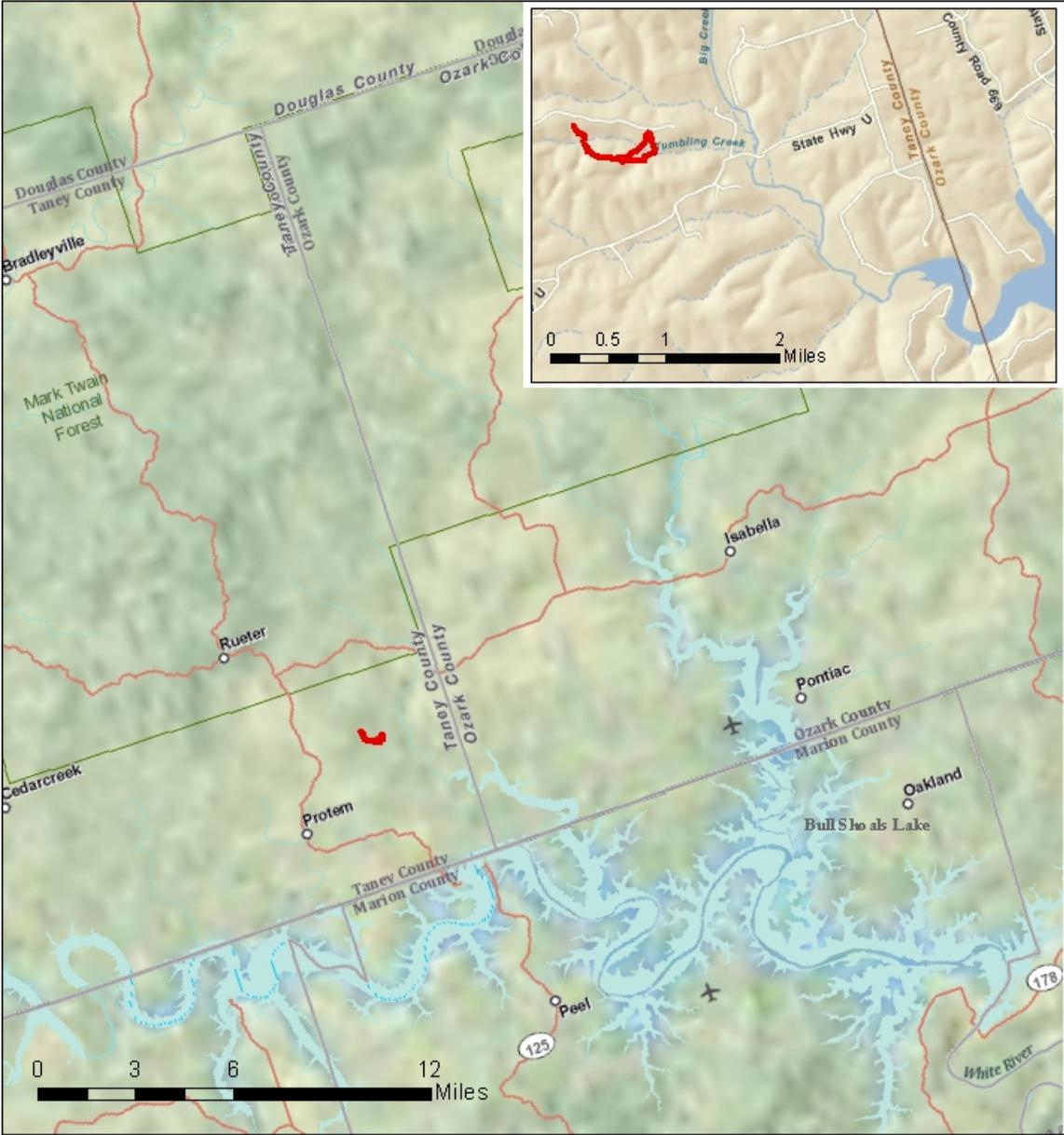
benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.³

OVERVIEW OF THE PROPOSED CRITICAL HABITAT

7. The cavesnail is an aquatic snail endemic to a single cave stream and associated springs in southwestern Missouri. The species has been identified only in Tumbling Creek, a few of its small tributaries, associated underground springs within the Tumbling Creek Cave, and areas immediately downstream of the cave. Tumbling Creek Cave itself has been designated as a National Landmark because of its diverse cave fauna, which include the cavesnail and the gray bat.
8. The proposed unit, located in Taney County, consists of the stream channel of Tumbling Creek to its confluence with Bear Cave Hollow and Owens Spring upstream of Big Creek, as well as the underground portions of Owens Spring. The unit is comprised entirely of private lands owned by Tom and Cathy Aley of the Ozark Underground Laboratory. Exhibit ES-1 provides an overview map of the proposed unit.
9. Review of the proposed rule, consultation history, and recovery plan identified the following economic activities as potential threats to the cavesnail and its habitat.
 - (1) **Water Management.** Significant changes in existing flow regimes, water level management of Bull Shoals Reservoir, or the quantity of groundwater and spring discharge sites all may require special management.
 - (2) **Other Activities that May Affect Water Quality.** The Proposed Rule identifies a number of activities that may degrade water quality, and thereby affect the cavesnail. These activities include road construction and maintenance; oil, gas, and utility easements; forest and pasture management; alteration of septic systems; and effluent discharges. Increased sedimentation and bank erosion caused by these activities also may threaten the cavesnail.

³ 16 U.S.C. §1533(b)(2).

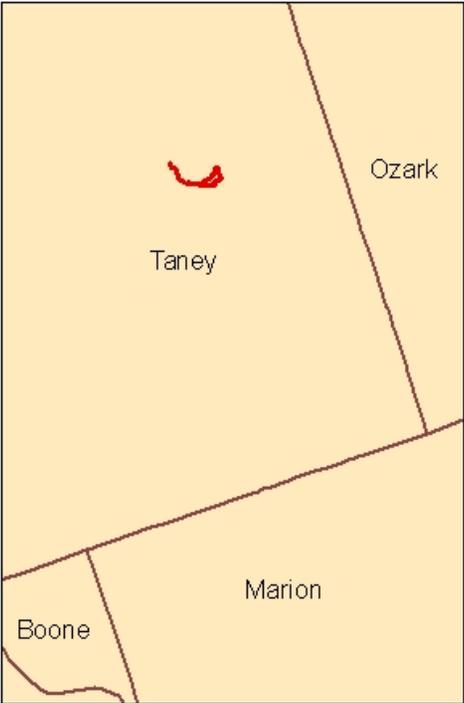
EXHIBIT ES-1. OVERVIEW OF TUMBLING CREEK CAVESNAIL PROPOSED CRITICAL HABITAT



Legend

— Cavesnail Critical Habitat

Overview of Proposed Critical Habitat Areas



Sources:
1. ESRI, Inc.
2. US Fish and Wildlife Service



KEY FINDINGS

10. Incremental impacts expected to result from the designation of critical habitat are limited to additional administrative effort to consider adverse modification in section 7 consultation. In total, these impacts are estimated at \$50,100 in present value terms over the next twenty years, or \$4,420 on an annualized basis (discounted at seven percent). These impacts are summarized by action agency in Exhibit ES-2.

EXHIBIT ES-2. INCREMENTAL IMPACTS BY ACTION AGENCY (2010 DOLLARS, 2011-2030)

ACTION AGENCY	DISCOUNTED AT THREE PERCENT		DISCOUNTED AT SEVEN PERCENT	
	PRESENT VALUE	ANNUALIZED	PRESENT VALUE	ANNUALIZED
Natural Resource Conservation Service	\$13,600	\$889	\$13,100	\$1,160
US Army Corps of Engineers	\$14,600	\$950	\$14,000	\$1,240
Missouri Department of Transportation and the Federal Highway Administration	\$14,200	\$923	\$13,200	\$1,160
US Forest Service	\$14,800	\$967	\$9,810	\$865
Total	\$57,200	\$3,730	\$50,100	\$4,420
Note: Totals may not sum due to rounding.				

11. These results are attributed to the following key findings.
- **All proposed areas are considered occupied.** While cavesnails may not always be present or detected through surveys within critical habitat every year, the Service assumes the species is present within the proposed designation. Thus, Action agencies are already anticipated to initiate consultation regarding the cavesnail regardless of whether critical habitat is designated. Activities taking place outside of the proposed designation but within the recharge area for the cave may affect the cavesnail. These types of road construction projects or US Forest Service activities are already subject to section 7 consultation.
 - **The owners of surface lands within proposed critical habitat are already undertaking voluntary conservation efforts.** The owners of surface critical habitat areas and the Tumbling Creek Cave Foundation, which owns lands within the cave's recharge area, have been undertaking extensive restoration and conservation efforts for the benefit of cavesnail throughout the recharge area for the cave. The lands owned by the Foundation and the Aleys have recently been enrolled in a voluntary conservation program that encourages landowners to undertake and continue additional conservation activities. These efforts are expected to continue after critical habitat designation.
 - **No economic benefits of critical habitat designation for the cavesnail.** This analysis does not anticipate that the designation of critical habitat will result in

additional conservation efforts for the cavesnail. As a result, no changes in economic activity or land management are expected to result from critical habitat designation. Absent any changes in land management or cavesnail conservation efforts, no incremental economic benefits are forecast to result from designation of critical habitat.

DISTRIBUTIONAL IMPACTS

12. While the analysis forecasts approximately \$50,100 in incremental impacts over the next twenty years, these impacts are expected to be borne by Federal and state agencies, including the US Forest Service, US Army Corps of Engineers, the Natural Resource Conservation Service, and the Missouri Department of Transportation. Such agencies are not considered small entities. Energy-related impacts associated with conservation efforts within the potential critical habitat are not expected.

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CHAPTER 1 | INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

13. This chapter provides an overview of the proposed critical habitat for the Tumbling Creek cavesnail (*Antrobia culveri*). It includes a summary of past legal actions that relate to the current proposal, the area proposed for designation, and threats to the proposed critical habitat.

1.1.1 PREVIOUS FEDERAL ACTIONS

14. The Service emergency listed the cavesnail on December 27, 2001 because of water degradation in Tumbling Creek and a precipitous decline in cavesnail populations.⁴ The species was subsequently listed as endangered on August 14, 2002, and a Recovery Plan was published on September 22, 2003.⁵ At the time, critical habitat was not designated in order to allow the Service to concentrate its resources on immediate protections needed for the conservation of the species.⁶
15. On August 11, 2008, the Institute for Wildlife Protection and Crystal Grace Rutherford filed a lawsuit against the Service for the failure to designate critical habitat for the cavesnail. In a court-approved settlement agreement, the Service agreed to submit a new prudency determination, as well as a proposed designation if critical habitat was found to be prudent. The Proposed Rule was published on June 23, 2010, identifying 25 acres in a single unit as proposed critical habitat for the cavesnail.⁷ This Proposed Rule is the subject of this report.

1.1.2 PROPOSED CRITICAL HABITAT DESIGNATION

16. The cavesnail is an aquatic snail endemic to a single cave stream and associated springs in southwestern Missouri. The species has been identified only in Tumbling Creek, a few of its small tributaries, associated underground springs within the Tumbling Creek Cave, and areas immediately downstream of the cave. Tumbling Creek Cave itself has been designated as a National Landmark.
17. The proposed unit, located in Taney County, consists of the stream channel of Tumbling Creek to its confluence with Bear Cave Hollow and Owens Spring upstream of Big Creek, as well as the underground portions of Owens Spring. The unit is comprised entirely of private lands owned by Tom and Cathy Aley of the Ozark Underground

⁴ Emergency Listing Rule, 66 FR 66803, December 27, 2001.

⁵ Final Listing Rule, 67 FR 52879, August 14, 2002. Recovery Plan, 68 FR 55060, September 22, 2003.

⁶ Proposed Rule, 75 FR 35752, June 23, 2010.

⁷ Ibid.

Laboratory.⁸ Exhibit 1-1 provides an overview map of the proposed unit. We define the “study area” for this analysis as the 25 acres proposed for critical habitat designation, as well as surrounding areas that may affect the cavesnail and its habitat. Official definitions and boundaries for the proposed unit are provided in the Proposed Rule.⁹

1.2 ECONOMIC ACTIVITIES CONSIDERED IN THIS ANALYSIS

18. The area proposed for designation comprises private lands that are already managed for the protection of the cave and its species, including the cavesnail. Land use activities on these lands are limited. More economic activity that may affect the cavesnail takes place in areas surrounding the cave, including the Mark Twain National Forest and Bull Shoals Lake.
19. Review of the proposed rule, consultation history, and recovery plan identified the following economic activities as potential threats to the cavesnail and its habitat.
 - (1) **Water Management.** Significant changes in existing flow regimes, water level management of Bull Shoals Reservoir, or the quantity of groundwater and spring discharge sites all may require special management.¹⁰
 - (2) **Other Activities that May Affect Water Quality.** The Proposed Rule identifies a number of activities that may degrade water quality, and thereby affect the cavesnail. These activities include road construction and maintenance; oil, gas, and utility easements; forest and pasture management; alteration of septic systems; and effluent discharges. Increased sedimentation and bank erosion caused by these activities also may threaten the cavesnail.¹¹
20. We discuss the management of these threats within the study area absent critical habitat (baseline) and following critical habitat designation (incremental) in Chapter 3 of this report. The Proposed Rule also identifies the introduction of non-native species as a potential threat to the cavesnail and its habitat.¹² Due to the unpredictable nature of these introductions and because non-native species introductions are not tied to a specific economic activity, we do not assess impacts related to non-native species events.

⁸ Ibid.

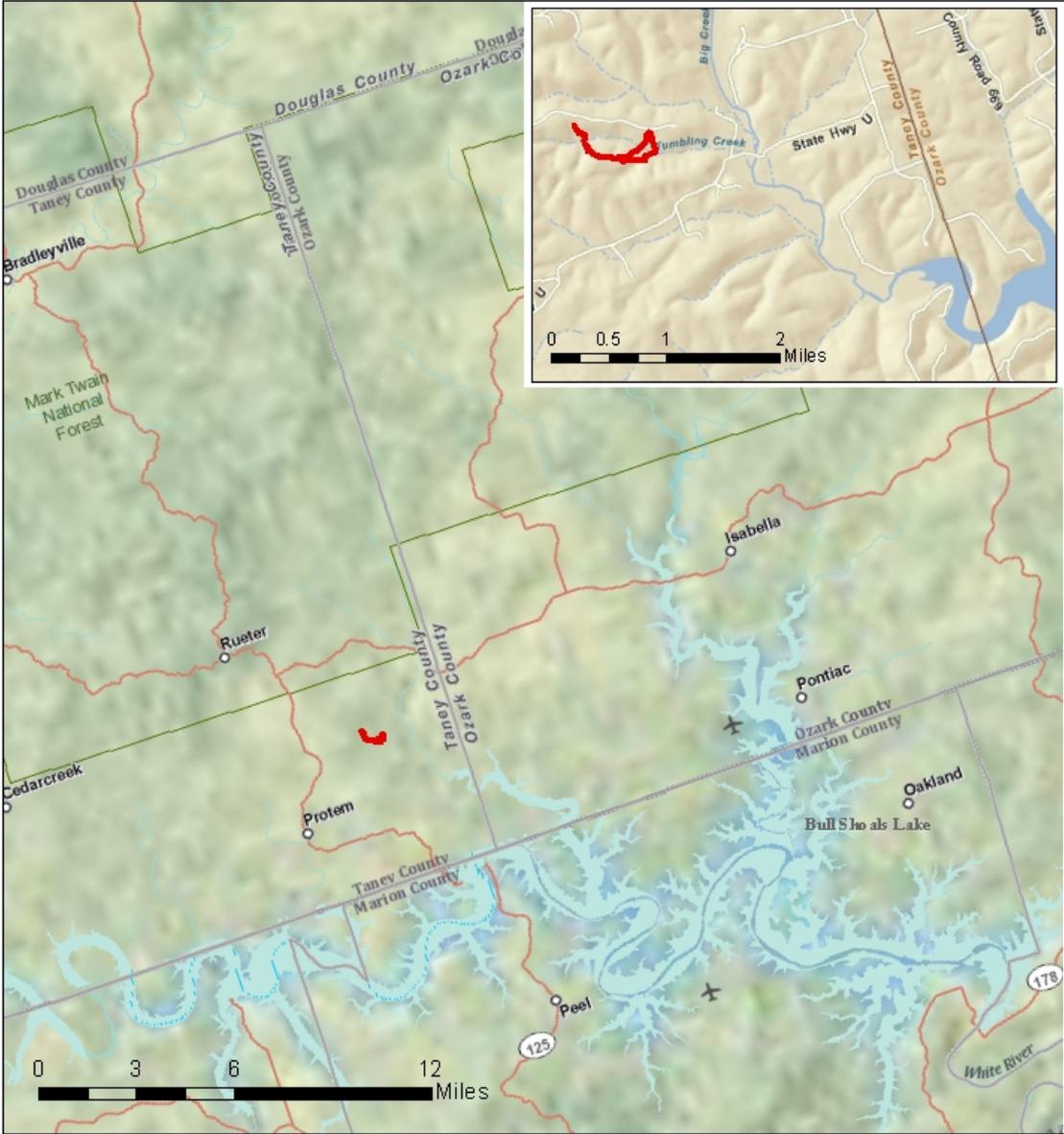
⁹ Ibid.

¹⁰ Ibid.

¹¹ Ibid.

¹² Ibid.

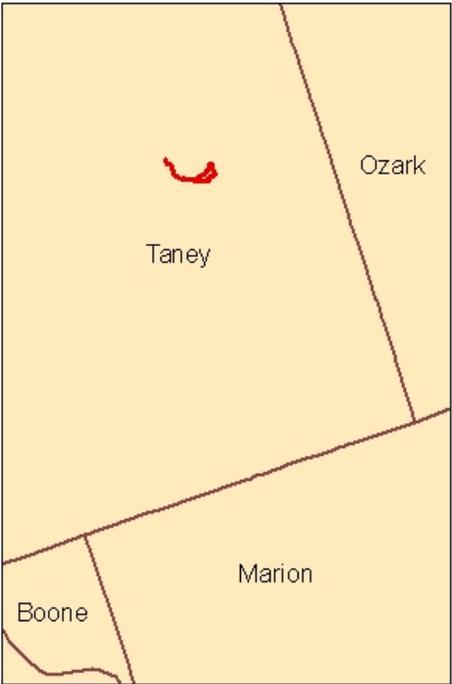
EXHIBIT 1-1. OVERVIEW OF TUMBLING CREEK CAVESNAIL PROPOSED CRITICAL HABITAT



Legend

— Cavesnail Critical Habitat

Overview of Proposed Critical Habitat Areas



Sources:
1. ESRI, Inc.
2. US Fish and Wildlife Service



1.3 ORGANIZATION OF THE REPORT

21. The remainder of this report is organized into two chapters. Chapter 2 discusses the framework employed in the analysis and Chapter 3 describes the baseline protections currently afforded the cavesnail and its habitat, and the incremental impacts of critical habitat designation for the cavesnail.

- Chapter 2 – Framework for the Analysis
- Chapter 3 – Economic Impacts of Critical Habitat Designation for the Tumbling Creek Cavesnail
- Appendix – Information from the U.S. Fish and Wildlife Service Regarding Potential Changes in Conservation for the Tumbling Creek Cavesnail Following Designation of Critical Habitat

CHAPTER 2 | FRAMEWORK FOR THE ANALYSIS

22. The purpose of this report is to estimate the economic impacts of critical habitat designation for the cavesnail. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the species and its habitat within the proposed critical habitat area. To accomplish this, we employ "without critical habitat" and "with critical habitat" scenarios. The "without critical habitat" scenario represents the baseline for the analysis, considering protections already accorded the cavesnail; for example, under the Federal listing and other Federal, State, and local regulations. The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat for the cavesnail.
23. 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.¹³ In addition, this information allows the Service to address the requirements of Executive Orders 12866 and 13211, and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).¹⁴
24. This chapter describes the framework for this analysis. First, it describes the case law that led to the selection of the framework applied in this report. It then describes in economic terms the general categories of economic effects that are the focus of the impact analysis, including a discussion of both efficiency and distributional effects. Next, this chapter defines the analytic framework used to measure these impacts in the context of critical habitat regulation and the consideration of benefits. It concludes with a presentation of the information sources relied upon in the analysis.

2.1 BACKGROUND

25. The U.S. Office of Management and Budget's (OMB) guidelines for conducting economic analysis of regulations direct Federal agencies to measure the costs of a regulatory action against a baseline, which it defines as the "best assessment of the way the world would look absent the proposed action."¹⁵ In other words, the baseline includes

¹³ 16 U.S.C. §1533(b)(2).

¹⁴ Executive Order 12866, Regulatory Planning and Review, September 30, 1993 (as amended by Executive Order 13258 (2002) and Executive Order 13422 (2007)); Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001; 5. U.S.C. §§601 *et seq.* and Pub Law No. 104-121.

¹⁵ OMB, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf>.

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

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

27. 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.¹⁸ 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,

“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

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

¹⁷ *Ibid.*

¹⁸ *Cape Hatteras Access Preservation Alliance v. Department of Interior*, 344 F. Supp. 2d 108 (D.D.C.); *Center for Biological Diversity v. United States Bureau of Land Management*, 422 F. Supp. 2d 1115 (N.D. Cal. 2006).

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.’¹⁹

28. In order to address the divergent opinions of the courts and provide the most complete information to decision-makers, Chapter 3 of this economic analysis:
- a. Describes the baseline protections afforded the cavesnail absent critical habitat designation; and
 - b. Monetizes the potential incremental impacts precipitated specifically by the designation of critical habitat for the species.
29. Incremental effects of critical habitat designation are determined using the Service's December 9, 2004 interim guidance on “Application of the ‘Destruction or Adverse Modification’ Standard Under Section 7(a)(2) of the Endangered Species Act” and information from the Service regarding what potential consultations and consultation efforts may be requested as a result of critical habitat designation over and above those associated with the listing.^{20,21} Specifically, in *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, the Ninth Circuit invalidated the Service’s regulation defining destruction or adverse modification of critical habitat, and the Service no longer relies on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat.²² Under the statutory provisions of the Endangered Species Act (Act), the Service determines destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the affected critical habitat would remain functional to serve its intended conservation role for the species. A detailed description of the methodology used to define baseline and incremental impacts is provided later in this Chapter.

2.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

30. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the cavesnail and its habitat (hereinafter referred to collectively as “cavesnail 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

¹⁹ *Center for Biological Diversity et al, Plaintiffs, v. United States Bureau of Land Management et al., Defendants and American Sand Association, et al, Defendant Intervenors*. Order re: Cross Motions for Summary Judgment, Case 3:03-cv-02509 Document 174 Filed 03/14/2006, pages 44-45.

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

²¹ U.S. Fish and Wildlife Service, Columbia Field Office, “Comments on how DEA Should Estimate incremental Costs for the Tumbling Creek Cavesnail Critical Habitat Designation,” July 6, 2010.

²² *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, No. 03-35279 (9th Circuit 2004).

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 cavesnail conservation efforts.

31. This analysis also addresses the distribution of impacts associated with the designation, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation efforts on small entities and the energy industry. This information may be used by decision-makers to assess whether the effects of species conservation efforts unduly burden a particular group or economic sector. For example, while conservation efforts may have a small impact relative to the national economy, individuals employed in a particular sector of the regional economy may experience relatively greater impacts.

2.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

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

2.3.1 IDENTIFYING BASELINE IMPACTS

33. The baseline for this analysis is the existing state of regulation, prior to the designation of critical habitat, which provides protection to the species under Act, as well as under other Federal, State and local laws and guidelines. This "without critical habitat designation" scenario also considers a wide range of additional factors beyond the compliance costs of regulations that provide protection to the listed species. As recommended by OMB, the baseline incorporates, as appropriate, trends in market conditions, implementation of other regulations and policies by the Service and other government entities, and trends in other factors that have the potential to affect economic costs and benefits, such as the rate of regional economic growth in potentially affected industries.
34. Baseline protections include sections 7, 9, and 10 of the Act, and economic impacts resulting from these protections to the extent that they are expected to occur absent the designation of critical habitat for the species. This analysis describes these baseline regulations, and where possible, provides examples of the potential magnitude of the costs of these baseline protections. The primary focus, however, is not on baseline costs, since these will not be affected by the proposed regulation. Instead, the focus of this analysis is on monetizing the incremental impacts forecast to result from the proposed critical habitat designation.

- Section 7 of Act, absent critical habitat designation, requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species. Consultations under the jeopardy standard result in administrative costs, as well as impacts of conservation efforts resulting from consideration of this standard.
- Section 9 defines the actions that are prohibited by the Act. In particular, it prohibits the "take" of endangered wildlife, where "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."²³ 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.²⁴ The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately avoided or minimized. While HCPs are not developed solely for plant species, the Service must consider whether the proposed activities may adversely affect or jeopardize the continued existence of plant species. 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.

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

2.3.2 IDENTIFYING INCREMENTAL IMPACTS

36. 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 due to existing

²³ 16 U.S.C. 1532.

²⁴ U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at <http://endangered.fws.gov/hcp/>.

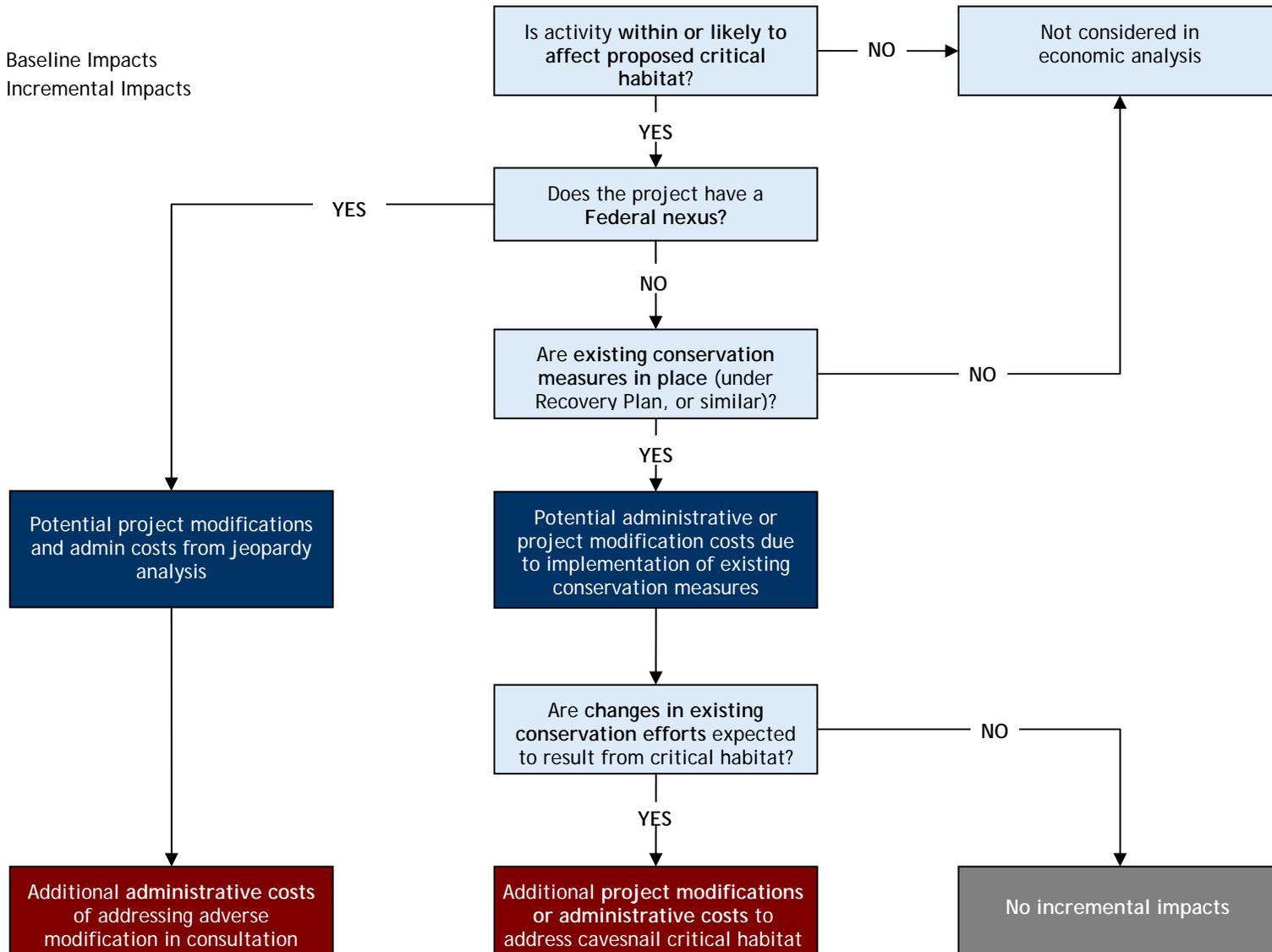
required or voluntary conservation efforts being undertaken due to other Federal, State, and local regulations or guidelines.

37. When critical habitat is designated, section 7 requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat (in addition to considering whether the actions are likely to jeopardize the continued existence of the species). The added administrative costs of including consideration of critical habitat in section 7 consultations, and the additional impacts of implementing conservation efforts (i.e., reasonable and prudent alternatives) resulting from the protection of critical habitat are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental impacts of the rulemaking. Exhibit 2-1 depicts the decision analysis regarding whether an impact should be considered incremental.
38. Incremental impacts may be the direct compliance costs associated with additional effort for consultations, reinitiated consultations, new consultations occurring specifically because of the designation, and additional conservation efforts that would not have been requested under the jeopardy standard. Additionally, incremental impacts may include indirect impacts resulting from reaction to the potential designation of critical habitat (e.g., implementing covesnail 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.

EXHIBIT 2. FRAMEWORK FOR DETERMINING BASELINE AND INCREMENTAL IMPACTS

Key:

- Baseline Impacts
- Incremental Impacts



Direct Impacts

39. 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.
40. Section 7(a)(2) of the Act requires Federal agencies to consult with the Service whenever activities that they undertake, authorize, permit, or fund may affect a listed species or designated critical habitat. In some cases, consultations will involve the Service and another Federal agency only, such as the U.S. Army Corps of Engineers (Corps). Often, they will also include a third party involved in projects that involve a permitted entity, such as the recipient of a Clean Water Act section 404 permit.
41. During a consultation, the Service, the Action agency, and the entity applying for Federal funding or permitting (if applicable) communicate in an effort to minimize potential adverse effects to the species and/or to the proposed critical habitat. Communication between these parties may occur via written letters, phone calls, in-person meetings, or any combination of these. The duration and complexity of these interactions depends on a number of variables, including the type of consultation, the species, the activity of concern, and the potential effects to the species and designated critical habitat associated with the proposed activity, the Federal agency, and whether there is a private applicant involved.
42. Section 7 consultations with the Service may be either informal or formal. *Informal consultations* consist of discussions between the Service, the Action agency, and the applicant concerning an action that may affect a listed species or its designated critical habitat, and are designed to identify and resolve potential concerns at an early stage in the planning process. By contrast, a *formal consultation* is required if the Action agency determines that its proposed action may or will adversely affect the listed species or designated critical habitat in ways that cannot be resolved through informal consultation. The formal consultation process results in the Service's determination in its Biological Opinion of whether the action is likely to jeopardize a species or adversely modify critical habitat, and recommendations to minimize those impacts. Regardless of the type of consultation or proposed project, section 7 consultations can require substantial administrative effort on the part of all participants.

Administrative Section 7 Consultation Costs

43. Parties involved in section 7 consultations include the Service, a Federal "action agency," and in some cases, a private entity involved in the project or land use activity. The action agency (i.e., the Federal nexus necessitating the consultation) serves as the liaison with the Service. While consultations are required for activities that involve a Federal nexus and may affect a species regardless of whether critical habitat is designated, the designation may increase the effort for consultations in the case that the project or activity

in question may adversely modify critical habitat. Administrative efforts for consultation may therefore result in both baseline and incremental impacts.

44. 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, 2) re-initiation of a past consultation to address adverse modification, and 3) incremental consultation resulting entirely from critical habitat designation.

Section 7 Conservation Effort Impacts

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

Indirect Impacts

46. 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. For example:

- **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, such as the California Environmental Quality Act. In cases where these impacts would not have been triggered absent critical habitat designation, they are considered indirect, incremental impacts of the designation.
- **Time Delays.** Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the need to reinitiate the section 7 consultation process and/or compliance with other laws triggered by the designation. To the extent that delays result from the designation, they are considered indirect, incremental impacts of the designation.
- **Regulatory Uncertainty or Stigma -** Government agencies and affiliated private parties who consult with the Service under section 7 may face uncertainty concerning whether reasonable and prudent alternatives 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. Such impacts to property markets are not anticipated in this case.

2.3.3 BENEFITS

47. Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.²⁵ 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.²⁶
48. 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.²⁷ *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.*
49. Critical habitat designation may also generate ancillary benefits. Critical habitat aids in the conservation of species specifically by protecting the primary constituent elements on which the species depends. To this end, critical habitat designation can result in maintenance of particular environmental conditions that may generate other social benefits aside from the preservation of the species. That is, management actions undertaken to conserve a species or habitat may have coincident, positive social welfare implications, such as increased recreational opportunities in a region. While they are not the primary purpose of critical habitat, these ancillary benefits may result in gains in employment, output, or income that may offset the direct, negative impacts to a region's economy resulting from actions to conserve a species or its habitat.

²⁵ Executive Order 12866, Regulatory Planning and Review, September 30, 1993.

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

²⁷ *Ibid.*

2.3.4 GEOGRAPHIC SCOPE OF THE ANALYSIS

50. Economic impacts of cavesnail conservation are considered across the entire area proposed for critical habitat designation, as well as surrounding areas that may affect the proposed designation. Results are presented by action agency (e.g., Corps or US Forest Service (USFS)).

2.3.5 ANALYTIC TIME FRAME

51. Ideally, the time frame of this analysis would be based on the expected time period over which the critical habitat regulation is expected to be in place. Specifically, the analysis would forecast impacts of implementing this rule through species recovery (i.e., when the rule is no longer required). However, absent specific information on the expected time frame for recovery of the cavesnail, this analysis forecasts impacts over a “reasonably foreseeable” time frame. Based on available data, this analysis considers economic impacts to activities from 2011 (expected year of final critical habitat designation) through 2030.

2.4 INFORMATION SOURCES

52. The primary sources of information for this report are communications with, and data provided by, personnel from the Service, and action agencies including Corps, USFS, etc. In addition, this analysis relies upon the Service's section 7 consultation records, and existing management plans that consider the cavesnail.

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CHAPTER 3 | ECONOMIC IMPACTS OF CRITICAL HABITAT DESIGNATION FOR THE TUMBLING CREEK CAVESNAIL

53. This chapter focuses on identifying and estimating potential incremental economic impacts that may result from critical habitat designation for the cavesnail. After summarizing our results (Section 3.1), we describe ongoing, baseline land management and conservation for the cavesnail. Ongoing land management practices and conservation efforts are not expected to be affected by critical habitat designation. Section 3.3 then contemplates the potential for critical habitat designation to result in additional (“incremental”) conservation for the cavesnail. This chapter also includes a discussion of the potential benefits of critical habitat designation for the cavesnail and distributional impacts on small entities and the energy industry.
54. As discussed in Chapter 1, we focus on the following threats to cavesnail habitat in our analysis of potential impacts of baseline and incremental conservation efforts:
- Water management; and
 - Activities that may affect water quality.

3.1 SUMMARY OF RESULTS

55. The proposed critical habitat designation occurs in private lands in southwestern Taney County, Missouri. The landowners and the Tumbling Creek Cave Foundation (Foundation) have undertaken extensive conservation efforts to protect the cave, many of which benefit the cavesnail. Our analysis concludes the designation of critical habitat is not likely to result in changes to ongoing and future conservation efforts for the cavesnail for the following two reasons:

- **No expected change in the outcome of consultations.** Because of the limited population size and range of the species, the Service states:

“In consultations involving projects that may impact the sole population of cavesnail, any adverse modification decision would likely be coincident to a jeopardy determination for the same action.”²⁸

Moreover, the Service believes that conservation efforts that would be recommended to avoid or reduce impacts of a project on critical habitat (e.g., implementation of Best Management Practices to protect water quality and

²⁸ U.S. Fish and Wildlife Service, Columbia Field Office, “Comments on how DEA Should Estimate incremental Costs for the Tumbling Creek Cavesnail Critical Habitat Designation,” July 6, 2010.

control erosion) also would be recommended to reduce impacts to individual cavesnails.

- **All proposed areas are considered occupied.** While cavesnails may not always be present or detected through surveys at a given location within critical habitat every year, the Service would always assume presence within the proposed designation. Thus, Action agencies will initiate consultation regarding the cavesnail regardless of whether critical habitat is designated. In addition, activities taking place outside of the proposed designation that may affect the cavesnail are already subject to section 7 consultation.²⁹

56. The analysis does forecast some incremental administrative costs associated with considering adverse modification in section 7 consultation. Present value impacts are estimated at \$50,100 over the next twenty years (discounted at seven percent), or \$4,420 on an annualized basis (see Exhibit 3-1).

EXHIBIT 3-1. INCREMENTAL IMPACTS BY ACTION AGENCY (2010 DOLLARS, 2011-2030)

ACTION AGENCY	DISCOUNTED AT THREE PERCENT		DISCOUNTED AT SEVEN PERCENT	
	PRESENT VALUE	ANNUALIZED	PRESENT VALUE	ANNUALIZED
Tumbling Creek Cave Foundation and the Natural Resource Conservation Service	\$13,600	\$889	\$13,100	\$1,160
US Army Corps of Engineers	\$14,600	\$950	\$14,000	\$1,240
Missouri Department of Transportation and the Federal Highway Administration	\$14,200	\$923	\$13,200	\$1,160
US Forest Service	\$14,800	\$967	\$9,810	\$865
Total	\$57,200	\$3,730	\$50,100	\$4,420
Note: Totals may not sum due to rounding.				

3.2 BASELINE CONSERVATION FOR CAVESNAIL WITHIN THE STUDY AREA

57. The baseline land management and cavesnail conservation efforts described in this section provide context for the incremental analysis. The proposed unit consists entirely of private lands owned by Tom and Cathy Aley of the Ozark Underground Laboratory. Together with the Tumbling Creek Cave Foundation, the Aleys already manage the proposed unit and the surrounding areas for the protection of Tumbling Creek Cave and the cavesnail. We expect the baseline conservation for the cavesnail described in this section to continue into the foreseeable future, even absent critical habitat designation for the species.

²⁹ Ibid.

58. The following subsections discuss the baseline conservation efforts being undertaken by land management agencies within the study area.

3.2.1 OWNERS OF CRITICAL HABITAT SURFACE AREA AND THE TUMBLING CREEK CAVE FOUNDATION

59. As described in the Proposed Rule, “the cave owners Tom and Cathy Aley have been actively involved in implementing numerous conservation measures that continue to contribute to the recovery of the species.”³⁰ The Aleys work in concert with the Tumbling Creek Cave Foundation (Foundation), a not-for-profit corporation focused on conserving the Tumbling Creek Cave and its natural environment. The Foundation also works to maintain and establish habitat for native species, including threatened and endangered species.
60. Toward this end, the Foundation and the Aleys have undertaken extensive conservation efforts that benefit the cavesnail, including:³¹
- Installation of a water quality monitoring station in the Big Room of the cave;
 - Preliminary work on captive propagation of cavesnails;
 - Acquisition of land surrounding the cave and within its recharge area through twelve different purchases from 1966 to 2009;
 - The collection and removal of trash from household or roadside dumps;
 - Restoration of over-grazed pasturelands (see Exhibit 3-2);
 - Replacement of a failing sewage system at the Mark Twain School;
 - Funded upgrades to septic systems within the recharge area;
 - Restricting unauthorized entry to the cave; and
 - Ending livestock grazing on the triangular tract of land on the eastern end of the proposed critical habitat unit.³²
61. In January 2010, the 2,700 acres owned by the Aleys and the Foundation were accepted in the Conservation Stewardship Program (CSP) operated by the U.S. Department of Agriculture’s Natural Resource Conservation Service. The CSP is a voluntary conservation program that encourages landowners to undertake and continue additional conservation activities. The Foundation expects that enrollment in the program will provide significant funding to expand conservation programs on their lands.³³

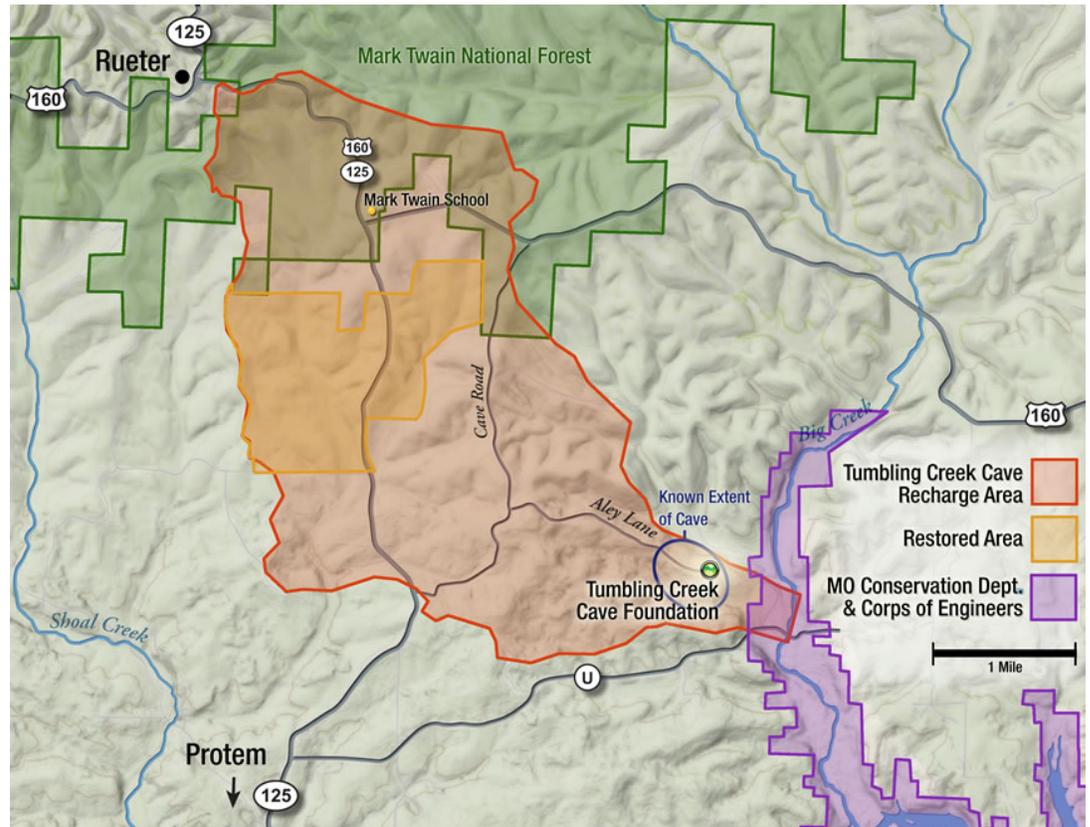
³⁰ Proposed Rule, 75 FR 35751, June 23, 2010.

³¹ Tumbling Creek Cave Foundation, *Protecting the Cave and its Ecosystem*, accessed at: http://tumblingcreekcave.org/4_protection.html on August 12, 2010.

³² Public comments of Ozark Underground Laboratory dated July 22, 2010.

³³ Tumbling Creek Cave Foundation, *Protecting the Cave and its Ecosystem*, accessed at: http://tumblingcreekcave.org/4_protection.html on August 12, 2010.

EXHIBIT 3-2. AREA RESTORED BY THE TUMBLING CREEK CAVE FOUNDATION



Source: Tumbling Creek Cave Foundation, *Protecting the Cave and its Ecosystem*, accessed at: http://tumblingcreekcave.org/4_protection.html on August 12, 2010.

62. Particularly with the enrollment in the CSP, these voluntary conservation efforts already being undertaken are considered to be baseline protections for the cavesnail, and are not expected to change due to the designation of critical habitat.

3.2.2 US ARMY CORPS OF ENGINEERS

63. The Corps manages water levels at the White River Basin lakes, including Bull Shoals Lake. Because water elevations in Bull Shoals Lake affect groundwater flow within Tumbling Creek Cave, the Proposed Rule has identified this lake as needing special management to prevent increased sedimentation or bank erosion from backwater flooding into Tumbling Creek Cave.³⁴
64. As shown in Exhibit 3-3, Bull Shoals Lake is located in Marion County, Arkansas. The reservoir comprises 45,440 surface acres with an average depth of 67 feet. Originally constructed primarily for flood control and power generation purposes, the lake also provides varied recreational opportunities. It hosts approximately 5.5 million visits per year, and features 30 recreational areas, 89 picnic sites, 930 camping sites, 14 swimming

³⁴ Proposed Rule, 75 FR 35752, June 23, 2010.

areas, 13 miles of trails, and 2,058 marina slips. The Corps estimates that approximately \$95.87 million is spent within 30 miles of the lake by visitors to the lake each year.³⁵

65. Since 2004, the Corps has been analyzing water storage reallocations at the White River Basin lakes. The intent of this reallocation is “to provide fish and wildlife enhancements, facilitate seasonal flood control and hydropower releases, and permit reasonable continued use of lakeside facilities at Bull Shoals and Norfolk Lakes.”³⁶ In particular, the proposed action would increase minimum flows for the benefit of the tailwater fisheries below Bull Shoals and Norfolk dams. The initial construction of the dams resulted in the conversion of the tailwater fishery from a warm-water to a cold-water fishery. While trout was stocked below the dam to create a non-native fishery, releases below the dam have not been sufficient to maintain the life cycle requirements of the trout. Increasing minimum flows may help to maintain the fishery.³⁷
66. All of the lake’s storage space is already allocated to existing purposes such as flood control or hydroelectric power generation, and no unused storage or surplus storage is available. Therefore, some storage must be reallocated in order to increase minimum flows for the fishery. Under the current plan, five feet of storage for minimum flows will be reallocated from the flood control pool to the conservation pool (see Exhibit 3-4).³⁸ This reallocation raises the level of the conservation pool, and thus may raise typical reservoir levels by as much as five feet compared to current operations.

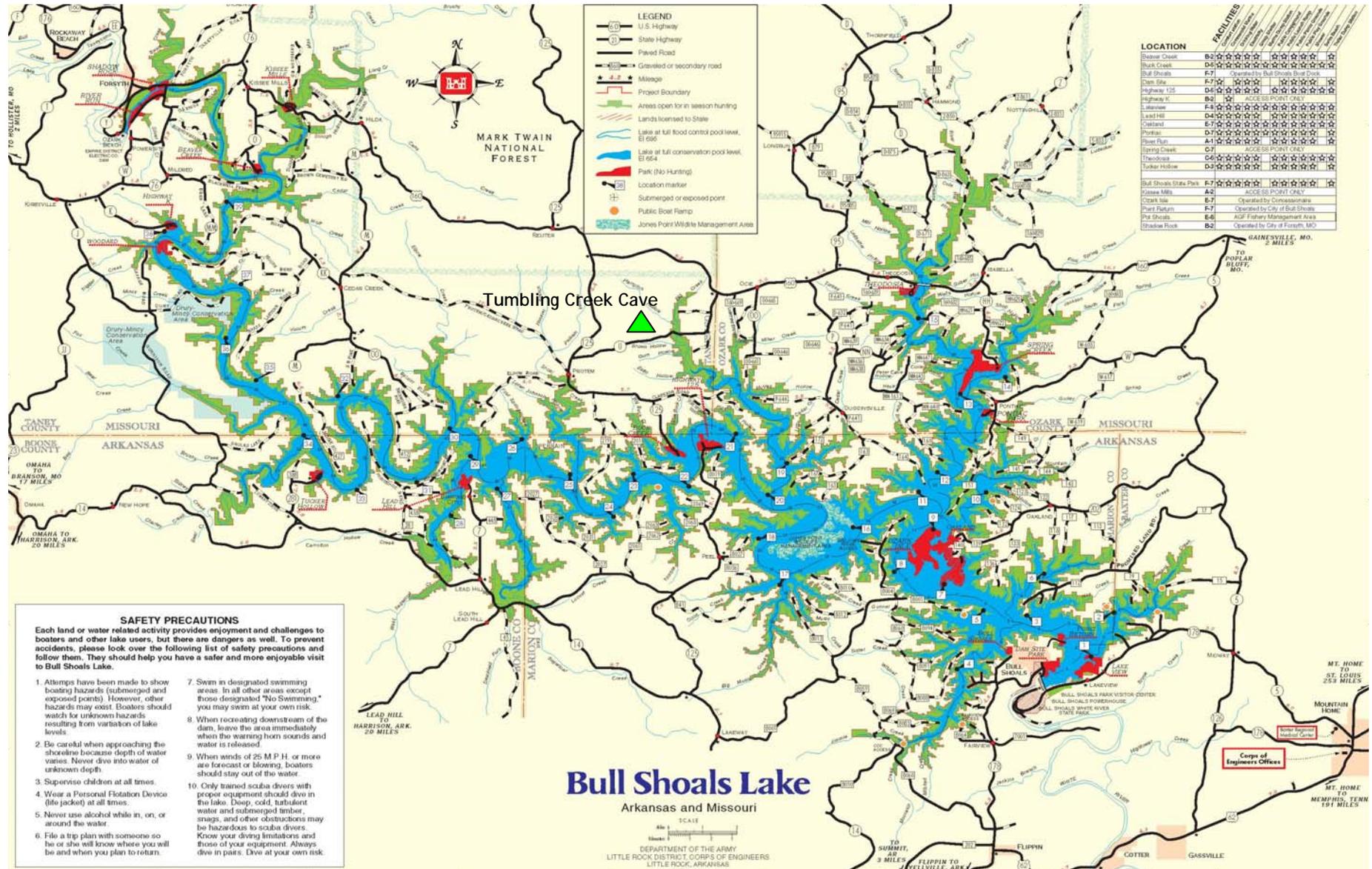
³⁵ US Army Corps of Engineers, Final Environmental Impact Statement: White River Basin, Arkansas, Minimum Flows, Revised January 2009.

³⁶ Ibid.

³⁷ Ibid.

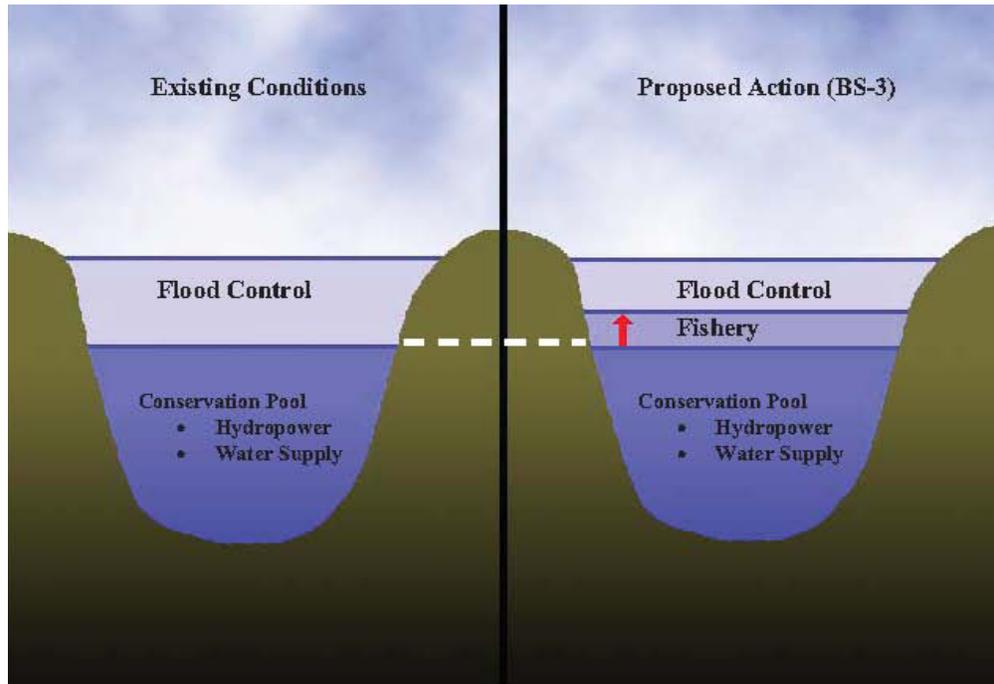
³⁸ Ibid.

EXHIBIT 3-3. MAP OF BULL SHOALS LAKE RESERVOIR



Source: US Army Corps of Engineers, Little Rock District. *Project Lakes Map*, accessed at: http://www.swl.usace.army.mil/parks/bullshoals/pdf_files/BullShoals.pdf.

EXHIBIT 3-4. PROPOSED FLOOD POOL REALLOCATION



Source: US Army Corps of Engineers, *Final Environmental Impact Statement: White River Basin, Arkansas, Minimum Flows*, Revised January 2009.

67. This change in the elevation of the conservation pool may result in changes to the drainage system of Tumbling Creek Cave, thereby impacting the cavesnail.³⁹ In particular, this reallocation may result in reservoir levels exceeding elevations of concern for the cavesnail as identified by the Service. As the reservoir is currently operated, the lowest of these levels, 670 feet mean sea level, is exceeded 10.65 percent of the year (see Exhibit 3-5). Reallocating five feet of storage from the flood control pool to the conservation pool would result in this level being exceeded 13.48 percent of the time, or an increase of approximately ten days over the course of a year.

EXHIBIT 3-5. PERCENTAGE OF YEAR ELEVATION EXCEEDED UNDER REALLOCATION SCENARIOS

ELEVATION OF CONCERN	CURRENT	REALLOCATION FROM THE CONSERVATION POOL	REALLOCATION FROM THE FLOOD CONTROL POOL	REALLOCATION SPLIT BETWEEN THE TWO POOLS
670	10.65%	9.96%	13.48%	11.32%
675	7.60%	7.03%	9.42%	8.17%
690	2.02%	1.90%	2.23%	2.05%

Source: US Army Corps of Engineers, *Biological Assessment for Impacts to the Tumbling Creek Cavesnail, Gray Bat, and Indiana Bat Related to the White River Minimum Flow Project*, undated.

³⁹ Ibid.

68. In 2004, the Service concurred with the Corps' finding that the reallocation may affect, but would not be likely to adversely affect the cavesnail. However, at that time, the Corps had not yet determined a preferred alternative and was still evaluating the appropriate pool to use for reallocation. Reallocating from the conservation pool rather than the flood control pool would have resulted in a decrease in the number of the days that reservoir levels would exceed the identified elevations of concern, thereby decreasing impacts to the cavesnail.⁴⁰
69. After reviewing the Environmental Impact Statement released in January 2009, the Service states that it may recommend changes to the proposed action because the proposal to reallocate from the flood control pool increases the amount of time reservoir levels exceed elevations of concern for the cavesnail.⁴¹ The Service believes these requested changes may result in reinitiation of consultation for this project; however, the Corps disagrees.
70. In its public comments, the Corps states that "nothing has changed in the physical conditions or understanding of the TCCS [cavesnail] habitat since the time of the original Biological Opinion in 2004 or completion of US Fish and Wildlife Coordination Act consultation in 2008. [...] We do not agree there is a need for additional review."⁴² The Corps further notes that "much discussion between the Corps and USFWS will be necessary to come to a proper resolution of this issue. Reinitiating consultation with the USFWS under section 7 of the Endangered Species Act could possibly delay implementation" of the proposed project.⁴³ Nonetheless, during discussions with the Corps on February 8, 2011, the Service reiterated its intention to reinitiate formal consultation on the project for the cavesnail because of new information regarding the status of the species, its presumed occupied range, and the potential threat of white nose syndrome (as it may affect the energy input from the guano of bats that roost in Tumbling Creek Cave).⁴⁴
71. Importantly, any changes requested to minimize the level or duration of Tumbling Creek inundation would be recommended to prevent jeopardy of the species.⁴⁵ Therefore, any impacts associated with changes in reservoir operations, the reinitiation of consultation, or resulting delays in implementation are considered baseline for purposes of this analysis.

3.2.3 US FOREST SERVICE

72. Parts of the recharge area for Tumbling Creek Cave are located on USFS lands within the Mark Twain National Forest. USFS maintains a Land Resource Management Plan

⁴⁰ Ibid.

⁴¹ Personal communication with the Service, Columbia Field Office, August 23, 2010.

⁴² Public comments of the Department of the Army, Little Rock District Corps of Engineers, dated February 11, 2011.

⁴³ Ibid.

⁴⁴ Public comments of the Department of the Army, Little Rock District Corps of Engineers, dated February 11, 2011. Written communication from the Service, Midwest Regional Office, March 14, 2011.

⁴⁵ Written communication from the Service, Washington Office, September 30, 2010.

(LRMP) that outlines forestwide standards and guidelines for vegetation management, non-native invasive species management, water management, prescribed fire, fuels, and wildland management, pesticide use, and rangeland management.⁴⁶ Many of these standards and guidelines provide baseline protection for the cavesnail. For example, the LRMP outlines erosion control guidelines for timber management, grazing, thinning, and prescribed fire activities for the Ava-Cassville-Willow District.⁴⁷ Erosion control efforts may help to minimize threats to water quality.

73. The Service completed programmatic biological opinions on the LRMP in 1999 and then again in 2005. In issuing these biological opinions, the Service evaluated the effects of all USFS actions outlined in the LRMP, as well as a number of site-specific projects. The Service concurred with USFS's determination of "may affect, not likely to adversely affect" the cavesnail.⁴⁸
74. Since the listing of the cavesnail, the Service conducted two additional section 7 consultations with Mark Twain National Forest. One of these consultations was related to the Mark Twain School Land Conveyance project, which the Service determined was not likely to adversely affect the cavesnail. As part of this project, the Ozark Underground Laboratory, Taney County Commissions, Missouri Department of Conservation, and the USFS raised sufficient funds to replace the school's sewage system, which had been leaking into the groundwater and then into the Tumbling Creek Cave.⁴⁹
75. The other consultation was related to the Ava-Cassville-Willow Openlands Grazing Allotments Project. This project involved the issuance of grazing permits, allotment management plans, and annual operating instructions for 11 open land pastures comprising 1,141 acres. As part of this effort, USFS proposed to maintain these lands using a combination of mowing, prescribed fire, and grazing, and to implement the following conservation efforts for the cavesnail:⁵⁰
 - Undertake section 7 consultation with the Service prior to treating any non-native invasive species infestations within the Tumbling Creek recharge area.
 - Re-vegetate any firelines constructed within the recharge area as soon as would be effective.

⁴⁶ United States Department of Agriculture, Forest Service, Mark Twain National Forest, *2005 Land and Resource Management Plan (2005 Forest Plan)*, September 2005.

⁴⁷ U.S. Fish and Wildlife Service, Columbia Field Office, "Comments on how DEA Should Estimate incremental Costs for the Tumbling Creek Cavesnail Critical Habitat Designation," July 6, 2010.

⁴⁸ Letter from Charles M. Scott, U.S. Fish and Wildlife Service, Columbia Field Office to Jenny Farenbaugh, Mark Twain National Forest, dated September 26, 2008.

⁴⁹ Letter from Charles M. Scott, U.S. Fish and Wildlife Service, Columbia Field Office to Jenny Farenbaugh, Mark Twain National Forest, dated June 15, 2005.

⁵⁰ Letter from Charles M. Scott, U.S. Fish and Wildlife Service, Columbia Field Office to Jenny Farenbaugh, Mark Twain National Forest, dated September 26, 2008.

76. These conservation efforts and adherence to the forestwide standards and guidelines in the LRMP are considered baseline protections for the cavesnail. This baseline protection is expected to continue after the designation of critical habitat, and is not expected to change to due to critical habitat designation.

3.2.4 MISSOURI DEPARTMENT OF TRANSPORTATION AND FEDERAL HIGHWAY ADMINISTRATION

77. Road construction activities may threaten the cavesnail through increased sedimentation or chemical runoff negatively affecting water quality.⁵¹ The Service has conducted one section 7 consultation for the cavesnail regarding preventative maintenance of the chip seal overlay on Route 160 between Theodesia and Route 125.⁵²
78. Though the Tumbling Creek Cavesnail Workgroup was concerned that chemicals from resurfacing activities might indirectly impact the cavesnail due to runoff, a dye tracing study determined that potentially harmful hydrocarbons from the resurfacing did not move sufficient distances to pose a threat to the cavesnail. The Service worked with the Missouri Department of Transportation (MODOT) to establish water monitoring protocols, and concurred with the determination that the project was not likely to adversely affect the cavesnail.⁵³
79. Additional projects are planned for Route 160 in the recharge zone of the Tumbling Creek Cave over the next five years (see Exhibit 3-6). These may include: (1) pavement improvements at the Route 165/Route 160 interchange, (2) bridge improvements over Bull Shoals Lake, and (3) additional pavement improvements on Route 160.⁵⁴ While these projects may require conservation efforts to protect the cavesnail and its habitat, any project modifications recommended by the Service in section 7 consultation would not be designed solely to address potential adverse modification of critical habitat, but rather to address potential jeopardy of the species.⁵⁵

⁵¹ Proposed Rule, 75 FR 35751, June 23, 2010. See also U.S. Fish and Wildlife Service, Columbia Field Office, "Comments on how DEA Should Estimate incremental Costs for the Tumbling Creek Cavesnail Critical Habitat Designation," July 6, 2010.

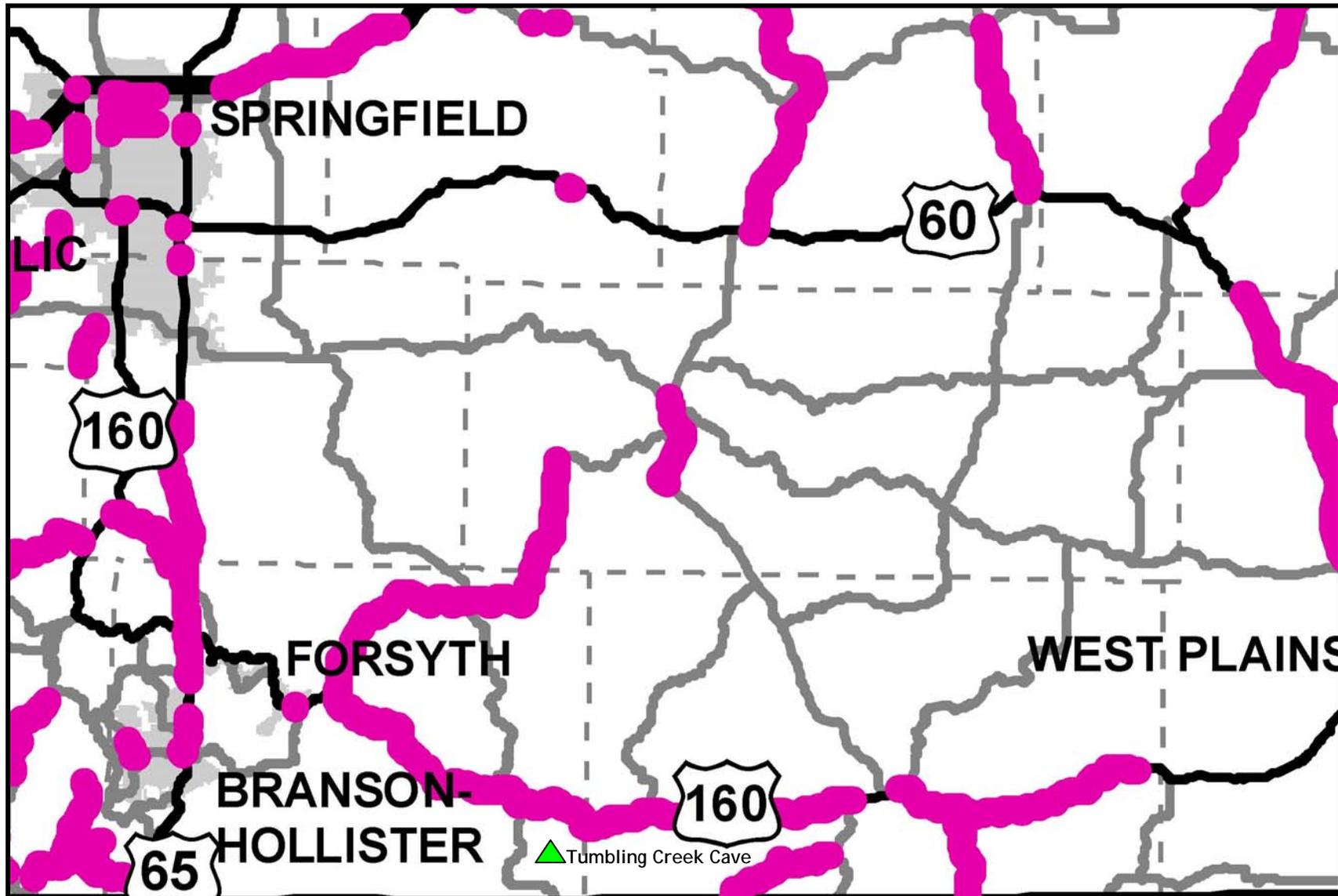
⁵² Letter from Charles M. Scott, U.S. Fish and Wildlife Service, Columbia Field Office to Alan W. Leary, Missouri Department of Transportation, dated May 26, 2006.

⁵³ Ibid.

⁵⁴ Missouri Department of Transportation, 2011-2015 Highway and Bridge Construction Schedule, accessed at: http://www.modot.mo.gov/plansandprojects/construction_program/STIP2011-2015/documents/final/D08R_Hwy_bridge_Sched.pdf on November 8, 2010.

⁵⁵ U.S. Fish and Wildlife Service, Columbia Field Office, "Comments on how DEA Should Estimate incremental Costs for the Tumbling Creek Cavesnail Critical Habitat Designation," July 6, 2010.

EXHIBIT 3-6. STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM 2011-2015 PROJECTS



Source: Missouri Department of Transportation, *Statewide Transportation Improvement Program 2011-2015: Statewide Map*, accessed at: http://www.modot.mo.gov/plansandprojects/construction_program/STIP2011-2015/documents/final/11_15STIPStatewideMap.pdf.

3.3 INCREMENTAL IMPACTS OF CRITICAL HABITAT FOR THE CAVESNAIL

80. This Section contemplates the potential changes in cavesnail conservation following designation of critical habitat. As described in the previous sections, economic activity taking place within the study area is already subject to baseline protection for the cavesnail. The Service does not anticipate any additional conservation would be requested for the cavesnail following critical habitat that would not already be expected to occur due to the implementation of baseline regulations.
81. Chapter 2 describes how critical habitat may result in direct impacts on economic activities through section 7 of the Act, or indirect impacts due to regulatory uncertainty or triggering of additional requirements under other Federal, State or local regulations. Section 3.3.1 discusses anticipated direct incremental impacts, while Section 3.3.2 discusses the potential for indirect impacts.

3.3.1 DIRECT IMPACTS OF SECTION 7 OF THE ACT

82. Following critical habitat designation, section 7 consultation includes consideration of whether a proposed plan or project may result in destruction or adverse modification of critical habitat for the cavesnail. As part of this consultation, the Service may recommend reasonable and prudent alternatives to this project to avoid destruction or adverse modification of critical habitat. The Service drafted a memorandum describing its expected approach to conservation for the cavesnail following critical habitat designation. The Service's memorandum is provided as an Appendix to this report. In general, the Service asserts that critical habitat is not likely to result in additional recommendations for cavesnail conservation based on the following:

- **No expected change in the outcome of consultations.** Because of the limited population size and range of the species, the Service states:

“In consultations involving projects that may impact the sole population of cavesnail, any adverse modification decision would likely be coincident to a jeopardy determination for the same action.”⁵⁶

Moreover, the Service believes that conservation efforts that would be recommended to avoid or reduce impacts of a project on critical habitat (e.g., implementation of Best Management Practices to protect water quality and control erosion) also would be recommended to reduce impacts to individual cavesnails.

- **All proposed areas are considered occupied.** While cavesnails may not always be present or detected through surveys at a given location within critical habitat every year, the Service would always assume presence within the proposed designation. Thus, Action agencies will initiate consultation regarding the cavesnail regardless of whether critical habitat is designated. In addition,

⁵⁶ Ibid.

activities taking place outside of the proposed designation that may affect the cavesnail are already subject to section 7 consultation.⁵⁷

83. While the Service does not anticipate additional conservation for the cavesnail following critical habitat designation, it does anticipate the potential for incremental administrative costs associated with considering adverse modification as part of future section 7 consultations.⁵⁸ In the case that section 7 consultation regarding the cavesnail does occur in the future, incremental administrative costs would result. Exhibit 3-7 forecasts the potential for section 7 consultations by action agency.

EXHIBIT 3-7. FORECAST SECTION 7 CONSULTATIONS BY ACTION AGENCY

ACTION AGENCY	CONSULTATION TYPE	EXPECTED YEAR	PROJECT DESCRIPTION AND ASSUMPTIONS
The Natural Resource Conservation Service	Programmatic	2011	Assumes one programmatic consultation after enrollment of Tumbling Creek Cave Foundation lands in the Conservation Stewardship Program to cover all activities undertaken under the program.
US Army Corps of Engineers	Formal	2011	Assumes one formal consultation related to the reallocation of flows under the White River Basin Lakes Project.
Missouri Department of Transportation and the Federal Highway Administration	Formal	2011	Assumes one formal consultation related to pavement improvements at the Route 165/Route 160 interchange.
	Formal	2011	Assumes one formal consultation related to additional pavement improvements on Route 160.
	Formal	2014	Assumes one formal consultation related to bridge improvements over Bull Shoals Lake.
US Forest Service	Programmatic	2024	Assumes one programmatic consultation associated with the revision of the Forest Plan twenty years after most recent 2005 Forest Plan.
	Informal	2011-2030	Assumes one informal consultation every four years for site-specific project analyses, based on past rate of consultation.

Source: Personal communication with the Service, Columbia Field Office, August 23, 2010. United States Department of Agriculture, Forest Service, Mark Twain National Forest, *2005 Land and Resource Management Plan (2005 Forest Plan)*, September 2005. Letter from Charles M. Scott, U.S. Fish and Wildlife Service, Columbia Field Office to Jenny Farenbaugh, Mark Twain National Forest, dated September 26, 2008. Letter from Charles M. Scott, U.S. Fish and Wildlife Service, Columbia Field Office to Jenny Farenbaugh, Mark Twain National Forest, dated June 15, 2005. Missouri Department of Transportation, *2011-2015 Highway and Bridge Construction Schedule*, accessed at: http://www.modot.mo.gov/plansandprojects/construction_program/STIP2011-2015/documents/final/D08R_Hwy_bridge_Sched.pdf on November 8, 2010.

⁵⁷ Ibid.

⁵⁸ The Service states "Therefore, the incremental costs in these consultations will likely be limited to administrative costs." See U.S. Fish and Wildlife Service, Columbia Field Office, "Comments on how DEA Should Estimate incremental Costs for the Tumbling Creek Cavesnail Critical Habitat Designation," July 6, 2010.

84. Incremental impacts associated with these consultations are forecast at a total present value of \$50,100 (discounted at seven percent) over the next twenty years, or \$4,420 on an annualized basis (see Exhibit 3-8).

EXHIBIT 3-8. INCREMENTAL IMPACTS BY ACTION AGENCY (2010 DOLLARS, 2011-2030)

ACTION AGENCY	DISCOUNTED AT THREE PERCENT		DISCOUNTED AT SEVEN PERCENT	
	PRESENT VALUE	ANNUALIZED	PRESENT VALUE	ANNUALIZED
The Natural Resource Conservation Service	\$13,600	\$889	\$13,100	\$1,160
US Army Corps of Engineers	\$14,600	\$950	\$14,000	\$1,240
Missouri Department of Transportation and the Federal Highway Administration	\$14,200	\$923	\$13,200	\$1,160
US Forest Service	\$14,800	\$967	\$9,810	\$865
Total	\$57,200	\$3,730	\$50,100	\$4,420
Note: Totals may not sum due to rounding.				

3.3.2 INDIRECT IMPACTS OF CRITICAL HABITAT

85. We also considered the potential for critical habitat to generate indirect economic impacts. For example, there is the potential for indirect impacts to result from critical habitat if city or county planning agencies impose additional restrictions within proposed critical habitat. However, given the enrollment of the privately owned lands surrounding Tumbling Creek Cave in the Conservation Stewardship Program, such indirect impacts are not anticipated.⁵⁹

3.4 BENEFITS OF CRITICAL HABITAT DESIGNATION FOR THE CAVESNAIL

86. As discussed in the previous sections of this chapter, this analysis does not anticipate that the designation of critical habitat will result in additional conservation for the cavesnail. As a result, no changes in economic activity or land management are expected to result from critical habitat designation. Absent changes in land management or cavesnail conservation efforts, no incremental economic benefits are forecast to result from designation of critical habitat.

⁵⁹ Moreover, the Service does not anticipate such an outcome in this case. U.S. Fish and Wildlife Service, Columbia Field Office, "Comments on how DEA Should Estimate incremental Costs for the Tumbling Creek Cavesnail Critical Habitat Designation," July 6, 2010.

3.5 DISTRIBUTIONAL ANALYSES

87. This section considers the extent to which incremental impacts of critical habitat designation for the cavesnail may be borne by small entities and the energy industry. While the analysis forecasts approximately \$50,100 in incremental impacts over the next twenty years, these impacts are expected to be borne by Federal and state agencies, including the US Forest Service, US Army Corps of Engineers, the Natural Resource Conservation Service, and the Missouri Department of Transportation. Such agencies are not considered small entities.
88. The Office of Management and Budget provides guidance for implementing this Executive Order, outlining nine outcomes that may constitute “a significant adverse effect” when compared with the regulatory action under consideration:
- Reductions in crude oil supply in excess of 10,000 barrels per day (bbls);
 - Reductions in fuel production in excess of 4,000 barrels per day;
 - Reductions in coal production in excess of 5 million tons per year;
 - Reductions in natural gas production in excess of 25 million Mcf per year;
 - Reductions in electricity production in excess of 1 billion kilowatts-hours per year or in excess of 500 megawatts of installed capacity;
 - Increases in energy use required by the regulatory action that exceed the thresholds above;
 - Increases in the cost of energy production in excess of one percent;
 - Increases in the cost of energy distribution in excess of one percent; or
 - Other similarly adverse outcomes.⁶⁰
89. As none of these criteria is relevant to this analysis, energy-related impacts associated with conservation efforts within the potential critical habitat are not expected.

⁶⁰ Ibid.

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16 U.S.C. §1533(b)(2).

16 U.S.C. 1532.

43 CFR 3809.

43 U.S.C. §§ 1701-1782, October 21, 1976.

5. U.S.C. §§601 *et seq.*

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**APPENDIX A | INFORMATION FROM THE SERVICE REGARDING
POTENTIAL CHANGES IN CONSERVATION FOR THE
CAVESNAIL FOLLOWING DESIGNATION OF CRITICAL
HABITAT**

**Comments on how DEA Should Estimate Incremental Costs
for the Tumbling Creek Cavesnail Critical Habitat Designation**

July 6, 2010

The Tumbling Creek cavesnail is a critically imperiled, small, troglobitic aquatic snail, endemic to a single cave stream and associated springs in Taney County, southwestern Missouri. The species is known only from Tumbling Creek and a few of its small tributaries and associated underground springs within Tumbling Creek Cave, and areas immediately downstream of the cave between the cave's natural exit and the confluence of Tumbling Creek with Big Creek at Schoolhouse Spring. Suitable habitat includes the underside of rocks, small stones, and cobble, and occasionally the upper surface of solid rock bottom within sections of Tumbling Creek that have moderate current. The Tumbling Creek cavesnail is dependent on good water quality and reduced sediment loads in Tumbling Creek.

The proposed designated critical habitat includes all portions of Tumbling Creek and the underground portions of Owens and Schoolhouse Springs that we consider as occupied habitat. We have defined "occupied habitat" as those stream reaches documented at the time of listing and all portions of Tumbling Creek between its emergence in Tumbling Creek Cave and its confluence with Big Creek at Schoolhouse Spring. Although there are underground portions of Tumbling Creek that are inaccessible to humans, the entire stream length is believed to be occupied by the Tumbling Creek cavesnail; thus, the entire stream is believed to comprise the entire known range of the Tumbling Creek cavesnail. We are not proposing to designate any areas outside of those mentioned above, because the species is believed to be a site endemic, and surveys in other nearby cave streams and springs have failed to find additional populations

Unfortunately, little is known of the specific habitat requirements for this species other than that the species requires adequate water quality, water quantity, water flow, a stable stream channel, minimal sedimentation, and energy input from the guano of bats, particularly gray bats (*Myotis grisescens*) that roost in Tumbling Creek Cave.

Like other members of the snail family Hydrobiidae, the Tumbling Creek cavesnail has separate male and female individuals, but there is no information on the mating behavior of the species or what role the unknown sex ratio of the species may have on successful reproduction. Eggs are likely deposited in gelatinous egg masses, but to date, the occurrence of such egg masses has yet to be documented. Although little is known about the reproductive behavior and development of offspring of the Tumbling Creek cavesnail, it is likely that rock and gravel substrates that are free from silt are important elements necessary for successful propagation, especially for attachment of gelatinous egg masses. It has been postulated that silt deposited in Tumbling Creek could smother egg masses, and a species expert suggested that silt could suffocate early developmental stages of the cavesnail. The life span of the Tumbling Creek cavesnail is unknown, but, if similar to other surface-dwelling hydrobid snails that have been studied, it is probably between 1 and 5 years.

The cavesnail is dependent on good water quality and the sole cave owners, Tom and Cathy Aley, have noted that oxygen depletion could occur in Tumbling Creek during low flows; therefore, permanent flow of the stream is apparently important to the survival of the cavesnail. Aley calculated that an average daily discharge of 0.07-150 cubic feet per second (cfs) was necessary to maintain good water quality for the cavesnail. Aley also postulated that, to ensure good water quality for the Tumbling Creek cavesnail, water temperature of the cave stream should be between 55-62 °F (12.78-16.67 °C), dissolved oxygen levels should not exceed 4.5 milligrams per liter, and turbidity of an average monthly reading should not exceed 200 Neophelometric Units and should not persist for a period greater than 4 hours.

Based on the information above, we identified an instream flow regime with an average daily discharge between 0.07 and 150 cubic feet per second (cfs), inclusive of both surface runoff and groundwater

sources (springs and seepages), and water quality with temperature between 55–62 °F (12.78–16.67°C), dissolved oxygen 4.5 milligrams or greater per liter, and turbidity of an average monthly reading of no more than 200 Nephelometric Turbidity Units (NTU; units used to measure sediment discharge) or less for a duration not to exceed 4 hours, to be PCEs for this species.

The proposed critical habitat unit for the Tumbling Creek cavesnail represents a habitat-based population distribution associated with the only known occurrence record for this species. The habitat-based population distribution, which is the basis for delineation of the sole proposed critical habitat unit, predicts the geographic habitat area needed for long-term conservation of the species outlined in the Tumbling Creek Cavesnail Recovery Plan.

Questions and Answers:

1. In section 7 consultations for the Tumbling Creek cavesnail, is there any difference in the types of project modifications requested to avoid jeopardy and those requested to avoid adverse modification?

Project descriptions that are modified to minimize impacts to critical habitat will also minimize impacts to individuals, and therefore it is not possible for us to differentiate any measures implemented solely to minimize impacts to the critical habitat from those implemented to minimize impacts to individuals. A jeopardy analysis for this species would look at the magnitude of the project's impacts relevant to the sole population of Tumbling Creek cavesnail. Furthermore, the 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 features [primary constituent elements (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 may impact the sole population of Tumbling Creek cavesnail, 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.

2. What kinds of project modifications are recommended in areas of critical habitat where the species is not present (i.e., surveys for the cavesnail at the project site do not identify the cavesnail)?

The entire length of Tumbling Creek from its emergence in Tumbling Creek Cave to its confluence with Big Creek at Schoolhouse Spring is considered occupied by the Tumbling Creek cavesnail. This includes the humanly inaccessible underground portion of Tumbling Creek that includes springs that emanate from fractures in the chert rock. Federal agencies would need to consider potential adverse effects to all portions of proposed critical habitat, including areas that are not accessible to humans but are considered occupied habitat. Any potential impacts to occupied habitat and physical and biological features considered essential to the conservation of Tumbling Creek cavesnail would necessitate an effects analysis.

If we determine that an adverse modification finding may be likely, we would suggest changes to the project or reasonable and prudent alternatives to eliminate or reduce the impacts. Examples of suggested measures include recommending the implementation of Best Management Practices to protect water

quality and control erosion or suggesting alternatives that could minimize the potential introduction of exotic species into Tumbling Creek.

3. What steps do project proponents currently take to ensure they are not affecting listed species?

Steps taking by project proponents to ensure their actions to not adversely affect the Tumbling Creek cavesnail depend on the nature of Federal agency projects. Multiple Federal agencies [e.g. Federal Highway Administration (and their designated non-Federal Representative the Missouri Department of Transportation) (MODOT), U.S. Forest Service, and the Army Corps of Engineers] have incorporated a wide array of measures to avoid impacts to the species. These are typical protective measures incorporated during informal section 7 consultation and most deal with potential impacts to the species through indirect actions that occur within the recharge area of Tumbling Creek Cave. The following are examples.

1. The U.S. Forest Service follows erosion control guidelines outlined in the Land Resource Management Plan (LRMP) for the Ava/Cassville District of the Mark Twain National Forest for timber management, grazing, thinning, and prescribed fire activities.
2. A section of Rt. 160 bisects portions of the recharge zone for Tumbling Creek Cave. Recently, MODOT wanted to resurface this section of the road to provide improvements. Because members of the Tumbling Creek Cavesnail Workgroup and Partnership was concerned that chemicals associated with resurfacing activities may indirectly impact the cavesnail due to runoff if conducted immediately following a major event, a dye tracing study was proposed to determine how long it would take associated chemicals to reach Tumbling Creek. Dye tracing was conducted after a major rain event and although there was a short period of time before runoff reached Tumbling Creek, examination of water collected at different distances down slope of the study revealed that potentially harmful hydrocarbons associated with resurface materials did not move sufficient distances to pose a threat to the cavesnail. Consequently, the road was resurfaced without any potential impact to the cavesnail.
3. MODOT does not apply potential harmful herbicides to control vegetation along portions of Rt. 160 that bisects portions of the recharge area of Tumbling Creek Cave.

(a) If surveys are standard procedure, do you have any information about the likelihood that the cavesnail will be identified at a particular project site?

It is highly unlikely that the Tumbling Creek cavesnail will be located anywhere other than currently occupied habitat within the length and extent of Tumbling Creek.

(b) If cavesnails are not identified at a project site within critical habitat, can the Service assume occupancy anyway?

The species is assumed present within the entire length of Tumbling Creek from its emergence in Tumbling Creek downstream to its confluence with Big Creek at Schoolhouse Spring. All other areas would be considered unoccupied.

4. **Is it possible that local regulators (i.e., county or city planning and building departments) will impose additional restrictions on areas identified as critical habitat?**

It is not anticipated that any county (Taney County, Missouri) or city (Protem) planning or building departments will imposed additional restrictions on the proposed designated critical habitat. Although Tumbling Creek Cave is designated as a National Natural Landmark under the National Park Service's National Landmark Program, associated guidelines (64 FR 25708) will apparently not provide any land management restrictions other than that city and county entities should consider such designations during planning activities. The only other implication of the designation applies to Federal agencies, because under the National Environmental Policy Act (NEPA) they are required to assess the effects of their actions on the environment, which includes potential impacts to exceptional areas like National Natural Landmarks.

Proposed Critical Habitat Unit for Tumbling Creek Cavesnail

Unit 1: Tumbling Creek, Taney County, Missouri

Unit 1 includes the entire length of Tumbling Creek, from its emergence in Tumbling Creek Cave (SE of the intersection of Routes 160 and 125) downstream to its confluence at Big Creek at Schoolhouse Spring. This section of Tumbling Creek and associated springs are under private ownership by Tom and Cathy Aley of the Ozark Underground Laboratory and contain all the PCEs for the Tumbling Creek cavesnail.

Total acreage: 25 ac (10.12 ha)