



ECONOMIC ANALYSIS OF
CRITICAL HABITAT
DESIGNATION FOR THE
DIAMOND DARTER

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prepared for:

U.S. Fish and Wildlife Service

4401 N. Fairfax Drive

Arlington, VA 22203

prepared by:

Industrial Economics, Incorporated

2067 Massachusetts Avenue

Cambridge, MA 02140

TABLE OF CONTENTS

EXECUTIVE SUMMARY

CHAPTER 1 INTRODUCTION AND BACKGROUND

- 1.1 Introduction *1-1*
- 1.2 Economic Activities Considered in this Analysis *1-5*
- 1.3 Organization of the Report *1-6*

CHAPTER 2 FRAMEWORK FOR THE ANALYSIS

- 2.1 Background *2-2*
- 2.2 Categories of Potential Economic Effects of Species Conservation *2-4*
- 2.3 Analytic Framework and Scope of the Analysis *2-7*
- 2.4 Information Sources *2-18*
- 2.5 Presentation of Results *2-18*

CHAPTER 3 BASELINE CONSERVATION FOR THE DIAMOND DARTER WITHIN THE PROPOSED CRITICAL HABITAT

- 3.1 Baseline Protections *3-2*
- 3.2 Economic Activity within the Proposed Critical Habitat for the Diamond Darter *3-6*

CHAPTER 4 INCREMENTAL IMPACTS OF CRITICAL HABITAT DESIGNATION FOR THE DIAMOND DARTER

- 4.1 Summary of Results of the Incremental Impact Analysis *4-1*
- 4.2 Section 7 Consultation Forecast *4-4*
- 4.3 Key Assumptions and Uncertainties *4-13*
- 4.4 Economic Benefits of Critical Habitat Designation for the Diamond Darter *4-14*

REFERENCES

APPENDIX A SMALL BUSINESS AND ENERGY IMPACTS ANALYSES

APPENDIX B SENSITIVITY OF RESULTS TO DISCOUNT RATE

APPENDIX C UNDISCOUNTED IMPACTS BY ECONOMIC ACTIVITY

APPENDIX D INCREMENTAL EFFECTS MEMORANDUM

LIST OF ACRONYMS AND ABBREVIATIONS

Act	Endangered Species Act
BMPs	Best Management Practices
BO	Biological Opinion
CEQA	California Environmental Quality Act
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
CNOR	Candidate Notice of Review
DOI	U.S. Department of the Interior
EPA	U.S. Environmental Protection Agency
EQIP	Environmental Quality Incentive Program
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FLP	Forest Legacy Program
FSP	Forest Stewardship Plans
HCPs	Habitat Conservation Plans
HUC	Hydrologic Unit Code
IEc	Industrial Economics, Incorporated
KDNR	Kentucky Department of Natural Resources
KTC	Kentucky Transportation Cabinet
KYDF	Kentucky Division of Forestry
KYDW	Kentucky Division of Water
KYTC	Kentucky Transportation Cabinet

MCNP	Mammoth Cave National Park
MSHCP	Multi Species HCP
NEPA	National Environmental Policy Act of 1969
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
OMB	U.S. Office of Management and Budget
OMBIL	Operations & Maintenance Business Information Link
ORM2	OMBIL Regulatory Module version 2
OSM	Office of Surface Mining Reclamation and Enforcement
OSRWs	Outstanding State Resource Waters
RFA	Regulatory Flexibility Act
RHA	Rivers and Harbors Act
RMA	Risk Management Association
SBREFA	Small Business Regulatory Enforcement Fairness Act
SWMP	Stormwater management plan
Service	U.S. Fish and Wildlife Service
SBA	Small Business Administration
SMCRA	Surface Mining Control and Reclamation Act of 1977
TMDLs	Total Maximum Daily Loads
WHIP	Wildlife Habitat Incentive Program
WRP	Wetlands Reserve Program
WVDEP	West Virginia Department of Environmental Protection
WVDF	West Virginia Division of Forestry
WVDOT	West Virginia Department of Transportation

EXECUTIVE SUMMARY

1. The purpose of this report is to evaluate the potential economic impacts associated with designation of critical habitat for the diamond darter (*Crystallaria cincotta*). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service (Service). It 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.¹
2. On July 26, 2012, the Service published a Proposed Rule to list this species as endangered and designate critical habitat, under the Endangered Species Act (Act).² The proposed critical habitat designation includes two units totaling approximately 123 miles of river. Unit 1 includes portions of the Elk River in Kanawha and Clay Counties, West Virginia, and Unit 2 includes portions of the Green River in Edmonson, Hart, and Green Counties, Kentucky.³ As described in the Proposed Rule, Unit 1 is occupied by the diamond darter, while Unit 2 is unoccupied but within the species' historical range.
3. This analysis first describes protections provided by Federal, State and local statutes and regulations, including the listing of the species under the Act, that may affect proposed critical habitat areas. These protections are not generated by or affected by critical habitat designation for the diamond darter; they are "baseline" protections afforded the diamond darter regardless of the designation of critical habitat. This analysis does not quantify the associated impacts of these protections, but describes them qualitatively.
4. The discussion of the baseline protections for the diamond darter provides context for the evaluation of the economic impacts of critical habitat designation, which are the focus of this analysis. These "incremental" economic impacts are those that are not expected to occur absent the designation of critical habitat. This analysis considers both direct and indirect incremental costs. Direct costs stem from the consideration of the potential for destruction or adverse modification of critical habitat during section 7 consultations with the Service. Indirect costs are those that may result from the influence of critical habitat designation on the decisions of regulators and decision-makers other than the Service (e.g., State agencies and land managers). Because the Service believes that the direct benefits of the Proposed Rule are best expressed in biological terms, this analysis does not quantify or monetize benefits. However, we provide a qualitative discussion of economic benefits at the end of this report in Chapter 4.

¹ 16 U.S.C. §1533(b)(2).

² 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43906.

³ *Ibid.*

OVERVIEW OF THE PROPOSED CRITICAL HABITAT

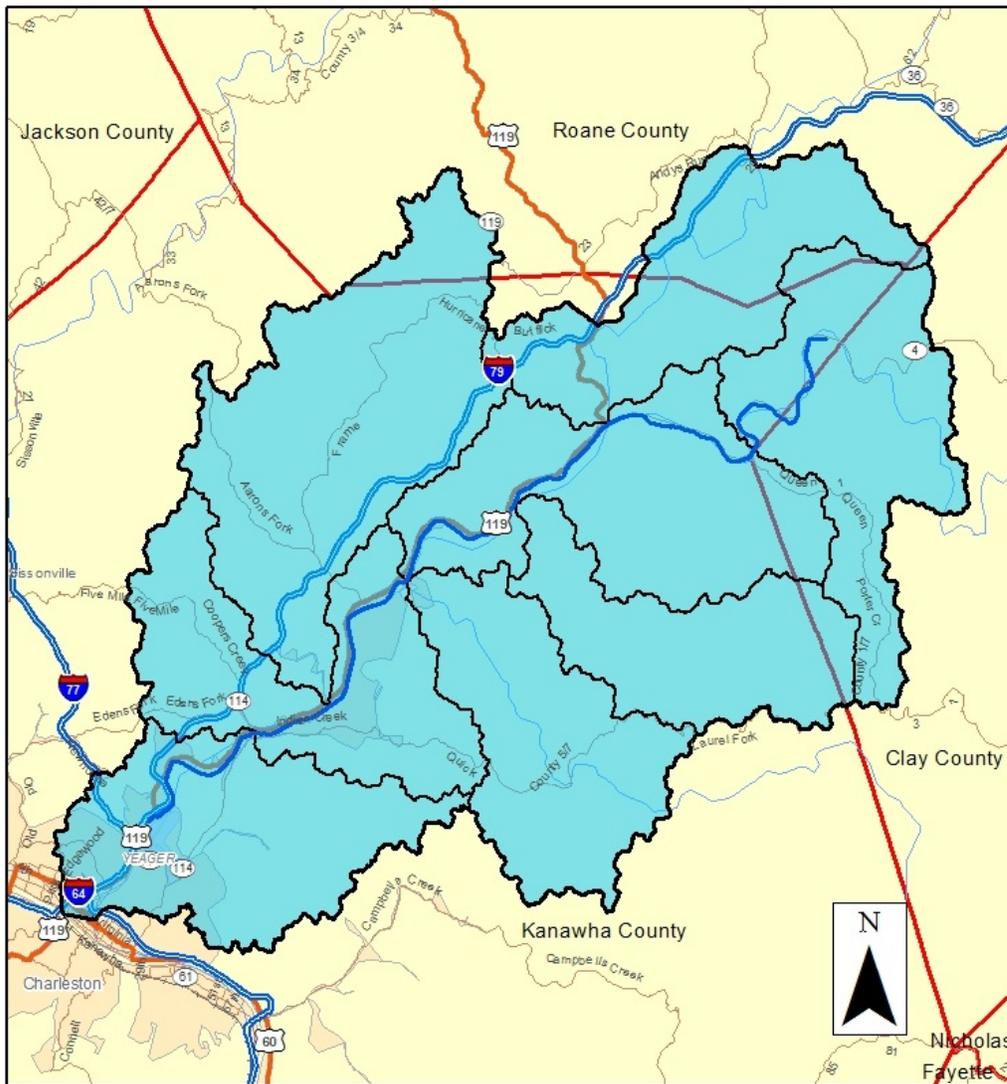
5. The diamond darter is a freshwater fish that generally lives embedded in the bottom of rivers and streams. The primary constituent elements of critical habitat for this species include: 1) a series of connected riffle-pool complexes with moderate velocities in moderate to large-sized, geomorphically stable streams within the Ohio River watershed; 2) stable, undisturbed bottom substrates composed of relatively silt-free, unembedded sand and gravel; (3) a hydrologic flow regime that is relatively unimpeded by impoundment or diversions such that there is minimal departure from a natural hydrograph; (4) adequate water quality necessary for normal behavior, growth, and viability for all life stages of the diamond darter characterized by seasonally moderated temperatures, high dissolved oxygen levels, moderate pH, and low levels of pollutants and siltation; and (5) a prey base of other fish larvae and benthic invertebrates including midge, caddisfly, and mayfly larvae.⁴

6. The Service has proposed approximately 123 miles of river channels located entirely in the Elk and Green Rivers for critical habitat designation for the diamond darter.⁵ Laterally, critical habitat extends to the ordinary high water line. Our analysis evaluates impacts of critical habitat designation on activities within or affecting the proposed critical habitat area. In order to capture the land and water use threats occurring outside of the proposed critical habitat that may affect the physical and biological features of critical habitat, we identify a broader study area for the analysis. Specifically, our study area is defined as all sixth level Hydrologic Unit Code (HUC) watersheds containing the two rivers proposed for critical habitat designation.

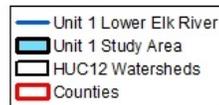
⁴ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43906.

⁵ *Ibid.*

EXHIBIT ES-1. OVERVIEW OF DIAMOND DARTER PROPOSED CRITICAL HABITAT IN UNIT 1: ELK RIVER, WEST VIRGINIA



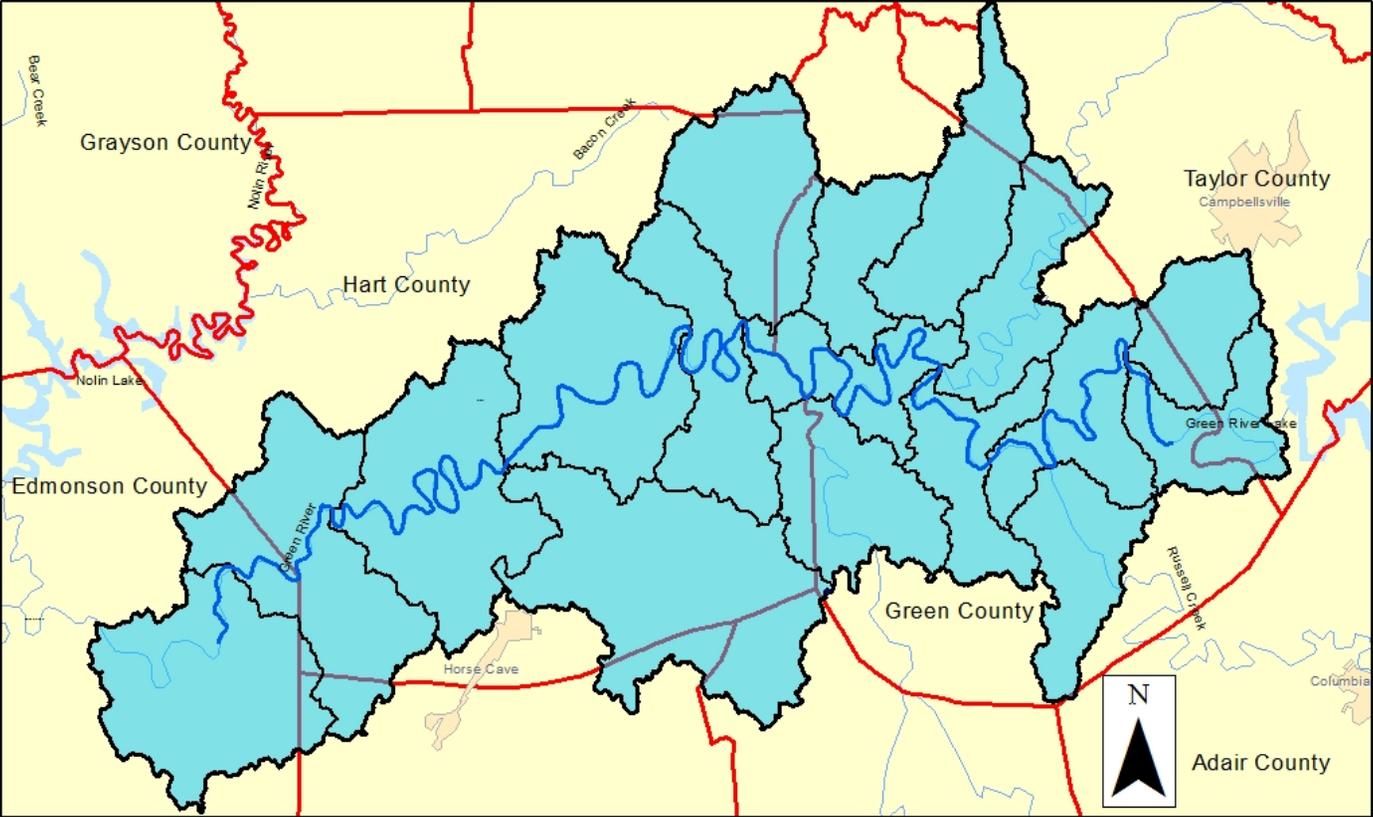
Source:
 1. U.S. Fish and Wildlife Service, West Virginia Field Office
 2. Environmental Systems Research Institute, Inc. (ESRI),
 Redlands, California, USA



Albers Projection
 Central Meridian: -96
 1st Std Parallel: 20
 2nd Std Parallel: 60
 Latitude of Origin: 40

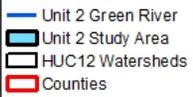


EXHIBIT ES-2. DIAMOND DARTER PROPOSED CRITICAL HABITAT IN UNIT 2: GREEN RIVER, KENTUCKY



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

Albers Projection
 Central Meridian: -96
 1st Std Parallel: 20
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7. The study area is organized into two “units” and corresponding HUCs, as shown in Exhibits ES-1 and ES-2, and occurs within central West Virginia and Kentucky. As shown in Exhibit ES-3, in the study area of Unit 1 over 90 percent of the lands are privately owned. The majority of lands in the Unit 2 study area are also privately owned. Approximately 10 percent of the study area of Unit 2 is Federal land within the Mammoth Cave National Park (MCNP), with a small amount of State lands and private conservation land. Note that information presented in Exhibit ES-3 reflects the distribution of land ownership within the study area, whereas land ownership estimates in the Proposed Rule reflect the type of owner of the riverbed and its stream banks.

EXHIBIT ES-3. LAND OWNERSHIP/MANAGEMENT WITHIN STUDY AREAS

LAND OWNERSHIP TYPE	ACRES (PERCENTAGE OF TOTAL)		
	UNIT 1	UNIT 2	TOTAL
Federal Land	0 (0%)	35,138 (9.6%)	35,138 (6.5%)
State Land	15,050 (8.5%)	138 (0.04%)	15,188 (2.8%)
Private Conservation Lands	0 (0%)	1,523 (0.4%)	1,523 (0.3%)
Private Land	161,826 (91.5%)	331,047 (90.0%)	492,873 (90.5%)
Total	176,876	367,846	544,722
Notes: 1. The Proposed Rule provides information on ownership of the riverbed and stream banks within the proposed critical habitat designation, whereas this exhibit provides ownership information within the much broader study area. As a result, estimates presented here differ from those presented in the Proposed Rule. 2. Totals may not sum due to rounding. Source: Protected Areas Database (PAD-US), CBI Edition 1.1, 2010.			

8. Review of the Proposed Rule, consultation history, and existing conservation plans identified the following economic activities as potential threats to the diamond darter and its habitat within the boundaries of proposed critical habitat. We therefore focus this analysis of potential impacts of diamond darter conservation on these activities.
- **Resource Extraction (coal, gravel and rock mining; and oil and natural gas exploration) and Utilities.** Resource extraction activities degrade water quality through siltation and contamination and alter stream banks and bottoms through direct in-stream disturbance. Some impoundments and dredge and fill operations may be associated with resource extraction, potentially modifying hydrology and disturbing substrate. Construction and maintenance of utility infrastructure degrades water quality through siltation and cause direct disturbance of in-stream habitats and riparian corridors.
 - **Timber Management, Agriculture, and Grazing.** Timber management, agriculture, and livestock grazing alter the hydrology and degrade the water quality of proposed diamond darter critical habitat through the removal of riparian vegetation, reduced bank stability, introduction of pesticides and fertilizers into the watershed, increased sedimentation due to stream bank trampling, higher peak flows and channel

incisement, lower base flows, changes in channel morphology, and loss of nutrients within the stream channel.

- **Other In-Stream Work.** Impoundments, dams, diversions, dredging, and channelization degrade water quality through siltation; alter stream hydrology and flow levels; and cause direct disturbances of in-stream habitats and riparian corridors. Recreational uses, such as construction of boat launches and other in-stream construction have the potential to negatively affect critical habitat by degrading water quality and habitats within the stream channel through direct disturbance of the stream and the spread of didymo and invasive species. Disposal of dredged material into proposed critical habitat can alter or destroy habitat through direct, in-stream disturbance.
- **Transportation (roads, highways, bridges).** Construction and maintenance of transportation infrastructure degrades water quality through siltation and is associated with destruction, modification, and curtailment of the species' habitat and range from direct disturbance of the stream banks, streambeds, and riparian areas, or through placing fill or other materials in the river. Road and highway construction also contributes to degradation of water quality through increased runoff of contaminated stormwater and road salts.
- **Water Quality/Sewage Management.** Untreated domestic sewage and poorly operating septic systems have the potential to degrade water quality through the introduction of chemical contamination and nutrient loading.

SUMMARY OF KEY FINDINGS

9. **The types of conservation efforts requested by the Service during section 7 consultation regarding the diamond darter are not expected to change due to critical habitat designation.** The Service believes that “in most cases, the results of consultation on projects in occupied diamond darter habitat under the adverse modification and jeopardy standards are likely to be similar because the diamond darter's entire life history is reliant on the presence of all the [critical habitat] primary constituent elements being present within one contiguous stream reach.”⁶ As a result, in the occupied Unit 1, the Service anticipates that the conservation efforts it would recommend to avoid jeopardy to the diamond darter would be the same as conservation efforts it would recommend to avoid adverse modification of critical habitat in that unit. While Unit 2 is unoccupied by the diamond darter, the entire unit is occupied by at least one mussel species that is already listed under the Act. During previous consultations for the mussels, the Service's management recommendations included using enhanced sedimentation and erosion control measures, avoiding in-stream disturbances, conducting project activities away from the river, and minimizing disturbances to and fill of lands adjacent to the river and stream tributaries.⁷ The Service anticipates that these and other conservation efforts it would recommend to avoid jeopardy to listed mussel species would provide sufficient

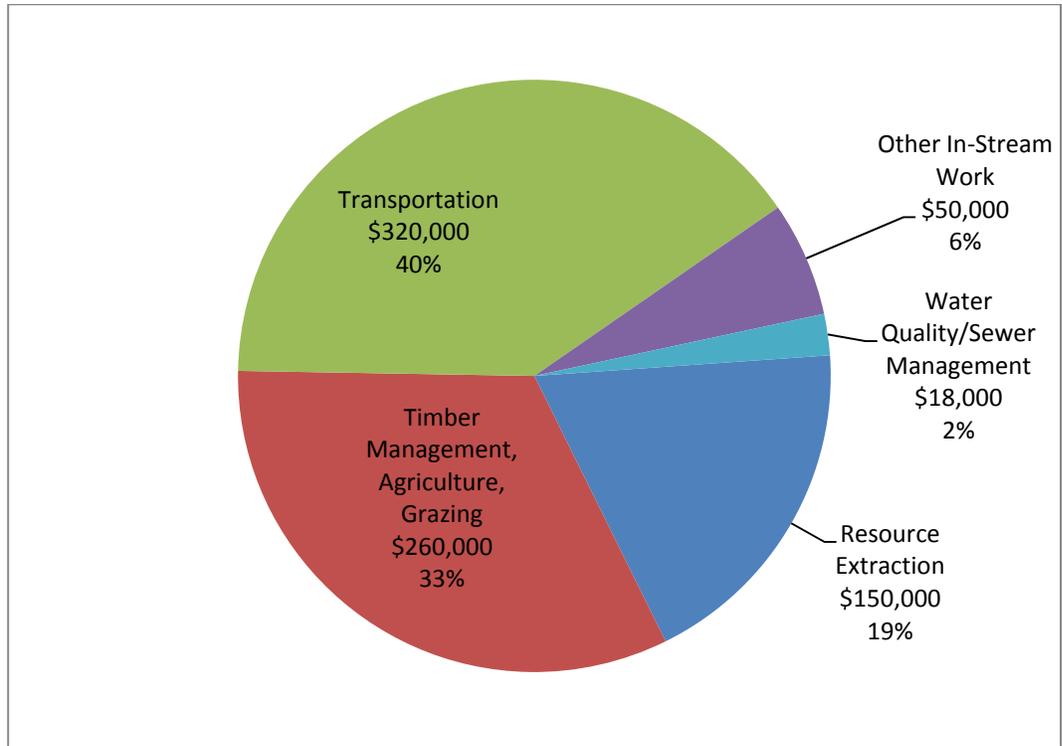
⁶ U.S. Fish and Wildlife Service, Incremental Effects Memorandum, September 28, 2012. See Appendix D.

⁷ *Ibid.*

protection to avoid adverse modification of critical habitat for the diamond darter. Therefore, we anticipate that critical habitat designation will not generate additional requests for project modification in either of the proposed critical habitat units above and beyond those requested due to the presence of listed species.

10. **Indirect incremental impacts are unlikely to result from the designation of critical habitat for the diamond darter.** Based on discussions with State and local regulatory authorities, including West Virginia Department of Environmental Protection (WVDEP) and Kentucky Division of Water (KYDW), land and water management practices are not expected to change due to the designation of critical habitat.
11. **Incremental impacts of critical habitat designation are limited to additional administrative costs of consultations.** Once critical habitat is designated, some additional effort is likely to be required as part of section 7 consultation to describe the potential for projects to result in adverse modification. This is reflected in additional hours spent in communication with the Service and on activities such as report-writing and project documentation.
12. The forecast present value of total incremental cost of critical habitat designation for both units is \$800,000 assuming a seven percent discount rate, or \$70,000 on an annualized basis. Exhibit 4-2 provides the estimated incremental impacts by activity. As shown in Exhibit ES-4, transportation activities are likely to be subject to the greatest incremental impacts at \$320,000 over 20 years, followed by timber management, agriculture, and grazing activities at \$260,000; resource extraction activities at \$150,000; other in-stream work at \$50,000; and water quality/sewage management at \$18,000 (present values over 20 years assuming a seven percent discount rate).
13. Because the incremental costs of the designation are administrative in nature, the proportion of total impacts likely to be experienced by each category of economic activity is driven by the number of anticipated projects in each category.

EXHIBIT ES-4. FORECAST INCREMENTAL IMPACTS BY ECONOMIC ACTIVITY (2013-2032, PRESENT VALUE, SEVEN PERCENT DISCOUNT RATE)



14. Exhibit ES-5 presents the estimated incremental impacts of diamond darter conservation over the next 20 years (2013 to 2032) by unit. Unit 2 is expected to incur \$450,000 in incremental costs over the next 20 years, while Unit 1 is expected to incur \$350,000 in incremental costs.

EXHIBIT ES-5. TOTAL FORECAST INCREMENTAL IMPACTS BY UNIT (2013-2032, PRESENT VALUE, SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE	ANNUALIZED
1 - Lower Elk River	\$350,000	\$31,000
2 - Green River	\$450,000	\$39,000
TOTAL	\$800,000	\$70,000
Notes: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

POTENTIAL IMPACTS TO SMALL ENTITIES

15. This analysis estimates that four small governments (counties) may be affected by the rule: Clay County, West Virginia, and Hart, Green, and Edmonson Counties, Kentucky. The affected counties represent three percent of small counties in West Virginia and Kentucky. We anticipate each of these four counties may be affected each year, with an impact ranging from approximately \$1,000 to \$10,000 per county for consultations on utility pipeline activity and approximately \$1,000 to \$10,000 per county for consultations on in-stream activity. For both activities, this represents less than one percent of annual revenues assuming annual county tax revenues of at least \$1 million. The other county within the study area, Kanawha County, West Virginia, does not meet the definition of a small government.
16. We forecast that six coal mining-related entities may incur administrative costs associated with section 7 consultations over 20 years. Assuming that all of these entities are small, they will represent 43 percent of all small mining companies in the affected counties. Annualized impacts per entity range from approximately \$1,000 to \$10,000, which represents less than one percent of annual, per entity revenues.
17. Approximately 190 other entities may incur administrative costs associated with section 7 consultations on timber management, agriculture, and grazing over the 2013 to 2032 period. Assuming that all of these entities are small, they represent approximately 80 percent of all small logging, farming, and grazing firms in the affected counties. Annualized impacts per entity range from approximately \$1,000 to \$10,000, which represents less than one percent of annual, per entity revenues.

ORGANIZATION OF REPORT

18. This report is organized into four chapters. Chapter 1 provides background on the proposed critical habitat rule. Chapter 2 discusses the framework employed in the analysis. Chapter 3 describes the baseline protections currently afforded the diamond darter and its habitat, and Chapter 4 discusses the potential incremental economic impacts of critical habitat designation for the diamond darter. Chapter 4 also provides a brief discussion of potential benefits of the designation. Finally, there are four appendices to this report: Appendix A discusses our small business and energy impacts analyses; Appendix B describes the sensitivity of results to changes in the assumed real discount rate; Appendix C presents undiscounted impacts by economic activity; and Appendix D provides a memorandum from the Service describing potential changes in conservation recommended for the species due to critical habitat designation.

CHAPTER 1 | INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

19. This chapter provides an overview of the proposed critical habitat for the diamond darter. This species is proposed to be listed as endangered concurrent with the proposed designation of critical habitat. This chapter also includes a summary of past legal actions that relate to the current proposal, a description of the area proposed for designation, and a discussion of threats to the proposed critical habitat. This information provides context for the analysis contained in Chapters 2, 3 and 4 of this report. All official definitions and proposed critical habitat boundaries are provided in the Proposed Rule.⁸

1.1.1 PREVIOUS FEDERAL ACTIONS

20. The diamond darter was first identified as a candidate for protection under the Act in the November 9, 2009, Candidate Notice of Review (CNOR).⁹ The species was subsequently included in two additional CNORs on November 10, 2010 and October 26, 2011.¹⁰ On July 26, 2012, the Service proposed to list the diamond darter and to designate critical habitat.¹¹ This economic analysis will inform the final critical habitat designation for the species.

1.1.2 PROPOSED CRITICAL HABITAT DESIGNATION

21. The Service proposes to designate approximately 123 miles of river channel as critical habitat, in two units: Unit 1 includes portions of the Elk River in Kanawha and Clay Counties, West Virginia, and Unit 2 includes portions of the Green River in Edmonson, Hart, and Green Counties, Kentucky.¹² The reach of the Elk River in Unit 1 is known to be currently occupied by the diamond darter, while the portion of the Green River in Unit 2 is not currently occupied by the species, but is within the species' historical range. In Kentucky, landowners maintain ownership of the streambed under non-navigable streams, but the water itself is under State jurisdiction. In West Virginia, the State owns the bed and banks of streams between the ordinary low-water marks, and reserves a public easement between the ordinary low-water and high-water marks.¹³

⁸ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43906.

⁹ 2009 Notice of Review, 74 FR 57804.

¹⁰ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43907.

¹¹ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43906.

¹² *Ibid.*

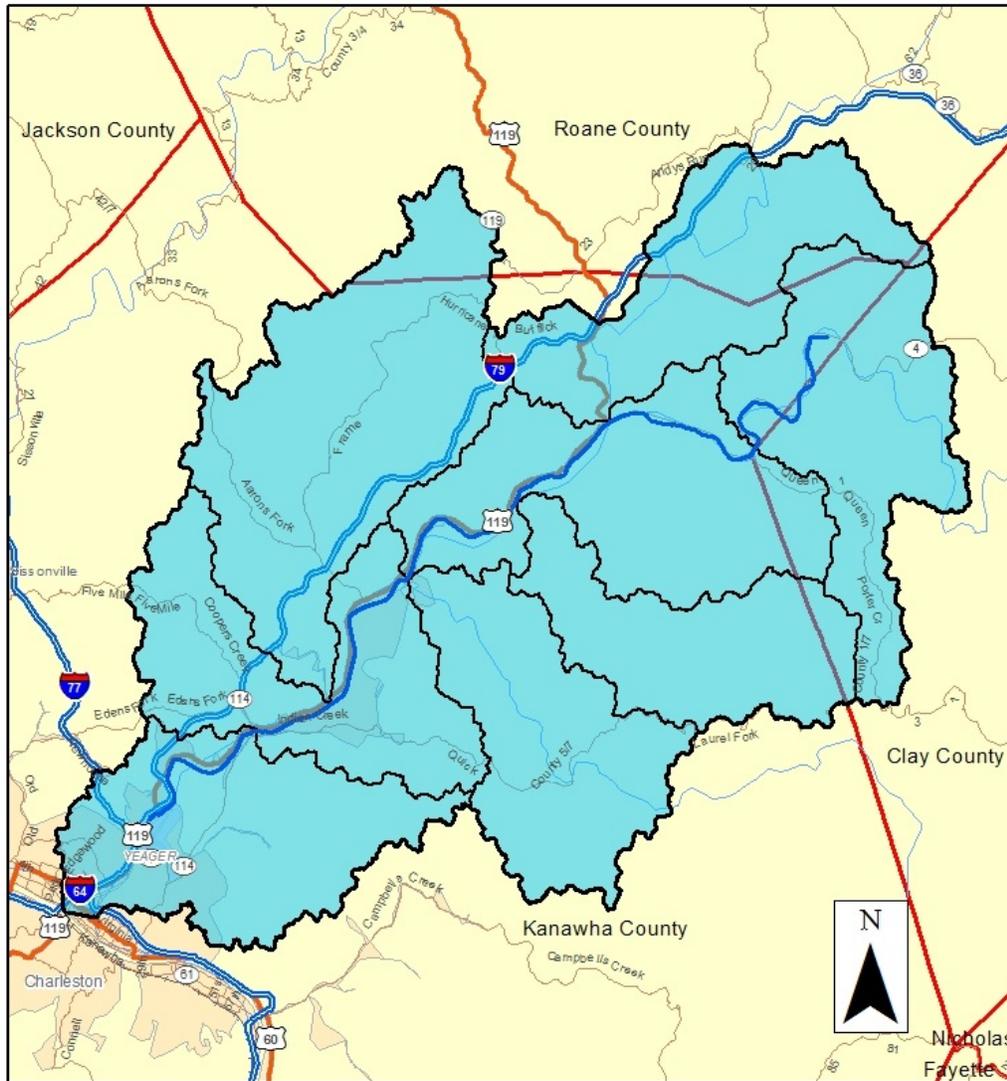
¹³ *Ibid.*

22. Laterally, proposed critical habitat extends to the ordinary high water line.¹⁴ The Proposed Rule provides ownership information for the riparian lands adjacent to the rivers proposed as critical habitat -- in both units, the majority of these lands are privately-owned, with the remaining lands owned by county, State, or Federal entities.¹⁵
23. Our analysis evaluates impacts of critical habitat designation on activities within or affecting the proposed critical habitat area. In order to capture the land and water use occurring outside of the proposed critical habitat that may affect the physical and biological features of critical habitat, we identify a broader study area for this analysis. Specifically, our “study area” is defined as all sixth level (12-digit) HUC watersheds containing the rivers proposed as critical habitat designation as well as significant tributaries of those rivers. Exhibits 1-1 and 1-2 identify the rivers proposed as critical habitat and the surrounding HUCs that constitute the study area for this analysis.

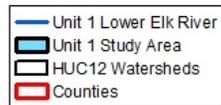
¹⁴ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43929.

¹⁵ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43906.

EXHIBIT 1-1. OVERVIEW OF DIAMOND DARTER PROPOSED CRITICAL HABITAT IN UNIT 1: ELK RIVER, WEST VIRGINIA



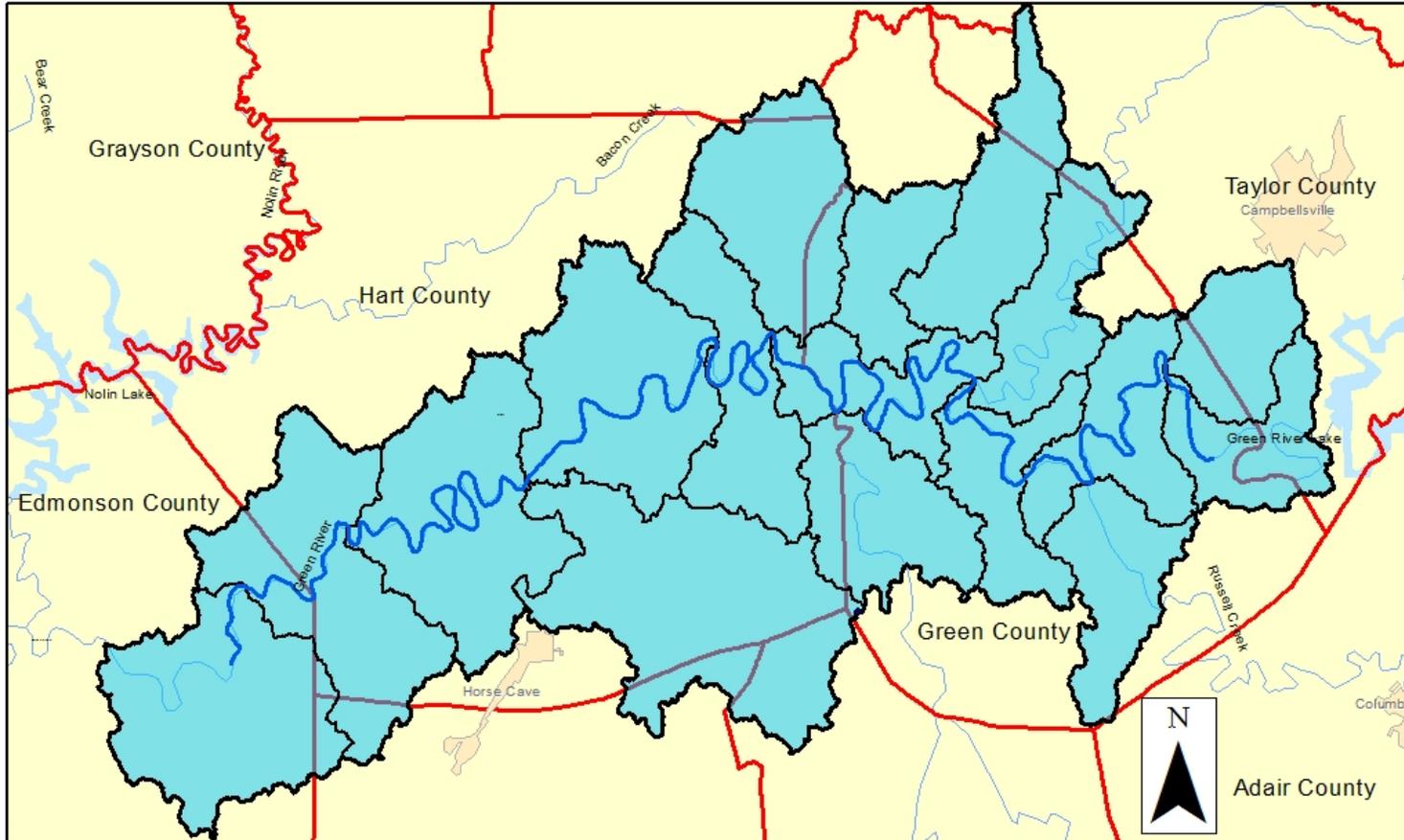
Source:
 1. U.S. Fish and Wildlife Service, West Virginia Field Office
 2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA



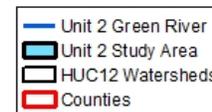
Albers Projection
 Central Meridian: -96
 1st Std Parallel: 20
 2nd Std Parallel: 60
 Latitude of Origin: 40



EXHIBIT 1-2. OVERVIEW OF DIAMOND DARTER PROPOSED CRITICAL HABITAT IN UNIT 2: GREEN RIVER, KENTUCKY



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



Albers Projection
 Central Meridian: -96
 1st Std Parallel: 20
 2nd Std Parallel: 60
 Latitude of Origin: 40

24. Exhibit 1-3 provides information on land ownership in the study area. In the Unit 1 study area, the majority (over 90 percent) of lands are privately owned. Approximately 10 percent of the study area of Unit 2 is Federal land within the MCNP, with a small amount of State lands and private conservation land. The remainder of the unit is privately owned. Note that information presented in Exhibit 1-3 reflects the distribution of land ownership within the study area, whereas land ownership estimates contained in the Proposed Rule reflect the type of owner of the riverbed and its stream banks.

EXHIBIT 1-3. LAND OWNERSHIP/MANAGEMENT WITHIN STUDY AREAS

LAND OWNERSHIP TYPE	ACRES (PERCENTAGE OF TOTAL)		
	UNIT 1	UNIT 2	TOTAL
Federal Land	0 (0%)	35,138 (9.6%)	35,138 (6.5%)
State Land	15,050 (8.5%)	138 (0.04%)	15,188 (2.8%)
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Private Land	161,826 (91.5%)	331,047 (90.0%)	492,873 (90.5%)
Total	176,876	367,846	544,722
Notes: 1. The Proposed Rule provides information on ownership of the riverbed and stream banks within the proposed critical habitat designation, whereas this exhibit provides ownership information within a broader study area. As a result, estimates presented here differ from those presented in the Proposed Rule. 2. Totals may not sum due to rounding. Source: Protected Areas Database (PAD-US), CBI Edition 1.1, 2010.			

1.2 ECONOMIC ACTIVITIES CONSIDERED IN THIS ANALYSIS

25. The primary threats to the diamond darter, as identified in the Proposed Rule, include physical habitat destruction, modification, and contamination resulting from a variety of human activities. Although other threats to the diamond darter and its habitat exist. However this analysis focuses on the human activities that may potentially result in destruction, modification, and contamination of habitat. Specifically, the Service identifies the following impacts of human activity as potentially threatening to the species: siltation; alteration of stream banks and bottoms; channelization and diversion; nutrient enrichment; and other contamination of water. We address these threats as potential consequences of the identified land and water use activities described below.
26. We identified the following economic activities as potential threats to the diamond darter and its habitat within the study area. These activities are based on a review the Proposed Rule; a Service incremental effects memorandum describing potential changes in conservation recommended for the species due to critical habitat designation (see Appendix D); and consultations developed for co-occurring listed mussel species.
1. **Resource Extraction (coal, gravel and rock mining; and oil and natural gas exploration) and Utilities.** Resource extraction activities can degrade water quality through siltation and contamination and can alter stream banks and bottoms through direct in-stream disturbance. Some impoundments and dredge and fill operations may be associated with resource extraction, potentially

modifying hydrology and disturbing substrate. Construction and maintenance of utility infrastructure can degrade water quality through siltation and cause direct disturbance of in-stream habitats and riparian corridors.

2. **Timber Management, Agriculture, and Grazing.** Timber management, agriculture, and livestock grazing can alter the hydrology and degrade the water quality in proposed diamond darter critical habitat through the removal of riparian vegetation, reduced bank stability, introduction of pesticides and fertilizers into the watershed, increased sedimentation due to stream bank trampling, higher peak flows and channel incisement, lower base flows, changes in channel morphology, and loss of nutrients within the stream channel.
 3. **Other In-Stream Work.** Impoundments, dams, diversions, dredging, and channelization can degrade water quality through siltation; alter stream hydrology and flow levels; and cause direct disturbances of in-stream habitats and riparian corridors. Recreational uses, such as construction of boat launches and other in-stream construction have the potential to negatively affect critical habitat by degrading water quality and habitats within the stream channel through direct disturbance of the stream and the spread of didymo and other invasive species.¹⁶ Disposal of dredged material into proposed critical habitat can alter or destroy habitat through direct, in-stream disturbance.
 4. **Transportation (roads, highways, bridges).** Construction and maintenance of transportation infrastructure can degrade water quality through siltation. These activities can also be associated with destruction, modification, and curtailment of the species' habitat and range from direct disturbance of the stream banks, streambeds, and riparian areas, or through placing fill or other materials in the river. Road and highway construction can also contribute to degradation of water quality through increased runoff of contaminated stormwater and road salts.
 5. **Water Quality/Sewage Management.** Untreated domestic sewage discharge and poorly operating septic systems have the potential to degrade water quality through the introduction of chemical contamination and nutrient loading.
27. We discuss the level of activity and management of these threats within the study area absent critical habitat (i.e., under baseline conditions) and following critical habitat designation (i.e., to identify incremental impacts) in Chapters 3 and 4, respectively. In addition to the above activities, we also consider impacts to water quality management efforts, which are discussed in greater detail in Chapter 4.

1.3 ORGANIZATION OF THE REPORT

28. The remainder of this report includes three additional chapters. Chapter 2 discusses the framework employed in the analysis, Chapter 3 describes the baseline protections currently afforded the diamond darter and its habitat, and Chapter 4 describes the incremental impacts of critical habitat designation for the diamond darter. In addition, the report includes four appendices: Appendix A considers potential impacts on small entities and the energy industry; Appendix B provides information on the sensitivity of the

¹⁶ *Didymosphenia geminata* is an invasive species of algae found in freshwater rivers and streams.

economic impact estimates to alternative discount rates; Appendix C provides undiscounted impacts by economic activity; and Appendix D provides the Service's memorandum to IEC describing potential changes in conservation recommendations for the species due to critical habitat designation.

CHAPTER 2 | FRAMEWORK FOR THE ANALYSIS

29. The purpose of this report is to estimate the economic impact of actions taken to protect the diamond darter and its habitat. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the species and its habitat within the proposed critical habitat area. This analysis employs "without critical habitat" and "with critical habitat" scenarios. The "without critical habitat" scenario represents the baseline for the analysis, considering protections afforded the diamond darter absent critical habitat designation, including listing under the Act, other Federal protections, and 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 diamond darter.
30. According to section 4(b)(2) of the Act, the Service must consider the economic impacts, impacts to national security, and other relevant impacts of designating any particular area as critical habitat. An area may be excluded from designation as critical habitat if the benefits of exclusion (i.e., the impacts that would be avoided if an area were excluded from the designation) outweigh the benefits of designation so long as exclusion of the area will not result in extinction of the species. **The purpose of the economic analysis is to provide information to assist the Secretary of the DOI in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.**¹⁷ 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).¹⁸
31. This chapter describes the framework for this analysis. The chapter first provides a background of case law that led to the selection of the framework applied in this report. We then describe in economic terms the general categories of economic effects that are the focus of the impact analysis, including a discussion of both efficiency and distributional effects. This chapter then defines the analytic framework used to measure these impacts in the context of critical habitat regulation and the consideration of benefits. It concludes with a description of the information sources relied upon in the analysis and notes on the presentation of the results.

¹⁷ 16 U.S.C. §1533(b)(2).

¹⁸ Executive Order 12866, Regulatory Planning and Review, September 30, 1993; Executive Order 13563, Improving Regulation and Regulatory Review, January 18, 2011; Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001; 5. U.S.C. §§601 et seq; and Pub Law No. 104-121.

2.1 BACKGROUND

32. 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. 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."¹⁹ In other words, the baseline includes the existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat. Impacts that are incremental to that baseline (i.e., occurring over and above existing constraints) are attributable to the proposed regulation. Significant debate has occurred regarding whether assessing the impacts of the Service's proposed regulations using this baseline approach is appropriate in the context of critical habitat designations.
33. 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.²⁰ 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].²¹

34. Since that decision, however, courts in other cases have held that an incremental analysis of impacts stemming solely from the critical habitat rulemaking is proper.²² For example, in the March 2006 ruling that the August 2004 critical habitat rule for the Peirson's milk-

¹⁹ OMB, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf>.

²⁰ *New Mexico Cattle Growers Assn. v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

²¹ *Ibid.*

²² *Cape Hatteras Access Preservation Alliance v. Department of Interior*, 344 F. Supp. 2d 108 (D.D.C. 2004).; *Center for Biological Diversity v. United States Bureau of Land Management*, 422 F. Supp. 2d 1115 (N.D. Cal. 2006).

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

The Court is not persuaded by the reasoning of *New Mexico Cattle Growers*, and instead agrees with the reasoning and holding of *Cape Hatteras Access Preservation Alliance v. U.S. Dep't of the Interior*, 344 F. Supp 2d 108 (D.D.C. 2004). That case also involved a challenge to the Service's baseline approach and the court held that the baseline approach was both consistent with the language and purpose of the ESA and that it was a reasonable method for assessing the actual costs of a particular critical habitat designation *Id* at 130. 'To find the true cost of a designation, the world with the designation must be compared to the world without it.'²³

35. More recently, in 2010, the U.S. Ninth Circuit Court of Appeals came to similar conclusions during its review of critical habitat designations for the Mexican spotted owl and 15 vernal pool species.²⁴
36. In order to address the divergent opinions of the courts and provide the most complete information to decision-makers, this economic analysis will employ "without critical habitat" and "with critical habitat" scenarios:
 - The "**without critical habitat**" scenario represents the **baseline** for the analysis, which is the state of regulation, absent designation of critical habitat that provides protection to the species under the Act, as well as under other Federal, State and local laws and conservation plans. The baseline includes sections 7, 9, and 10 of the Act to the extent that they are expected to apply absent the designation of critical habitat for the species. The analysis will qualitatively describe how baseline conservation for the diamond darter is currently implemented across the proposed designation in order to provide context for the incremental analysis (Chapter 3).
 - The "**with critical habitat**" scenario describes and monetizes the **incremental** impacts due specifically to the designation of critical habitat for the species. The incremental diamond darter conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat. This report focuses on the incremental analysis (Chapter 4).
37. Incremental effects of critical habitat designation are determined using the Service's December 9, 2004 interim guidance on "Application of the 'Destruction or Adverse Modification' Standard Under Section 7(a)(2) of the Endangered Species Act" and information from the Service regarding what potential consultations and project modifications may be imposed as a result of critical habitat designation over and above

²³ *Center for Biological Diversity v. United States Bureau of Land Management* 422 F. Supp.2d 1115 (N.D. Cal. 2006).

²⁴ *Home Builders Association of Northern California v. United States Fish and Wildlife Service*, 616 F.3d 983 (9th Cir. 2010), cert. denied, 179 L. Ed 2d 301, 2011 U.S. Lexis 1392, 79 U.S.L.W. 3475 (2011); *Arizona Cattle Growers v. Salazar*, 606 F. 3d 1160 (9th Cir. 2010), cert. denied, 179 L. Ed. 2d 300, 2011 U.S. Lexis 1362, 79 U.S.L.W. 3475 (2011).

those associated with the listing.²⁵ 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.²⁶ Under the Act, the Service determines destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the affected critical habitat would remain functional to serve its intended conservation role for the species.

38. A detailed description of the methods used to define baseline and incremental impacts is provided in Section 2.3.

2.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

39. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the diamond darter and its habitat (hereinafter referred to collectively as "diamond darter 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 diamond darter conservation efforts.
40. This analysis also addresses the distribution of impacts associated with the designation, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation efforts on small entities and the energy industry. This information may be used by decision-makers to assess whether the effects of species conservation efforts unduly burden a particular group or economic sector. For example, while conservation efforts may have a small impact relative to the national economy, individuals employed in a particular sector of the regional economy may experience relatively greater impacts. The differences between economic efficiency effects and distributional effects, as well as their application in this analysis, are discussed in greater detail below.

2.2.1 EFFICIENCY EFFECTS

41. 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 diamond darter habitat, these efficiency effects

²⁵ 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.

²⁶ *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, 378 F.3d 1059 (9th Cir. 2004).

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.²⁷

42. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a Federal land manager may enter into a consultation with the Service to ensure that a particular activity will not adversely modify critical habitat. The effort required for the consultation is an economic opportunity cost because the landowner or manager's time and effort would have been spent in an alternative activity had the parcel not been included in the designation. When compliance activity is not expected to significantly affect markets -- that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price -- the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.
43. 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.
44. This analysis begins by measuring impacts associated with efforts undertaken to protect the diamond darter and its habitat. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. However, if the cost of conservation efforts is expected to significantly impact markets, the analysis will consider potential changes in consumer and/or producer surplus in affected markets. As described in Chapter 4, in the case of the diamond darter, conservation efforts are not anticipated to significantly affect markets; therefore, this report focuses on compliance costs.

2.2.2 DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

45. 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.²⁸ 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.

²⁷ 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>.

²⁸ 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>.

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

46. 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.²⁹ 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.³⁰

Regional Economic Effects

47. Regional economic impact analysis can provide an assessment of the potential localized effects of conservation efforts. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that represent the relationship between a change in one sector of the economy (e.g., expenditures by recreators) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreators). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.
48. 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.
49. Despite these and other limitations, in certain circumstances regional economic impact analysis may provide useful information about the scale and scope of localized impacts. It is important to remember that measures of regional economic effects generally reflect shifts in resource use rather than efficiency losses. Thus, these types of distributional effects are reported separately from efficiency effects (i.e., not summed). In addition, measures of regional economic impact cannot be compared with estimates of efficiency effects, but should be considered as distinct measures of impact.
50. Impacts associated with diamond darter conservation efforts reflect increased administrative effort to participate in section 7 consultations. As described in the remainder of this report, critical habitat designation is not expected to affect the levels of

²⁹ 5 U.S.C. §§601 *et seq.*

³⁰ Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001.

economic activity occurring within the region. Therefore, measurable impacts of the type typically assessed with input-output models are not anticipated.

2.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

51. This analysis: 1) identifies those economic activities most likely to threaten the diamond darter and its habitat; 2) describes the baseline regulation protection for the species; and 3) monetizes the incremental economic impacts of actions that would be taken to avoid adverse modification of the proposed critical habitat area. This section provides a description of the methods used to separately identify baseline protections from the incremental impacts stemming from the proposed designation of critical habitat for the diamond darter. 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

52. The baseline for this analysis is the state of regulation, absent the designation of critical habitat, including the listing of the species under the Act, as well as protection under other Federal, State and local laws and guidelines. This "without critical habitat designation" scenario also considers a wide range of additional factors beyond the compliance costs of regulations that provide protection to the listed species. As recommended by OMB, the baseline incorporates, as appropriate, trends in market conditions, implementation of other regulations and policies by the Service and other government entities, and trends in other factors that have the potential to affect economic costs and benefits, such as the rate of regional economic growth in potentially affected industries.

53. 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 the Act, even absent critical habitat designation, requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species. Consultations under the jeopardy standard result in administrative costs, as well as impacts of conservation efforts resulting from consideration of this standard.
- Section 9 defines the actions that are prohibited by the Act. In particular, it prohibits the "take" of endangered wildlife, where "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage

in any such conduct."³¹ 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.³² The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately avoided or minimized. The development and implementation of HCPs is considered a baseline protection for the species and habitat unless the HCP is determined to be precipitated by the designation of critical habitat, or the designation influences stipulated conservation efforts under HCPs.

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

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

2.3.2 IDENTIFYING INCREMENTAL IMPACTS

55. 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.
56. 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.

³¹ 16 U.S.C. 1532.

³² U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at <http://endangered.fws.gov/hcp/>.

Direct Impacts

57. 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.
58. Section 7(a)(2) of the Act requires Federal agencies to consult with the Service whenever activities that they undertake, authorize, permit, or fund may affect a listed species or designated critical habitat. In some cases, consultations will involve the Service and another Federal agency only, such as the U.S. Army Corps of Engineers (Corps). Often, they will also include a third party involved in projects that involve a permitted entity, such as the recipient of a CWA section 404 permit.
59. 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.
60. 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

61. 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.

62. In general, three different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:
1. **Additional effort to address adverse modification in a new consultation** - New consultations taking place after critical habitat designation may require additional effort to address critical habitat issues above and beyond the listing issues. In this case, only the additional administrative effort required to consider critical habitat is considered an incremental impact of the designation.
 2. **Re-initiation of consultation to address adverse modification** - Consultations considering other listed species that have already been completed on a project or activity may require re-initiation to address diamond darter critical habitat. In this case, the costs of re-initiating the consultation, including all associated administrative and project modification costs are considered incremental impacts of the designation.
 3. **Incremental consultation resulting entirely from critical habitat designation** - Critical habitat designation may trigger additional consultations that may not occur absent the designation (e.g., for an activity for which adverse modification may be an issue, while jeopardy is not, or consultations resulting from the new information about the potential presence of the species provided by the designation). Such consultations may, for example, be triggered in critical habitat areas that are not occupied by the species. All associated administrative and project modification costs of incremental consultations are considered incremental impacts of the designation.
63. The administrative costs of these consultations vary depending on the specifics of the project. One way to address this variability is to show a range of possible costs of consultation, as it may not be possible to predict the precise outcome of each future consultation in terms of level of effort. Review of consultation records and discussions with Service field offices resulted in a range of estimated administrative costs of consultation.
64. Exhibit 2-1 provides the incremental administrative consultation costs applied in this analysis. To estimate the fractions of the total administrative consultation costs that are baseline and incremental, the following assumptions are applied.
- The greatest effort will be associated with consultations that consider both jeopardy and adverse modification. Depending on whether the consultation is precipitated by the listing or the critical habitat designation, part or all of the costs, respectively, will be attributed to the critical habitat designation.
 - Efficiencies exist when considering both jeopardy and adverse modification at the same time (e.g., in staff time saved for project review and report writing), and therefore incremental administrative costs of considering adverse modification in consultations precipitated by the listing result in the least incremental effort, roughly 25 percent of the cost of the entire consultation.³³ The remaining 75

³³ U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at <http://endangered.fws.gov/hcp/>.

percent of the costs are attributed to consideration of the jeopardy standard in the baseline scenario. This latter amount also represents the cost of a consultation that only considers adverse modification (e.g., an incremental consultation for activities in unoccupied critical habitat) and is attributed wholly to critical habitat.

- Incremental costs of the re-initiation of a previously completed consultation because of the critical habitat designation are assumed to be approximately half the cost of a consultation considering both jeopardy and adverse modification. This assumes that re-initiations are less time-consuming as the groundwork for the project has already been considered in terms of its effect on the species. However, because the previously completed effort must be re-opened, they are more costly than simply adding consideration of critical habitat to a consultation already underway.

EXHIBIT 2-1. INCREMENTAL ADMINISTRATIVE CONSULTATION COSTS (2012 DOLLARS)

INCREMENTAL ADMINISTRATIVE COSTS OF CONSULTATION					
CONSULTATION TYPE	SERVICE	FEDERAL AGENCY	THIRD PARTY	BIOLOGICAL ASSESSMENT	TOTAL COSTS
NEW CONSULTATION RESULTING ENTIRELY FROM CRITICAL HABITAT DESIGNATION (TOTAL COST OF A CONSULTATION CONSIDERING BOTH JEOPARDY AND ADVERSE MODIFICATION)					
Informal	\$2,500	\$3,100	\$2,100	\$2,000	\$9,600
Formal	\$5,500	\$6,200	\$3,500	\$4,800	\$20,000
Programmatic	\$17,000	\$14,000	n/a	\$5,600	\$36,000
RE-INITIATION OF CONSULTATION TO ADDRESS ADVERSE MODIFICATION					
Informal	\$1,200	\$1,600	\$1,000	\$1,000	\$4,800
Formal	\$2,800	\$3,100	\$1,800	\$2,400	\$10,000
Programmatic	\$8,300	\$6,900	n/a	\$2,800	\$18,000
ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION					
Informal	\$620	\$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, 2012, 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.					

Section 7 Conservation Effort Impacts

65. Section 7 consultation considering critical habitat may also result in additional conservation effort recommendations specifically addressing potential destruction or adverse modification of critical habitat. For forecast consultations considering jeopardy and adverse modification, and for re-initiations of past consultations to consider critical habitat, the economic impacts of conservation efforts undertaken to avoid adverse modification are considered incremental impacts of critical habitat designation. For consultations that are forecast to occur specifically because of the designation (incremental consultations), impacts of all associated conservation efforts are assumed to be incremental impacts of the designation. This is summarized below.
1. **Additional effort to address adverse modification in a new consultation** - Only project modifications above and beyond what would be requested to avoid or minimize jeopardy are considered incremental.
 2. **Re-initiation of consultation to address adverse modification** - Only project modifications above and beyond what was requested to avoid or minimize jeopardy are considered incremental.
 3. **Incremental consultation resulting entirely from critical habitat designation** - Impacts of all project modifications are considered incremental.
66. To inform the economic analysis, the Service provided a memorandum describing its expected approach to conservation for the diamond darter following critical habitat designation.³⁴ Specifically, this memorandum provides information on how the Service intends to address projects that might lead to adverse modification of critical habitat as distinct from projects that pose jeopardy to the species. In the memorandum, the Service states:
- There is a close relationship between the health of the diamond darter and the health of its habitat. Alterations of habitat that diminish the value (e.g., actions which alter hydrology, water quality, or suitability of substrate) and the amount of diamond darter habitat would likely affect its population size and ability to recruit, cause further range declines, and could appreciably reduce the species' likelihood of survival and recovery in the wild. Such habitat alterations could, therefore, constitute jeopardy to the species. In most cases, the results of consultation on projects in occupied diamond darter habitat under the adverse modification and jeopardy standards are likely to be similar because the diamond darter's entire life history is reliant on the presence of all the primary constituent elements (PCEs) being present within one contiguous stream reach.³⁵
67. In other words, due to the close ties between the survival of the diamond darter and the quality of its habitat, any conservation efforts the Service requests to avoid adverse modification of critical habitat will most likely match those requested to avoid jeopardy.

³⁴ U.S. Fish and Wildlife Service, Incremental Effects Memorandum, September 28, 2012. See Appendix D.

³⁵ Ibid.

The Service anticipates that the conservation efforts it would recommend to avoid jeopardy to the species would be the same conservation efforts it would recommend to avoid adverse modification of critical habitat for the darter.³⁶ Therefore, this analysis does not expect incremental project modifications to occur within the Unit 1 study area.

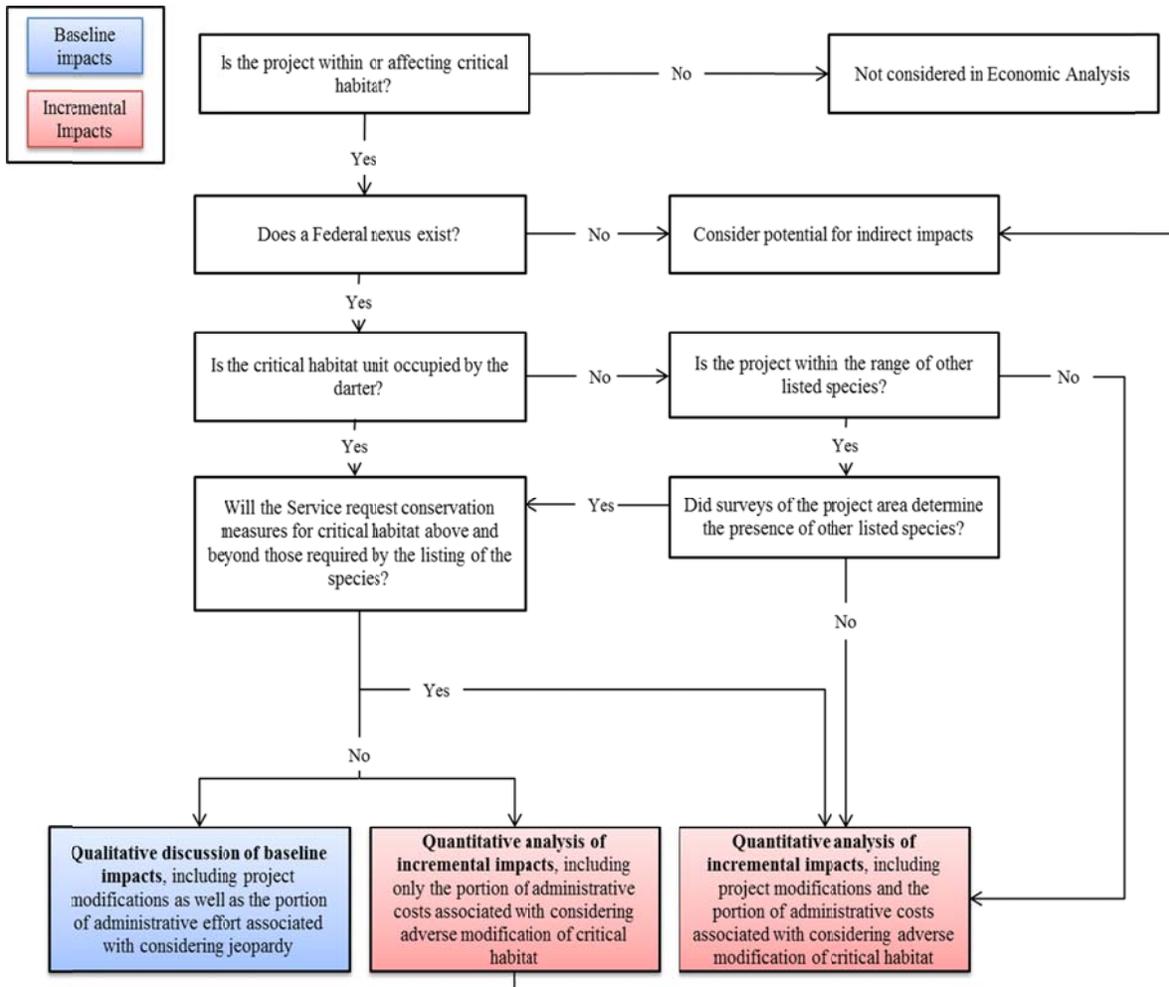
68. In occupied habitat, the Service does not anticipate recommending additional conservation efforts due to critical habitat designation above and beyond those measures requested to avoid jeopardy of the diamond darter. In unoccupied habitat, the Service anticipates potentially recommending project modifications *if* co-occurring listed mussel species are not detected in project area surveys. According to the Service, however, the entirety of proposed critical habitat in Unit 2 is occupied by listed mussel species,³⁷ and surveys conducted for any proposed projects in the unit would detect at least one of those listed species.³⁸ Therefore, this analysis does not expect incremental project modifications to occur within the Unit 2 study area, as any conservation measures the Service requests to avoid jeopardy to any or all of the listed mussel species would be sufficient to avoid both jeopardy of the diamond darter and adverse modification of its critical habitat. As a result, the incremental economic impacts of the critical habitat designation reported in this analysis are limited to additional administrative costs to the Service, Federal agencies and private third parties of considering critical habitat as part of section 7 consultation.
69. Exhibit 2-2 summarizes the decision framework employed in this analysis to estimate the incremental impacts of the proposed designation.

³⁶ Personal communication on kick-off call with the Service, October 18, 2012.

³⁷ The nine species include: northern riffleshell (*Epioblasma torulosa rangiana*), snuffbox (*E. triquetra*), pink mucket (*Lampsilis abrupta*), ring pink (*Obavaria retusa*), rough pigtoe (*Pleura bema plenum*), clubshell (*P. clava*), fanshell (*Cypragenia stegaria*), spectaclecase (*Cumberlandia manadanta*), and sheepnose (*Plethabasus cyphus*). See U.S. Fish and Wildlife Service, Incremental Effects Memorandum, September 28, 2012. See Appendix D.

³⁸ Written communication with the Kentucky Field Office on December 12, 2012; Personal communication with Monte McGregor of the Kentucky Department of Fish & Wildlife Resources on December 12, 2012.

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



Indirect Impacts

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

Habitat Conservation Plans

71. Under section 10 of the Act, landowners seeking an incidental take permit must develop an HCP to counterbalance the potential harmful effects that an otherwise lawful activity may have on a species. As such, the purpose of the habitat conservation planning process is to ensure that the effects of incidental take are adequately avoided or minimized. Thus,

HCPs are developed to ensure compliance with section 9 of the Act and to meet the requirements of section 10 of the Act. No permitted HCPs exist that consider the diamond darter or its habitat. NiSource, Inc. developed a draft Multi Species HCP (MSHCP) for its pipeline installation and repair operations, but it does not include the diamond darter as a covered species.^{39,40} Chapter 3 of this report discusses the NiSource MSHCP in greater detail.

Other State and Local Laws

72. 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.
73. In California, for example, the California Environmental Quality Act (CEQA) requires that lead agencies, public agencies responsible for project approval, consider the environmental effects of proposed projects that are considered discretionary in nature and not categorically or statutorily exempt. In some instances, critical habitat designation may trigger CEQA-related requirements. This is most likely to occur in areas where the critical habitat designation provides clearer information on the importance of particular areas as habitat for a listed species. In addition, applicants who were “categorically exempt” from preparing an environmental impact report under CEQA may no longer be exempt once critical habitat is designated. In cases where the designation triggers the CEQA significance test or results in a reduction of categorically exempt activities, associated impacts are considered to be an indirect, incremental effect of the designation. However, neither West Virginia or Kentucky have any similar State or local laws that would trigger additional economic impacts.
74. In the case of diamond darter critical habitat, no indirect, incremental effects are anticipated in association with State and local regulation. The WVDEP and the KYDW regulate water quality within the proposed critical habitat through State water quality regulations. While listed species and critical habitat are considered by certain WVDEP and KYDW programs, the presence of critical habitat does not trigger different behavior or requirements on the part of the WVDEP and KYDW over and above those triggered by the presence of listed species.⁴¹ Chapter 3 of this report discusses these baseline regulations in greater detail.

Additional Indirect Impacts

75. In addition to the indirect effects of compliance with other laws or triggered by the designation, project proponents, land managers and landowners may face additional indirect impacts, including the following:

³⁹ Draft NiSource Multi-Species Habitat Conservation Plan, accessed at <http://www.fws.gov/midwest/Endangered/permits/hcp/nisource/2011NOA/NiSourceDraftHCP.html> on December 30, 2012.

⁴⁰ Personal communication with John Shaffer and Rick Hall, NiSource, on December 17, 2012.

⁴¹ Personal communication with Ben Lowman, WVDEP, on December 6, 2012; personal communication with KYDW on November 30, 2012.

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

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

2.3.3 BENEFITS

76. Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.⁴² OMB's Circular A-4 distinguishes two types of economic benefits: *direct benefits and ancillary benefits*.

⁴² Executive Order 12866, Regulatory Planning and Review, September 30, 1993.

Ancillary benefits are defined as favorable impacts of a rulemaking that are typically unrelated, or secondary, to the statutory purpose of the rulemaking.⁴³

77. 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.⁴⁴ *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.*
78. Critical habitat designation may also generate ancillary benefits. Critical habitat aids in the conservation of species specifically by protecting the primary constituent elements on which the species depends. To this end, critical habitat designation can result in maintenance of particular environmental conditions that may generate other social benefits aside from the preservation of the species. That is, management actions undertaken to conserve a species or habitat may have coincident, positive social welfare implications, such as increased recreational opportunities in a region. While they are not the primary purpose of critical habitat, these ancillary benefits may result in gains in employment, output, or income that may offset the direct, negative impacts to a region's economy resulting from actions to conserve a species or its habitat. As there is expected to be no change in management practices due to this proposed critical habitat designation, the analysis does not anticipate any direct or ancillary economic benefits.

2.3.4 GEOGRAPHIC SCOPE OF THE ANALYSIS

79. The lateral extent of the proposed critical habitat extends to the ordinary high water line.⁴⁵ As described in Chapter 1, this analysis evaluates impacts of critical habitat designation on activities within or affecting the proposed critical habitat area. In order to capture the land and water use threats occurring outside of the proposed critical habitat that may affect the physical and biological features of critical habitat, we identify a broader study area for the analysis including all sixth level HUC watersheds containing the streams proposed for critical habitat designation, as defined in Chapter 1.

2.3.5 ANALYTIC TIME FRAME

80. Ideally, the time frame of this analysis would be based on the expected time period over which the critical habitat regulation is expected to be in place. Specifically, the analysis would forecast impacts of implementing this rule through species recovery (i.e., when the rule is no longer required). Recent guidance from OMB indicates that "if a regulation has no predetermined sunset provision, the agency will need to choose the endpoint of its

⁴³ 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>

⁴⁴ *Ibid.*

⁴⁵ Proposed Listing and Critical Habitat Rule, 77 FR 43930.

analysis on the basis of a judgment about the foreseeable future.”⁴⁶ The “foreseeable future” for this analysis includes, but is not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public (note that “foreseeable future” used in this DEA is different from the foreseeable future as used in the ESA definition of a threatened species). Forecasted impacts will be based on the planning periods for potentially affected projects and will look out over a 20-year time horizon for most activities. OMB supports this time frame stating that “for most agencies, a standard time period of analysis is 10 to 20 years, and rarely exceeds 50 years.”⁴⁷ Therefore, this analysis considers economic impacts to activities over a 20-year period from 2013 (expected year of final critical habitat designation) through 2032.

2.4 INFORMATION SOURCES

81. The primary sources of information for this report are communications with, and data provided by, personnel from the Service, State and local government agencies, and other stakeholders. In particular, the report relies on the incremental effects memorandum provided by the Service (see Appendix D). In addition, this analysis relies upon the Service’s section 7 record of previous consultations conducted in the proposed critical habitat units. These consultations addressed other listed mussel species and in some cases also consider the diamond darter as a candidate species. A complete list of references is provided at the end of this document.

2.5 PRESENTATION OF RESULTS

82. Impacts are described in present value and annualized terms applying discount rates of seven percent throughout the body of the report. Additionally, Appendix B provides the present and annualized value of impacts in each unit applying a three percent discount rate for comparison with values calculated at seven percent.⁴⁸ Appendix C presents undiscounted annual impact values by activity and subunit. Present value and annualized impacts are calculated according to the methods described in Exhibit 2-3.

⁴⁶ 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.

⁴⁷ *Ibid.*

⁴⁸ The OMB requires Federal agencies to report results using discount rates of three and seven percent (see OMB, Circular A-4, 2003).

EXHIBIT 2-3. CALCULATING PRESENT VALUE AND ANNUALIZED IMPACT

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

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

C_t = cost of diamond darter critical habitat conservation efforts in year t

r = discount rate^b

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

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

N = number of years in the forecast period (in this analysis, 20 years)

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

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

CHAPTER 3 | BASELINE CONSERVATION FOR THE DIAMOND DARTER WITHIN PROPOSED CRITICAL HABITAT

83. This chapter discusses the baseline state of conservation for the diamond darter absent designation of critical habitat. The species and habitat protections described in this chapter result from implementation of the Act, as well as other Federal, State and local regulations and conservation plans. These protections are not generated or affected by critical habitat designation for the diamond darter, and thus we do not quantify the associated impacts in this analysis. The qualitative discussion of baseline protections provides context for the incremental analysis in Chapter 4. Specifically, this chapter discusses diamond darter conservation efforts anticipated to occur due to the listing of the species, while Chapter 4 focuses on whether and how critical habitat designation may generate additional conservation for the species.

KEY ISSUES AND CONCLUSIONS OF THE BASELINE ANALYSIS

- Because all proposed diamond darter critical habitat units are already occupied by other listed species, the Act provides a high level of baseline protection. In addition to the Act, State water quality regulations also provide conservation benefits. The Service does not anticipate requesting project modifications for critical habitat over and above those requested for the listing of darter or co-occurring mussel species.
- Under section 404 of the CWA, any operation involving dredge or fill of the waters of the United States is required to receive a permit issued by the Corps. This broad permitting requirement serves as the main Federal nexus for activities that may threaten the diamond darter or its critical habitat.
- Resource Extraction and Utilities. Nine coal mining projects were permitted in the Unit 1 study area in the last 30 years. Mining activity is not expected to impact critical habitat in Unit 2 however, and no oil and gas exploration and drilling projects are expected to occur in Unit 1 or 2. Four and eight utilities projects occurred in the Unit 1 and Unit 2 study areas, respectively, in the past five years. One pending utility line project and 10 natural gas pipeline projects are expected within Unit 1 over the next fifteen years.
- Timber Management, Agriculture, and Grazing. In Unit 2, 105 NRCS-funded projects have occurred since 2008, while none occurred in Unit 1.
- Other In-Stream Work. There is one existing dam (not subject to Federal regulation) in the Unit 2 study area and none in the Unit 1 study area, and there are no known future dam projects that are expected to occur. Levels of other in-stream work activities are very low across the Unit 1 study area; no projects were consulted on historically in Unit 1, while there were four consultations in the past five years in Unit 2. Additionally, we anticipate 12 projects related to MCNP will result in consultation over the next 20 years.
- Transportation. Within the study area, WVDOT and KYTC identified nearly 1,500 road and bridge maintenance projects expected to occur within the next six years—most of which occur in Unit 1. Such activity is subject to a Federal nexus through Federal funding received by WVDOT and KYTC.
- Water Quality and Sewer Management. Within the study area, the WVDEP and KYDW set water quality standards for their respective States. Triennial EPA review of these State regulations under CWA may result in consultation. No Federal nexus exists for sewer and septic system activity.
- Because any conservation efforts recommended through section 7 would occur regardless of critical habitat designation, impacts of conservation recommendations for these projects are considered baseline impacts.

3.1 BASELINE PROTECTIONS

84. This section first describes baseline water quality protections benefiting the diamond darter under the CWA and State water quality regulations. The section continues with a discussion of baseline conservation efforts afforded the diamond darter in association with each of the activities discussed in Chapter 1 of this report. Section 3.2 includes a discussion of conservation measures commonly recommended by the Service in the context of a section 7 consultation, the current and historical prevalence of the activities considered in this report, and the relevant Federal regulatory framework that applies to each of these activities.

3.1.1 CLEAN WATER ACT

85. Section 404 of the CWA requires project proponents to obtain a permit from the Corps prior to discharging dredge or fill material into “waters of the United States.”⁴⁹ Due to the riverine nature of diamond darter habitat, it is expected that the Corps will issue section 404 permits within the areas proposed for critical habitat designation. Specifically, many of the activities listed as threats to the diamond darter in the Proposed Rule may require section 404 permits including resource extraction and utility infrastructure development, other in-stream work, and transportation.

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

- Select sites or manage discharges to ensure that habitat remains suitable for indigenous species.
- Avoid sites having unique habitat or other value, including habitat of threatened or endangered species.
- Utilize habitat development and restoration techniques to minimize adverse impacts and compensate for destroyed habitat.
- Time discharge to avoid biologically critical time periods.
- Avoid the destruction of remnant natural sites within areas already affected by development.⁵⁰

87. These conservation efforts would be required by the Corps to obtain a section 404 permit regardless of critical habitat designation.⁵¹ Accordingly, the impacts of implementing these conservation efforts are considered baseline impacts.

⁴⁹ 33 U.S.C. § 1344.

⁵⁰ 40 CFR § 230.75.

⁵¹ *Ibid.*

3.1.2 STATE WATER QUALITY REGULATIONS

88. According to the Proposed Rule, adequate water quality is essential to the life history of the diamond darter.⁵² Under the authority of the CWA, WVDEP and the KYDW set, maintain, and enforce water quality standards in their respective States. The U.S. Environmental Protection Agency (EPA) reviews State water quality standards to ensure that they comply with national minimum protections under the CWA. The EPA and the Service enter consultation on a triennial basis to review all State water quality standards to ensure they are protective of listed species and critical habitat.⁵³ Such consultation may result in administrative costs related to addressing diamond darter critical habitat in consultation.
89. WVDEP and KYDW administer several programs under the CWA that may affect water quality in the proposed critical habitat and thereby provide some level of protection to the species. For some programs, the presence of listed species or critical habitat may affect the outcome of water quality standards, however, WVDEP and KYDW do not treat the presence of critical habitat differently than the presence of listed species.⁵⁴ In the case of the diamond darter, since all proposed critical habitat units are considered occupied by the diamond darter or listed mussel species, WVDEP and KYDW believe that the presence of the species, not critical habitat, would be responsible for any changes in water quality standards.⁵⁵ Relevant programs provided by WVDEP and KYDW are listed below, along with the role of listed species and critical habitat in the program.

West Virginia⁵⁶

- **Water quality criteria.** WVDEP sets numeric criteria for numerous water quality parameters, including metals, dissolved oxygen, pH, temperature, and toxic organic compounds, among others. EPA reviews the proposed criteria and consults with the Service to determine potential effects on listed species and critical habitat. In the past, WVDEP has promulgated numeric criteria based on the sensitivity of aquatic species, including sensitive trout populations, but there have been no other numeric water quality criteria set in response to the presence of similar fish species, listed or otherwise, in the State. WVDEP does not foresee water quality standards changing in response to the listing of the diamond darter or designation of critical habitat.
- **NPDES permits.** WVDEP has primacy in issuing National Pollution Discharge Elimination System (NPDES) permits under the CWA. Under the NPDES program, all facilities that discharge pollutants from any point source into waters of the United States are required to obtain a NPDES permit.⁵⁷ Because WVDEP

⁵² 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43906.

⁵³ Personal communication with Ben Lowman, WVDEP, on December 6, 2012; personal communication with Sandy Gruzeky, KYDW on November 30, 2012.

⁵⁴ *Ibid.*

⁵⁵ *Ibid.*

⁵⁶ Personal communication with Ben Lowman, WVDEP, on December 6, 2012.

⁵⁷ U.S. EPA, "Water Permitting 101," accessed at <http://www.epa.gov/npdes/pubs/101pape.pdf> on December 27, 2011.

issues NPDES permits instead of the EPA, NPDES permitting activity is not subject to a Federal nexus.

- **Section 303(d) Impaired Waters.** WVDEP lists section 303(d) Impaired Waters in West Virginia. Water bodies listed as impaired under section 303(d) contain levels of pollutants that restrict the intended use of the water bodies and receive additional protections in the form of elevated permitting requirements and the assignment of Total Maximum Daily Loads (TMDLs). The Elk River in Unit 1 was listed as a section 303(d) stream in West Virginia and TMDLs were developed in 2012.⁵⁸ No specific provision exists for consideration of listed species or critical habitat in section 303(d) of the CWA, and although WVDEP may consider either listed species or critical habitat as a potential factor in listing a stream as impaired, because all critical habitat is occupied by listed species, WVDEP does not expect the presence of critical habitat to generate additional considerations in decisions to designate Impaired Waters. In the event changes are made to the status of the lower Elk River on West Virginia's section 303(d) list due to, at least in part, the presence of listed diamond darter species, the change in water quality standards would be considered a baseline effect of the listing of the species.
- **Tier 3 waters.** WVDEP also designates "Tier 3 Waters." In contrast to section 303(d) Impaired Waters, which aim to restore heavily polluted waters, the Tier 3 waters designation aims to protect waters that are already outstanding recreational or ecological resources. Tier 3 waters are known as "outstanding national resource waters," and include waters in Federal Wilderness Areas, specifically designated Federal waters, and high quality waters or naturally reproducing trout streams in state parks, National Parks, and National Forests. The presence of listed species and critical habitat is not considered during the Tier 3 designation process. Tier 3 designation provides the highest level of protection under the antidegradation provisions of the Federal CWA. The portion of the Elk River being proposed as critical habitat is not designated as a Tier 3 water in West Virginia.
- **Sewer and stormwater regulation.** According to the Proposed Rule, municipal sewer system overflows from extraordinary weather events and septic tank spills resulting from poor maintenance represent threats to diamond darter habitat through water quality degradation. While these activities may threaten the diamond darter and its habitat, little Federal regulation of these activities occurs. WVDEP regulates municipal water and sewer systems through the NPDES permitting process. Municipalities are required to develop a stormwater management plan (SWMP) that includes measurable goals and to implement needed stormwater management controls (BMPs). Because West Virginia has primacy in issuing NPDES permits, WVDEP and West Virginia municipalities are not required to consult with the Service related to the operation of municipal sewer systems. The West Virginia Department of Health and Human Resources,

⁵⁸ WVDEP. "Section 303(d) List, 2012," accessed at [http://www.dep.wv.gov/WWE/watershed/IR/Documents/2012_Draft_303\(d\)_Documents/2012_303\(d\)_Complete_Document_M112012.pdf](http://www.dep.wv.gov/WWE/watershed/IR/Documents/2012_Draft_303(d)_Documents/2012_303(d)_Complete_Document_M112012.pdf) on December 29, 2012.

Public Health Sanitation Division regulates septic systems, and no Federal nexus exists related to septic activities.

Kentucky⁵⁹

- **Water quality criteria.** KYDW sets numeric criteria for water pollutants for the protection of aquatic life and human health in surface water, as recommended by the EPA. EPA reviews proposed criteria and consults with the Service to determine potential effects on listed species and critical habitat. KYDW has never adjusted water quality criteria specifically for the sensitivity of any single species of fish. KYDW does not anticipate making any adjustments to water quality standards due to the listing or designation of critical habitat for the diamond darter.
- **NPDES permits.** KYDW also has primacy in issuing NPDES permits under the CWA and, therefore, issuance of each permit does not generate consultation with the Service.
- **Section 303(d) Impaired Waters.** KYDW lists section 303(d) Impaired Waters in Kentucky. KYDW does not consider the presence of listed species and critical habitat in evaluating water bodies for listing under section 303(d) of the CWA. KYDW has stated that it does not expect the presence of critical habitat to influence decisions regarding listing or delisting of a water body as impaired above and beyond the consideration of the presence of listed species. A portion of the Green River in Hart County proposed as critical habitat Unit 2 is listed on Kentucky's most recent section 303(d) list, from River Mile 210.5 to 250.3.⁶⁰ Like in West Virginia, because all critical habitat is occupied by listed species, KYDW does not expect the presence of critical habitat to generate additional considerations in decisions to designate Impaired Waters. Any changes to the Green River's status as an impaired stream would result from the presence of listed species, absent the designation of critical habitat. As such, these changes would be considered baseline impacts of the rulemaking.
- **Outstanding State Resource Waters.** Similar to Tier 3 Waters designated by WVDEP, KYDW designates "Outstanding State Resource Waters" (OSRWs). The designation affords elevated protections, including increased permitting requirements, restrictions on discharges, and site specific water quality criteria. Unlike WVDEP Tier 3 waters, the presence of listed species automatically results in the designation of a water body as an OSRW. As a result, the Green River in Unit 2 has already been designated as an OSRW due to the presence of listed mussel species. Because the listed mussels occupy the entirety of the proposed critical habitat in Unit 2, KYDW has indicated that designation of critical habitat for the diamond darter will not influence the OSRW designation process.

⁵⁹ Personal communication with Sandy Gruzsky, KYDW on November 30, 2012.

⁶⁰ Kentucky Energy and Environment Cabinet Division of Water. "Final 2010 Integrated Report to Congress on the Condition of Water Resources in Kentucky Volume II. 303(d) List of Surface Waters." October 2011. Accessed on February 11, 2013, at <http://water.ky.gov/waterquality/303d%20Lists/2010%20IR%20Volume%202-%20Final.pdf>

- **Sewer and stormwater regulation.** KYDW regulates municipal water and sewer systems through the NPDES permitting process. Because Kentucky has primacy in issuing NPDES permits, KYDW and Kentucky municipalities are not required to consult with the Service related to the operation of municipal sewer systems. If an OSRW is designated in the vicinity of a municipality, KYDW will regulate the municipal sewer system to avoid impacts to the OSRW. However, threatened and endangered species and their critical habitat in particular do not affect KYDW's management of these systems. The Kentucky Department of Public Health regulates septic systems, and thus no Federal nexus exists related to septic activities.

90. As noted above, in West Virginia and Kentucky, water quality standards are subject to review by EPA Regions 3 and 4, respectively, on a triennial basis. This review generates section 7 consultation with the Service to ensure that the water quality standards are sufficiently protective of listed species and critical habitats. Neither State anticipates additional consultations related to water quality standards beyond those associated with triennial reviews. Chapter 4 of this report includes a description of the potential incremental administrative costs associated with these consultations.

3.2 ECONOMIC ACTIVITY WITHIN PROPOSED CRITICAL HABITAT FOR THE DIAMOND DARTER

91. As discussed in Chapter 1, this analysis focuses on the following threats to critical habitat for the diamond darter: (1) resource extraction and utilities; (2) timber management, agriculture, and grazing; (3) other in-stream work; (4) transportation; and (5) water quality/sewage management.
92. This section discusses baseline protection afforded the diamond darter for each of these activities. As the diamond darter has not been previously listed, there are no past section 7 consultations from which to derive a list of project modifications requested by the Service to avoid jeopardy to the species. This analysis therefore references examples of project modifications requested through section 7 consultations for co-occurring listed mussel species in the proposed critical habitat. The Service provided these specific consultations as representative examples of the project modifications most likely to be requested as part of consultation on the diamond darter in order to avoid jeopardy to the species (i.e., as examples of baseline conservation efforts).
93. Exhibit 3-1 summarizes baseline conservation efforts for the diamond darter by activity. These are project modifications that may be recommended by the Service due to the listing of these species (i.e., absent critical habitat designation).

EXHIBIT 3-1. SUMMARY OF BASELINE CONSERVATION EFFORTS BY ACTIVITY

ACTIVITIES	POTENTIAL THREATS ¹	POTENTIAL BASELINE CONSERVATION EFFORTS
Resource Extraction (coal mining; and oil and natural gas exploration) and Utilities	Degradation of water quality through contamination and siltation	<ul style="list-style-type: none"> • Implement BMPs that reduce sedimentation, erosion, dissolved solids, and stream bank destruction.¹ • Implement enhanced sediment and erosion control measures.² • Employ spill prevention measures.² • Retain riparian buffers.² • Reduction of other watershed and floodplain disturbances that release sediments or other pollutants.¹
	Alteration or destruction of habitat through direct, in-stream disturbance	<ul style="list-style-type: none"> • Development of alternatives that avoid or minimize streambed disturbances.¹ • Use horizontal directional drilling at pipeline stream crossings.² • Complete avoidance or minimization of the number of additional river crossings.²
Timber Management, Agriculture, and Grazing	Degradation of water quality through siltation	<ul style="list-style-type: none"> • Implement BMPs that reduce sedimentation, erosion, and stream bank destruction.¹ • Implement regulations that control the amount and quality of point source discharges.
	Degradation of water quality by agrochemical runoff and animal waste	<ul style="list-style-type: none"> • Implement regulations that control the amount and quality of point source and non-point source discharges.¹
	Alteration or destruction of habitat through direct, in-stream disturbance	<ul style="list-style-type: none"> • Development of alternatives that avoid and minimize streambed disturbances.¹
Other In-Stream Work	Alteration of stream hydrology and flow levels	<ul style="list-style-type: none"> • Development of alternatives that avoid and minimize streambed disturbances.¹
	Degradation of water quality through excessive siltation	<ul style="list-style-type: none"> • Implement BMPs that reduce sedimentation, erosion, and stream bank destruction.¹
	Alteration or destruction of habitat through direct, in-stream disturbance	<ul style="list-style-type: none"> • Avoid occupied or presumed occupied habitats and limit riparian disturbance.²
Transportation (roads, highways, bridges)	Degradation of water quality through contamination and siltation	<ul style="list-style-type: none"> • Implement BMPs that reduce sedimentation, erosion, and stream bank destruction.¹ • Develop and implement plans for enhanced sediment and erosion control and spill/road runoff prevention.² • Use of a closed draining system to divert water slowly downstream.²
	Destruction, modification, and curtailment of habitat	<ul style="list-style-type: none"> • Design bridges so that no piers or fill are placed in the river.²

ACTIVITIES	POTENTIAL THREATS ¹	POTENTIAL BASELINE CONSERVATION EFFORTS
Water Quality/Sewer Management	Degradation of water quality through contamination and siltation	<ul style="list-style-type: none"> Implementation of regulations that control the amount and quality of point source discharges.¹ Implement enhanced sediment and erosion control measures.² Upgrade or repair existing facilities.³
Sources: 1. 77 FR 43906. 2. US Fish and Wildlife Service, Incremental Effects Memorandum, September 28, 2012. See Appendix D. 3. Written communication with the Service on November 30, 2012.		

94. Exhibit 3-2 summarizes historical and planned consultations within the study area by activity and by unit. Sections 3.2.1 through 3.2.5 summarize the baseline regulation of these activities, identify Federal permits or regulatory compliance that may be required, and describe the potential level of activity forecast to occur within the study area over the next 20 years. Chapter 4 of this analysis focuses on the potential incremental effects of critical habitat designation on these activities.

EXHIBIT 3-2. HISTORIC AND PLANNED PROJECTS BY ACTIVITY WITHIN DIAMOND DARTER PROPOSED CRITICAL HABITAT STUDY AREA

ACTIVITY	UNIT	PROJECTS	HISTORICAL OR PLANNED?	TIMEFRAME
Resource Extraction	1	9 historical coal mining permits issued by WVDEP	Historical SMCRA permits	1983-2012
		No consultations on oil and gas exploration and drilling	Historical Consultation Record	2008-2012
		4 consultations on water and sewer line projects	Historical Consultation Record	2008-2012
		10 pipeline maintenance and repair projects on NiSource natural gas pipelines	Planned	2018-2028
	2	No historical consultations on coal mining	Historical Consultation Record	1993-2012
		No consultations on oil and gas exploration and drilling	Historical level of section 404 permitting	2008-2012
		7 historical permitted water lines and 1 historical permitted natural gas pipeline	Historical level of section 404 permitting	2008-2012
		1 known future water utility line occurring in 2013	Planned/pending section 404 permit	2013
Timber Management, Agriculture, and Grazing	1	Review of West Virginia NRCS informal programmatic consultation	Planned	Annually
	2	Review of Kentucky NRCS informal programmatic consultation	Planned	Annually
		105 historical projects resulting in consultation in Kentucky counties containing proposed critical habitat	Historical NRCS Funding Record	2009-2012

ACTIVITY	UNIT	PROJECTS	HISTORICAL OR PLANNED?	TIMEFRAME
Other In-Stream Work	1	No historical consultations on other in-stream work	Historical Consultation Record	2008-2012
	2	2 historical permitted recreational boating projects and 1 gravel mining permit	Historical level of section 404 permitting	2008-2012
		12 projects within MCNP related to ferry boat maintenance and other park operations	Planned	2013-2032
Transportation	1	1,497 projects expected within the study area, according to the WVDOT 6-Year Plan	Planned	2014-2019
	2	12 road and bridge construction projects within the study area, according to the KYTC 6-Year Plan	Planned	2013-2018
Water Quality/Sewage Management	1	One informal consultation on State water quality standards every 3 years	Planned	Triennially, beginning in 2013
	2	One informal consultation on State water quality standards every 3 years	Planned	Triennially, beginning in 2014

3.2.1 RESOURCE EXTRACTION AND UTILITIES

95. This section addresses three activities associated with the extraction of natural resources for energy use that may impact the diamond darter and its critical habitat: (1) coal mining; (2) oil and gas exploration and extraction; and (3) the construction and maintenance of pipelines associated with the transportation and distribution of natural gas, and other utilities such as water and sewer pipelines.

Coal Mining

96. In the Proposed Rule, the Service identifies coal mining as a potential threat to the diamond darter and its proposed critical habitat.⁶¹ The Service states that, in general, coal mining may pose a threat to the diamond darter and its habitat through increased sedimentation and water quality degradation. The Service also states that runoff from coal mines can carry sediment and ions from exposed loose earth and rock into waterways.⁶²
97. The Service does not anticipate adverse impacts from coal mining projects in the Unit 2 study area because very little coal mining takes place within that watershed. In West Virginia (Unit 1), coal mining takes place in both counties that overlap proposed critical habitat. WVDEP permits all coal mining applications and reviews water quality standards for pollutants related to mining operations. The Corps permits all coal mining operations that require dredge and fill of waters of the U.S., particularly valley fill

⁶¹ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43906.

⁶² *Ibid.*

operations.⁶³ There are several baseline protections that are unlikely to result in additional consultation activity with the Service, including:

- **SMRCA.** The Surface Mining Control and Reclamation Act of 1977 (SMCRA), which regulates the environmental effects of coal mining, created the Office of Surface Mining Reclamation and Enforcement (OSM) to establish a nationwide program to protect society and the environment from the adverse effects of surface coal mining operations, under which OSM is charged with balancing the nation's need for continued domestic coal production with protection of the environment.⁶⁴ WVDEP administers the program that regulates coal mining activities under SMCRA.⁶⁵ Although West Virginia receives funding assistance from OSM, monetary allotments to States for mining was deemed not to be a major Federal action within the meaning of Section 102(2)(C) of NEPA, and therefore does not require section 7 consultation.⁶⁶ In addition, the Service consulted with OSM in 1996 on the continuation and approval of surface coal mining and reclamation operations under State and Federal regulatory programs adopted pursuant to SMCRA.^{67,68} The terms and conditions of that Biological Opinion (BO) required that the States work with the Service to develop measures to conserve species that may be adversely affected by permitted mining activities. The Service's BO concluded that surface coal mining and reclamation operations conducted in accordance with the provisions of SMCRA and the terms and conditions of the BO are "unlikely to jeopardize the continued existence of any threatened, endangered, or proposed species or result in adverse modification of designated or proposed critical habitats."⁶⁹ In sum, due to the fact that most mining programs are State-run and due to the findings of the BO, there are few cases where mining activities lead to section 7 consultation with the Service.
- **Section 401 under CWA.** The WVDEP's Division of Mining and Reclamation also requires permitted OSM operations to apply for Section 401 Water Quality Certification under CWA. Section 401 Certification ensures that projects will not

⁶³ Personal communication with Nick Shaer, WVDEP, on December 19, 2012.

⁶⁴ Office of Surface Mining Reclamation and Enforcement. 2010. *About Us*. Accessed on February 10, 2012 at <http://www.osmre.gov/aboutus/Aboutus.shtm>.

⁶⁵ Personal communication with the Service on December 18, 2012.

⁶⁶ "Department of the Interior, Departmental Manual, Series: Environmental Quality Programs, Part 516: National Environmental Policy Act of 1969, Chapter 13: Managing the NEPA Process—Office of Surface Mining." Effective Date: 5/17/04.

⁶⁷ Memorandum of Understanding among the U.S. Army Corps of Engineers, the U.S. Office of Surface Mining, the U.S. Environmental Protection Agency, and the U.S. Fish and Wildlife Service for the purpose of providing concurrent and coordinated review and processing of surface coal mining applications proposing placement of dredged and/or fill material in waters of the United States.

⁶⁸ Endangered Species Act - section 7 Consultation - Biological Opinion and Conference Report - Surface Coal Mining Regulatory Programs Under the Surface Mining Control and Reclamation Act of 1977, P.L. 95-87 (SMCRA or the Act). September 24, 1996.

⁶⁹ Memorandum from Assistant Director - Ecological Services, Formal Section 7 Biological Opinion and Conference Report on Surface Coal Mining and Reclamation Operations Under the Surface Mining Control and Reclamation Act of 1977.

violate State water quality standards or designated stream uses. While Section 401 Certification is authorized by EPA, because the State of West Virginia, specifically WVDEP's Division of Mining and Reclamation, carries out this action, it is unlikely that a consultation on 401 permits will occur.⁷⁰

- **NPDES permits.** NPDES permits are also required for most mining operations. Because the State of West Virginia has primacy for EPA, it is unlikely that a consultation on NPDES permits will occur related to the diamond darter.

98. In addition to State permits, mining activities may also require a permit under section 404 of the CWA. Authority for the Service's mandated role in evaluating permit applications under section 404 is provided under section 7 of the Act, for which authority is delegated to the Corps.⁷¹ Surface coal mining and reclamation operations may be subject to section 404 which regulates projects that result in the placement of dredged or fill materials in waters of the U.S.⁷² In West Virginia, any projects receiving a section 404 permit are required to enter section 7 consultation with the Service.
99. WVDEP's Division of Mining and Reclamation administers the permitting process for mining operations in West Virginia. Section 401 of CWA, NPDES, section 404 of CWA, and West Virginia's Water Quality Standards may provide some level of protection for diamond darter and its critical habitat through numeric pollutant criteria regulating contributors to water conductivity.⁷³ Pursuant to SMCRA, the West Virginia Surface Mining Reclamation Regulations currently require that sediment control structures be constructed to minimize adverse hydrologic impacts and be located as near as possible to the disturbed area.^{74,75}
100. Measures that the Service may recommend to avoid jeopardy include (1) avoidance or minimization of fill in the Elk River or any of its tributaries; (2) sedimentation avoidance measures; (3) adherence to water quality standards; and/or (4) monitoring of sediment and water quality levels in the waterways. Additionally, to protect against increased sedimentation and water quality degradation, the Service may recommend that coal mining operations take special precautions to encase exposed rock and redirect drainage away from the Elk River and its tributaries.⁷⁶ Regardless, as discussed above, because all conservation measures the Service recommends to avoid jeopardy are the same as it

⁷⁰ According to WVDEP, while the EPA provides significant informal input when WVDEP's Division of Mining and Reclamation issues Section 401 permits, EPA's involvement is informal in nature and is unlikely to result in a consultation.

⁷¹ 16 U.S.C. § 1536(a)(2)

⁷² Memorandum of Understanding among the U.S. Army Corps of Engineers, the U.S. Office of Surface Mining, the U.S. Environmental Protection Agency, and the U.S. Fish and Wildlife Service for the purpose of providing concurrent and coordinated review and processing of surface coal mining applications proposing placement of dredged and/or fill material in waters of the United States.

⁷³ Personal communication with Chris Harvey and Ben Lowman, WVDEP on December 18, 2012.

⁷⁴ West Virginia CSR 38-2-5.4(a).

⁷⁵ West Virginia CSR 38-2-5.4(b)(2).

⁷⁶ Personal communication with the Service on December 18, 2012.

would recommend to avoid adverse modification of critical habitat, all potential project modifications are assumed to be part of the baseline.⁷⁷

101. In West Virginia, considerable mining activity occurs in areas upstream of proposed critical habitat that may contribute pollutants into the stream which could impact the portions of the lower Elk River occupied by the diamond darter.⁷⁸ This analysis forecasts coal mining projects based on the past level of coal mining operations receiving SMCRA and section 404 permitting within the Unit 1 study area.⁷⁹ Since 1983, WVDEP issued nine SMCRA mine permits in the Unit 1 study area, equivalent to three every 10 years.⁸⁰ The Corps' Huntington District has not provided information on the historical level of section 404 permitting in West Virginia. Therefore, this analysis forecasts future coal mining consultations based on the historical rate of SMCRA permits issued by WVDEP. The textbox below provides additional information on potential impacts to the coal mining and oil and gas industries.

POTENTIAL IMPACTS TO THE COAL MINING AND OIL AND GAS INDUSTRIES
<p>Representatives of the coal mining and oil and natural gas industries have expressed concern in public comments that "as written...the proposed rule could theoretically imperil a regulated activity from acquiring the necessary permits" due to delays in the permitting process resulting from the designation of critical habitat.¹ In this analysis, we do not forecast such impacts to resource extraction activities. To the extent that such impacts may occur, the impacts would be attributable to the listing of the diamond darter and co-occurring mussel species, and therefore not be an incremental cost of the proposed critical habitat designation.</p> <p>The potential also exists for the designation of critical habitat to be the basis of lawsuits brought by third parties that may result in regulatory delays to industry.² Because it is not possible to forecast either the timing or nature of such lawsuits, we are unable to quantify their potential costs.</p>
<p>Sources:</p> <p>1. West Virginia Oil and Natural Gas Association. "Comments on Proposed Rule for Endangered and Threatened Wildlife and Plants; Proposed Endangered Status for the Diamond Darter and Designations of Critical Habitat," September 24, 2012. FWS-R5-ES-2012-0045-0017.</p> <p>2. West Virginia Coal Association. "Comments on Proposed Rule for Endangered and Threatened Wildlife and Plants; Proposed Endangered Status for the Diamond Darter and Designations of Critical Habitat," September 24, 2012. FWS-R5-ES-2012-0045-0015.</p>

⁷⁷ Ibid.

⁷⁸ Personal communication with Jason Bostic, West Virginia Coal Association, on December 7, 2012; Personal communication with the Service on December 18, 2012.

⁷⁹ Note that the consultation forecast for this activity will be updated once we receive information from the Corps.

⁸⁰ WVDEP, "Mining Permit Boundaries" shapefile, accessed at <http://tagis.dep.wv.gov/data2.html> on January 2, 2013.

Oil and Natural Gas Exploration and Drilling

102. The Proposed Rule mentions oil and gas exploration and drilling as a potential threat to the diamond darter through siltation; alteration of water quality through release of pollutants into the water channel; and alteration of water quantity through reservoir construction and use of water for hydraulic fracturing procedures.^{81,82}
103. Oil and gas exploration and drilling activities currently occur in West Virginia and Kentucky. Such activities are permitted by the WVDEP Office of Oil and Gas and the Kentucky Department of Natural Resources (KDNR), respectively. Additionally, activities in West Virginia follow what is required by State water quality regulations, as described in Section 3.1.2 of this report. Kentucky oil and gas activities have no specific provisions for endangered species and critical habitat above and beyond those required by State regulations.⁸³
104. Activities may also require a 404 permit from the Corps if, for example, the activity involves discharge of dredged or fill material into waters or rig access into or within wetlands.⁸⁴ If the Corps receives a 404 permit application for oil and gas activities, they are required to consult with the Service under section 7 of the Act. In addition, a Federal permit would also be required if either the surface or the mineral rights are Federally owned.
105. The Corps' Operations & Maintenance Business Information Link (OMBIL) Regulatory Module version 2 (ORM2) database may provide information on the number of 404 permits that have been issued for oil and gas activities within the our study area.^{85,86} However, because this information is not yet available from the Corps' Huntington District, this analysis bases its projection of future consultations on the historical consultation record for listed mussels within Unit 1.⁸⁷ In the Unit 2 study area, we forecast consultations based on the Corps' historical rate of section 404 permitting. As no such consultations have occurred within the study area of either unit, this analysis does not forecast consultations related to oil and gas exploration and drilling.

Natural Gas and Other Utility Pipelines

106. Installation, construction, and maintenance of utility pipelines—including natural gas, water, and sewage pipelines—and storage facilities—including underground sequestration of natural gas in its gaseous form and above-ground tanks containing liquefied natural gas—may present a threat to the diamond darter and its habitat through removal of riparian vegetation and direct disturbance of substrate, sedimentation, introduction of pollutants, decreased dissolved oxygen concentration, increased acidity

⁸¹ 2012 Proposed Listing and Critical Habitat Rule. 77 FR 43906. July 26, 2012.

⁸² Ibid.

⁸³ Personal communication with Sandy Gruzsky, KYDW, on November 30, 2012.

⁸⁴ Personal communication with the Corps' Huntington District on December 6, 2012.

⁸⁵ Personal communication with the Corps' Huntington District on December 12, 2012.

⁸⁶ Personal communication with the Corps' Louisville District on December 6, 2012.

⁸⁷ We are awaiting a response and detailed information from the ORM2 database from the Huntington Corps.

and conductivity, and altered stream flow.⁸⁸ These projects may be subject to the Corps' permitting requirements under section 404 of the CWA. Common practice in the installation of pipelines to avoid section 404 permitting requirements, however, is to place the pipeline well beneath the stream or water body.⁸⁹ For this reason, pipeline projects are frequently not subject to 404 permitting requirements and, absent a Federal nexus, may not undertake section 7 consultation to evaluate impacts of listed species and critical habitats.

107. In West Virginia and Kentucky, the ORM2 databases of the Corps' Huntington and Louisville Districts contain information on the number of 404 permits that have been issued for pipeline activities within the Unit 1 and Unit 2 study areas.^{90,91} However, as this information is not yet available from the Corps' Huntington District, we base our projection of future consultations on the historical consultation record for listed mussels within Units 1 over the last five years.⁹² In the Unit 2 study area, we base our forecast on historical section 404 permits provided in the Corps' Louisville District's ORM2 database.⁹³
108. In the Unit 1 study area, four informal consultations have been conducted on pipeline activity: three projects replacing or constructing new waterlines and one project to construct a new sewer line. In the Unit 2 study area, the Corps has permitted seven water line projects and one natural gas pipeline project since 2008. Additionally, the Corps identified one pending future water utility line project schedule to occur in 2013.⁹⁴ Exhibit 3-3 provides information on the geographic and temporal distribution of these projects.
109. Another potential Federal nexus commonly associated with natural gas pipeline projects is Federal Energy Regulatory Commission (FERC) permitting, generally issued for major natural gas pipeline projects. Through a permit or "certificate" process, FERC regulates natural gas pipelines and storage facilities nationally. There are currently two approved planned or ongoing pipeline projects in West Virginia and Kentucky; however, both projects are located outside of the study area. Since 2009, FERC has approved four natural gas pipeline and storage projects in West Virginia and no such projects in Kentucky; none of the West Virginia projects are located in counties containing proposed critical habitat.⁹⁵

⁸⁸ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43906. July 26, 2012.

⁸⁹ Personal communication with the Service on December 18, 2012.

⁹⁰ Personal communication with the Corps' Huntington District on December 12, 2012.

⁹¹ Personal communication with the Corps' Louisville District on December 6, 2012.

⁹² We are awaiting a response and detailed information from the ORM2 database from the Huntington Corps.

⁹³ Operations & Maintenance Business Information Link (OMBIL) Regulatory Module version 2 (ORM2). Received from U.S. Army Corps of Engineers, Louisville District, on January 17, 2013.

⁹⁴ Operations & Maintenance Business Information Link (OMBIL) Regulatory Module version 2 (ORM2). Received from U.S. Army Corps of Engineers, Louisville District, on January 17, 2013.

⁹⁵ FERC "Approved Pipeline Projects, 2009 to the Present," accessed at <http://www.ferc.gov/industries/gas/industry/pipelines/approved-projects.asp> on December 17, 2012.

EXHIBIT 3-3. HISTORICAL UTILITY PROJECTS SINCE 2007

UNIT	PROJECT NAME	YEAR	CONSULTATION TYPE
1 ¹	1 water line replacement	2010-2011	Informal
	1 sewer line expansion	2009	Informal
	2 new water line construction	2009	Informal
2 ²	7 historical permitted water lines	2008-2012	Formal
	1 historical permitted natural gas pipeline	2008-2012	Formal
	1 pending future water utility line	2013 (expected)	Formal
Sources: 1. Written communication with the Service on November 7, 2012. 2. Operations & Maintenance Business Information Link (OMBIL) Regulatory Module version 2 (ORM2). Received from U.S. Army Corps of Engineers, Louisville District, on January 17, 2013.			

110. Future natural gas pipeline construction activities are closely linked to the demand for transportation and storage of natural gas, which is in turn closely linked to the demand for natural gas itself. As significant uncertainty exists related to the long-term demand for natural gas, considerable uncertainty surrounds the future level of construction of natural gas pipelines and storage facilities. As a result, this analysis does not attempt to forecast such activity within the proposed critical habitat area.

NiSource Draft HCP

111. Based in Merrillville, Indiana, NiSource, Inc. provides natural gas and electric transmission and distribution services to 14 states, including West Virginia and Kentucky. In 2005, NiSource began working with the Service to develop an incidental take permit and MSHCP for its natural gas pipeline installation and repair operations.⁹⁶ This HCP streamlines the consultation process for NiSource, addressing many species and critical habitats throughout all 14 States in which NiSource operates. The diamond darter is not covered in the NiSource MSHCP.⁹⁷ Therefore, NiSource pipeline maintenance and replacement activities within the study area will result in formal section 7 consultation.⁹⁸
112. Although NiSource operates pipelines in Kentucky, they do not cross the portions of the Green River within the Unit 2 study area.⁹⁹ Therefore, we do not anticipate that any consultations will occur within in Unit 2 over the next 20 years. Six NiSource-owned pipelines cross the Elk River within the Unit 1 study area. As one was recently replaced, five of the six pipelines will require one maintenance and one replacement action over the next 20 years.¹⁰⁰ NiSource expects that each action will result in formal consultation,

⁹⁶ Draft NiSource Multi-Species Habitat Conservation Plan, accessed at <http://www.fws.gov/midwest/Endangered/permits/hcp/nisource/2011NOA/NiSourceDraftHCP.html> on December 30, 2012.

⁹⁷ Personal communication with John Shaffer and Rick Hall, NiSource, on December 17, 2012.

⁹⁸ *Ibid.*

⁹⁹ *Ibid.*

¹⁰⁰ *Ibid.*

totaling 10 formal consultations between 2018 and 2028. NiSource does not anticipate installation of new pipelines or any consultations outside of the 10 formal consultations mentioned above.¹⁰¹ As described in Chapter 2, any project modifications resulting from these consultations will be part of the baseline.

3.2.2 TIMBER MANAGEMENT, AGRICULTURE, AND GRAZING

113. Silviculture, agriculture, and grazing pose threats to the diamond darter and its habitat due to potential sedimentation, pesticide use, and direct substrate disturbance through road construction. Although these activities on private lands are not normally Federally-regulated or permitted, the possibility exists that these operations may be subject to a Federal nexus. This can occur through Federal funding from the Natural Resources Conservation Service (NRCS) programs, such as the Environmental Quality Incentive Program (EQIP), Wildlife Habitat Incentive Program (WHIP), Wetlands Reserve Program (WRP), and Public Law 566 (P.L. 566). In these cases, the activities may be subject to section 7 with the Service. These activities are generally exempt from section 404 permitting under the CWA section 404(f) exclusions.

Activities Relying Upon NRCS Funding

114. Through EQIP and WHIP, NRCS provides funds for private operations to implement more than 100 farming practices aimed at improving the natural environment for both farming operations and wildlife habitat.¹⁰² Foresters and farmers can receive WRP funds to build fencing or enact other protections for wetlands on or adjacent to their property.¹⁰³ P.L. 566 provides congressional funding to NRCS to build dams and other watershed improvement projects that benefit overall watershed health, specifically the health of lands that support silviculture, agriculture, and grazing.¹⁰⁴
115. In both States, project modifications through section 7 are rarely recommended because NRCS' projects in each of the four programs mentioned above primarily benefit species conservation and general ecosystem health. If the Service reaches a determination that a particular practice is likely to adversely affect the species, NRCS typically seeks alternative practices or withdraws funding applications in order to avoid section 7 consultation.¹⁰⁵ As described previously, all project modification costs are considered baseline, including potential withdrawn NRCS funding, as any project modifications the Service recommends for the presence of the listed species are likely to be sufficiently protective of diamond darter critical habitat.

¹⁰¹ *Ibid.*

¹⁰² Personal and written communication with Conservation Biologist, Kentucky NRCS, on December 27, 2012; personal communication with Conservation Biologist, West Virginia NRCS, on November 27, 2012.

¹⁰³ NRCS, "Wetlands Reserve Program," accessed at <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/wetlands/> on December 30, 2012.

¹⁰⁴ "Watershed and Flood Prevention Operations Program," NRCS, accessed at www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/wfpo/ on December 30, 2012.

¹⁰⁵ Written communication with the Service on January 30, 2013.

EQIP and WHIP

116. Between 2010 and 2013 alone, Kentucky's EQIP and WHIP programs provided more than 105 contracts in Kentucky counties containing critical habitat.¹⁰⁶ Because of the large number of projects subject to this Federal nexus, NRCS officials in West Virginia and Kentucky have undertaken statewide programmatic consultations with the Service to develop "consultation matrices," which allow NRCS to minimize the number of EQIP- and WHIP-related section 7 consultations required each year.¹⁰⁷
117. In Kentucky, NRCS and the Service developed a programmatic informal consultation process in 2006 to address potential impacts to Federally listed species by NRCS practices. Through use of the consultation matrix, Kentucky NRCS officials have only entered into informal consultations related to listed mussel species in the Unit 2 study area. Since 2008, roughly 80 percent of Kentucky NRCS funding was dedicated to EQIP projects, while roughly 20 percent was dedicated to WHIP. In that same time, 104 informal consultations occurred in the Unit 2 study area.¹⁰⁸ Additionally, the programmatic consultation is reviewed on an annual basis, or sooner if needed.
118. In West Virginia, the NRCS and the Service completed a programmatic informal consultation in 2010. This consultation addressed potential impacts to Federally listed mussels as well as the diamond darter as a candidate species. Since implementation of the programmatic consultation in 2010, EQIP- and WHIP-funded projects have not triggered formal section 7 consultations related to listed co-occurring mussels or the diamond darter, due in large part to the conservation-oriented nature of the projects and streamlined administrative efforts associated with the programmatic consultation.¹⁰⁹ This analysis projects future consultations on NRCS-funded projects based on the historical consultation record for listed mussels and the diamond darter within Unit 1.¹¹⁰ As no such individual consultations have occurred in this unit, this analysis does not forecast consultations related to silviculture, agriculture, and grazing in Unit 1, with the exception of the annual review of the programmatic consultation. With the exception of changing references to the status of the species from candidate to endangered, we do not anticipate that the listing or designation of critical habitat will result in any changes to the programmatic consultation.
119. Any project modifications associated with avoidance measures or alternative practices implemented within EQIP and WHIP would be considered baseline impacts because the Service would request them for the listing of the diamond darter regardless of critical habitat designation.

¹⁰⁶ Written communication with Resource Conservationist, Kentucky NRCS, on December 20, 2012. We are awaiting records from the WV NRCS on the number of EQIP and WHIP contracts that have been issued for silviculture, agriculture, and grazing activities within the study area

¹⁰⁷ Personal and written communication with Casey Shrader, Conservation Biologist, Kentucky NRCS, and former West Virginia NRCS Conservation Biologist, on November 30, 2012.

¹⁰⁸ *Ibid.*

¹⁰⁹ *Ibid.*

¹¹⁰ We are awaiting records from the WV NRCS on the number of EQIP and WHIP contracts that have been issued for silviculture, agriculture, and grazing activities within the study area.

WRP and P.L. 566

120. In West Virginia and Kentucky, NRCS also administers projects through the WRP and P.L. 566. In West Virginia, NRCS has entered informal consultation with the Service to address impacts to listed aquatic species related to WRP and P.L.566 projects, however none of these consultations occurred in the Elk River.¹¹¹ Therefore, we do not anticipate any future consultations related to WRP or P.L. 566 projects in Unit 1. In Kentucky, NRCS maintains records of WRP and P.L. 566 funded activities beginning in 2006. In the Unit 2 study area, NRCS has funded one WRP easement and no projects under P.L. 566 since 2006. Therefore, we anticipate one informal consultation to occur related to the WRP program every four years in the Unit 2 study area. We do not anticipate that any consultations will result from P.L. 566 projects in Unit 2.

Forestry Activities

121. According to NRCS, the West Virginia Division of Forestry (WVDF), and the Kentucky Division of Forestry (KYDF), the only potential Federal nexus for forestry projects that may affect the diamond darter or its critical habitat is through EQIP and WHIP.¹¹² That is, no forestry projects in the study area receive funding through WRP and P.L. 566. Consultation is not required for forestry projects conducted on private lands with no Federal funding. As such, all potential forestry-related consultations are captured in the data, discussed above, provided by NRCS on EQIP and WHIP projects. Additionally, WVDF and KYDF administer other programs that provide Federal funding for forestry projects, such as the Forest Legacy Program (FLP) and Forest Stewardship Plans (FSP). FLP provides funds to private landowners to purchase and set aside forested lands for preservation.¹¹³ FSP “provides technical assistance, through State forestry agency partners, to nonindustrial private forest owners to encourage and enable active long-term forest management.”¹¹⁴ FLP and FSP activities generally do not result in section 7 consultation due to the low-impact nature of the programs.¹¹⁵

3.2.3 OTHER IN-STREAM WORK

122. Impoundments, dams, diversions, dredging, and channelization can affect the diamond darter by altering stream hydrology and flow levels, degrading water quality through excessive siltation, and causing direct disturbances of in-stream habitats and riparian corridors.¹¹⁶ Recreational uses, such as construction of boat launches and other in-stream construction have the potential to negatively affect critical habitat by degrading water quality and habitats within the stream channel through direct disturbance of the stream

¹¹¹ Personal and written communication with Casey Shrader, Kentucky NRCS, on December 15, 2012.

¹¹² Personal communication with Pam Snyder, Kentucky Division of Forestry, on December 13, 2012; personal communication with Jeremy McGill, West Virginia Division of Forestry, on December 14, 2012.

¹¹³ U.S. Forest Service, “Forest Legacy Program,” accessed at <http://www.fs.fed.us/spf/coop/programs/loa/flp.shtml> on January 3, 2012.

¹¹⁴ U.S. Forest Service, “Forest Stewardship Program,” accessed at <http://www.fs.fed.us/spf/coop/programs/loa/fsp.shtml> on January 3, 2012

¹¹⁵ Personal communication with Bob Radspinner, West Virginia Division of Forestry, on December 18, 2012.

¹¹⁶ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43914.

and the spread of didymo and invasive species. In addition, disposal of dredged material into proposed critical habitat can alter or destroy habitat through direct, in-stream disturbance, alteration or loss of habitat and range due to dam and impoundment projects may threaten survival of the darter. These activities are regulated by the Corps pursuant to Section 10 of the Rivers and Harbors Act (RHA) of 1899 and section 404 of the CWA.

123. Under the Federal Power Act, the FERC issues licenses for privately owned hydropower facilities.¹¹⁷ As a Federal agency, FERC undertakes section 7 consultation with the Service to consider the potential effects of the licensed projects on listed species and critical habitats. FERC hydropower licenses are valid for 30, 40, or 50 years, depending on the extent of proposed new development or environmental mitigation and enhancement measures. Consequently, FERC undertakes consultation with the Service upon initially permitting a project, and up to 50 years thereafter, as long as the permit is re-issued throughout the life of the project. FERC may also issue exemptions from licensing. Two types of small hydroelectric projects are eligible for exemptions from licensing: (1) a small conduit hydroelectric facility up to 15 MW (up to 40 MW for certain projects) may be eligible for a Conduit Exemption; and (2) a small hydroelectric project of 5 MW or less may be eligible for a 5 MW exemption.¹¹⁸ FERC maintains up-to-date records of dam licenses and exemptions.¹¹⁹
124. Non-Federal dams that do not produce power (and are therefore not licensed by FERC) and are located in navigable waters of the U.S. are regulated by the Corps pursuant to Section 10 of the RHA and section 404 of the CWA.¹²⁰ Section 10 of the RHA requires authorization from the Corps for the construction of any structure in or over navigable waters of the U.S., as well as the excavation and dredging or deposition of material in these waters or any obstruction or alteration in navigable water.¹²¹ The Corps permits the construction and maintenance of dams; once this work is complete, however, dams are not required to be re-permitted. Consultation with the Service is therefore typically only undertaken upon the development of a new dam project.
125. The Corps' National Inventory of Dams identifies one dam, located in Unit 2, within the study area for this analysis.¹²² This dam is not located directly along proposed critical habitat for the diamond darter. Further, it does not generate hydropower and is therefore not subject to regulation by FERC.¹²³ Because no known Federal nexus exists for this

¹¹⁷ United States Code: Title 16, Chapter 12. "Federal Regulation and Development of Power."

¹¹⁸ Federal Energy Regulatory Commission. (2004). "Handbook for Hydroelectric Project Licensing and 5 MW Exemptions from Licensing." Available at http://www.ferc.gov/industries/hydropower/gen-info/handbooks/licensing_handbook.pdf. Accessed on February 9, 2012.

¹¹⁹ Federal Energy Regulatory Commission. (2011). "FERC: Hydropower." Available at <http://www.ferc.gov/industries/hydropower.asp>. Accessed on February 9, 2012.

¹²⁰ U.S. Army Corps of Engineers. (2007). "Practices for Documenting Jurisdiction under Section 404 of the Clean Water Act (CWA) and Sections 9 & 10 of the Rivers & Harbors Act (RHA) of 1899." Available at <http://www.usace.army.mil/CECW/Documents/cecwo/reg/rxls/rgl07-01.pdf>. Accessed on December 29, 2011.

¹²¹ Section 10 of the Rivers and Harbors Act of 1899, 33 U.S.C. 403. Available at <http://www.usace.army.mil/CECW/Documents/cecwo/reg/materials/rhsec10.pdf>. Accessed on December 28, 2011.

¹²² U.S. Army Corps of Engineers, National Inventory of Dams (2007).

¹²³ *Ibid.*

dam, it is not anticipated to be subject to Federal regulatory action which would trigger consultation with the Service. Any future dam projects proposed within the study area would be subject to Federal regulation and would therefore require section 7 consultation with the Service.

126. In addition to dam projects, other in-stream work related to the installation of docks, boat launches, and other marine transportation structures threatens diamond darter habitat by altering stream hydrology and destabilizing the stream channel through direct physical disturbance of substrates. Such in-stream activity is subject to section 7 consultation, as it is permitted by the Corps pursuant to section 404 of the CWA.¹²⁴ The consultation history provided by the Service shows that such activities are very infrequent within the Unit 1 study area across both West Virginia and Kentucky. The Service has only consulted on four Corps-permitted actions for other in-stream work activities in the past five years.¹²⁵ Within the Unit 2 study area, the Corps has issued three section 404 permits since 2008—two related to boating activities and one for gravel mining.¹²⁶
127. In addition to these historical permitted actions within the Unit 2 study area, ferry boat maintenance and other operations at MCNP may result in consultation in the future. Since 2008, the Service has conducted two informal consultations on MCNP actions.¹²⁷ Representatives at MCNP anticipate that 10 projects at the National Park will result in informal consultation over the next 20 years, and two additional projects will result in formal consultations.¹²⁸

3.2.4 TRANSPORTATION

128. The primary threats associated with bridge construction and maintenance activities are sedimentation, alteration of stream hydrology, and direct substrate disturbance.¹²⁹ Road construction and maintenance may increase the sediments entering the stream through normal runoff, and can result in streams being channelized, filled, or culverted.
129. The West Virginia Department of Transportation (WVDOT) and the Kentucky Transportation Cabinet (KYTC) permit or conduct all State and county road and bridge construction in West Virginia and Kentucky. WVDOT and KYTC generally enter into section 7 consultation with the Service regarding the effects of these projects on listed species and critical habitats.
130. In West Virginia, one transportation district overlaps proposed critical habitat for the diamond darter. The Federal Highway Administration, WVDOT, and the Service

¹²⁴ We are awaiting a response and detailed information from the ORM2 database from the Huntington Corps. There may also be in-stream transportation construction projects requiring section 404 permits from the Corps.

¹²⁵ "TAILS" Tracking and Integrated Logging System Report, WV Field Office (2012); consultation history provided by the Service on October 26, 2012.

¹²⁶ Operations & Maintenance Business Information Link (OMBIL) Regulatory Module version 2 (ORM2). Received from U.S. Army Corps of Engineers, Louisville District, on January 17, 2013.

¹²⁷ U.S. Fish and Wildlife Service, Incremental Effects Memorandum, September 28, 2012. See Appendix D.

¹²⁸ Personal communication with Bobby C. Carson, Chief, Science and Resources Management Division, Mammoth Cave National Park, on February 13, 2013.

¹²⁹ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43916.

completed a programmatic informal consultation in 2005 that has been periodically updated, most recently in 2011. This consultation addressed potential impacts to Federally listed species as well as the diamond darter as a candidate species. When a listed species or critical habitat is present, WVDOT incorporates special environmental measures to avoid adverse effects, such as BMPs for controlling sedimentation and erosion, and, in the case of riverine habitat, construction equipment and personnel are prohibited from entering the stream or disturbing the riparian area.¹³⁰ If a project does not meet the criteria for inclusion in the programmatic consultation, then individual consultation is required.

131. KYTC divides Kentucky's roads into 12 districts. KYTC's Districts 3 and 4 include all three Kentucky counties containing proposed critical habitat. KYTC follows BMPs, developed with the Kentucky Environmental and Public Protection Cabinet, Divisions of Conservation and Water, for special management of construction activities that occur near an OSRW.¹³¹ These guidelines require coordination between KYTC, KYDW, and the Service to determine whether wildlife exclusionary structures, alternative roadway design, or other conservation efforts are necessary to protect the species. In some cases, the design of the bridge or road is altered to completely span the stream to avoid direct disturbance of the river flow or substrate.¹³²
132. Within the study area in West Virginia, our analysis identifies the road or bridge construction or maintenance projects that may require section 7 consultation over the next 20 years. WVDOT's Six-Year Plan indicates that 1,497 road or bridge construction and maintenance projects (largely repaving, guard rail repair, and culvert replacement projects) are ongoing or planned to begin construction within the next five years within the study area in West Virginia.¹³³ Assuming the rate remains steady, this analysis forecasts 4,990 construction and maintenance projects will be carried out over the next 20 years within the study area in West Virginia.¹³⁴
133. Within the study area in Kentucky, KYTC's Six-Year Plan identifies 12 road and bridge construction projects that are ongoing or planned to begin construction within six years.¹³⁵ Assuming this rate remains steady this analysis forecasts 40 construction projects will be carried out over the next 20 years within the study area in Kentucky.¹³⁶ KYTC conservatively estimates eight additional bridge crossing projects within the Kentucky

¹³⁰ West Virginia DOT Division of Highways, Erosion and Sediment Control Manual, March 1, 2003 accessed on December 14, 2012; personal communication with Lovell Facemire, WVDOT, on December 3, 2012.

¹³¹ Personal communication with Dave Harmon, KTC, on December 6, 2012.

¹³² *Ibid.*

¹³³ Written communication with Environmental Program Manager, WVDOT, on December 11, 2012. Conversations with WVDOT indicate that road construction activity will only result in formal consultation when roadways cross streams designated as critical habitat; all other projects within a quarter-mile buffer from the stream bank will result in informal consultation.

¹³⁴ *Ibid.*

¹³⁵ Personal communication with Dave Harmon, KTC, on December 6, 2012. Conversations with KTC indicate that paving projects and minimal maintenance projects do not require consultation.

¹³⁶ *Ibid.*

portion of the study area bringing the total to 48 projects requiring section 7 consultation in the next 20 years.¹³⁷

3.2.5 WATER QUALITY/SEWAGE MANAGEMENT

134. The Proposed Rule states that adequate water quality is essential to the life history of the diamond darter.¹³⁸ Degradation of water quality is the primary threat associated with other activities discussed above. This section addresses two main activities that directly affect concentrations of aquatic pollutants within the study area and may result in section 7 consultation: the development of State water quality standards, and the operation and potential failure of municipal sewer systems and septic systems.
135. WVDEP and KYDW set, maintain, and enforce water quality standards and programs in each State, which are discussed in detail in Section 3.1.2. Listed species and critical habitat influence the development of these standards and programs. However, as described above, because both units are occupied by the diamond darter or listed mussel species, WVDEP and KYDW do not anticipate the designation of critical habitat to result in changes to the States' water regulation.
136. The EPA reviews State water quality standards to ensure that they comply with national minimum protections under the CWA, on a triennial basis to review all State water quality standards to ensure they are protective of listed species and critical habitat.¹³⁹ This action represents a Federal nexus and results in section 7 consultation between the Service and EPA. Administrative costs related to addressing diamond darter critical habitat in consultation are expected to be incurred with each triennial review. The next triennial review is expected to occur in 2013 in West Virginia and in 2014 in Kentucky.¹⁴⁰
137. Municipal sewer system overflows from extraordinary weather events and septic tank spills resulting from poor maintenance represent threats to diamond darter habitat through water quality degradation. As described in Section 3.1.2, while these activities may threaten the diamond darter and its habitat, little Federal regulation of these activities occurs. As a result, we do not anticipate future consultations on septic systems within the study area.

¹³⁷ *Ibid.*

¹³⁸ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43906.

¹³⁹ Personal communication with Ben Lowman, WVDEP, on December 6, 2012; personal communication with Sandy Gruzsky, KYDW on November 30, 2012.

¹⁴⁰ *Ibid.*

CHAPTER 4 | INCREMENTAL IMPACTS OF CRITICAL HABITAT DESIGNATION FOR THE DIAMOND DARTER

138. In this chapter we forecast the incremental impacts of critical habitat designation for the diamond darter. In Section 4.1, we summarize the results of the incremental analysis. In Section 4.2 we discuss, by activity, forecast consultations for projects subject to Service review with respect to diamond darter conservation. In Section 4.3, we describe key assumptions and caveats that generate uncertainty regarding the estimated incremental impacts. Lastly, in Section 4.4 we discuss the potential economic benefits of critical habitat designation for the diamond darter.

4.1 SUMMARY OF RESULTS OF THE INCREMENTAL IMPACT ANALYSIS

139. Based on the Service's incremental effects memorandum (see Appendix D), the first key conclusion of this analysis is that this proposed critical habitat designation is not expected to affect the types of conservation efforts requested by the Service during section 7 consultations for the diamond darter. As stated in the incremental effects memorandum, the Service believes that "in most cases, the results of consultation under the adverse modification and jeopardy standards are likely to be similar because... the primary constituent elements that define critical habitat are also essential for the survival of the diamond darter."¹⁴¹ In addition, while the diamond darter does not occur in Unit 2, the entirety of that unit is occupied by listed mussel species. The Service anticipates that the conservation efforts it would recommend to avoid jeopardy to the diamond darter and to avoid adverse modification of its critical habitat would be the same as those recommended to avoid jeopardy for the co-occurring listed mussel species.¹⁴² Therefore, we anticipate that critical habitat designation will not generate additional requests for project modification in either of the proposed critical habitat units.

140. The second key conclusion is that there are no indirect incremental impacts for any of the activities considered in this analysis. Specifically, based on discussions with State and local regulatory authorities, including WVDEP and KYDW, land and water management practices are not expected to change due to the designation of critical habitat for the diamond darter.¹⁴³

¹⁴¹ US Fish and Wildlife Service, Incremental Effects Memorandum, September 28, 2012. See Appendix D.

¹⁴² Written communication with the Kentucky Field Office on December 12, 2012; Personal communication with Monte McGregor of the Kentucky Department of Fish & Wildlife Resources on December 12, 2012.

¹⁴³ Personal communication with Ben Lowman, WVDEP, on December 6, 2012; personal communication with KYDW on November 30, 2012.

KEY ISSUES AND CONCLUSIONS OF THE INCREMENTAL ANALYSIS

Incremental Impacts of Critical Habitat Designation

- Incremental impacts of critical habitat designation are limited to additional administrative costs of consultations. The Service expects that conservation measures implemented to avoid jeopardy to the species (anticipated to be undertaken regardless of critical habitat designation) are sufficiently protective to avoid adverse modification of critical habitat. Thus, no additional conservation measures are likely to be requested due to critical habitat designation for the species.
- The present value impacts of critical habitat designation in areas proposed for designation over the next 20 years (2013 through 2032) are \$800,000, or \$70,000 on an annualized basis, assuming a seven percent discount rate. These costs are entirely made up of added administrative cost.

Incremental Impacts by Activity

- Resource Extraction. Six formal consultations associated with coal mining operations in Unit 1 are expected. We do not anticipate impacts to oil and natural gas exploration and drilling, based on the level of consultations and Corps-permitted actions over the last five years. Sixty consultations on utilities projects are expected over 20 years within the study area based on historical activity levels and known/planned projects.
- Timber Management, Agriculture, and Grazing. NRCS funding serves as the only Federal nexus for these activities. Consultations on individual projects are expected to be informal due to streamlined section 7 processes associated with recent statewide NRCS programmatic consultations in both States. 190 informal consultations are expected to occur related to such projects over 20 years in Unit 2. West Virginia NRCS does not expect NRCS-funded projects to occur in Unit 1 within the next 20 years. One informal consultation is expected per year in each State in association with annual revision of an NRCS programmatic consultation.
- Other In-Stream Work. We forecast 14 formal and 10 informal consultations, all occurring in the Unit 2 study area, within the next 20 years. These consultations are based on extrapolations of historical consultations in the study area considering co-occurring listed mussels, historical levels of Section 404 permitting, and communications with MCNP.
- Transportation. Based on extrapolations of Six-Year Plans from WVDOT and Kentucky Transportation Cabinet (KTC), over the next 20 years, we forecast 14 formal and 2,258 informal consultations in association with road and bridge maintenance and resurfacing projects. The vast majority of these consultations are expected to occur in Unit 1 and involve minimum administrative effort. Additionally, we forecast 2,767 transportation projects that will be covered under WVDOT's programmatic consultation, each of which may result in minimal administrative effort. This may overestimate future consultations for a number of reasons.
- Water Quality Management. One informal consultation is expected to occur every three years in each state associated with triennial review of water quality standards.

Incremental Impacts by Unit

- We anticipate that both Unit 1 and Unit 2 will incur \$350,000 and \$450,000, respectively, of incremental impacts over 20 years (assuming a seven percent discount rate), totaling \$800,000 for the entire study area.

Key Uncertainties

- A number of assumptions regarding existing baseline protection for the diamond darter within proposed critical habitat areas and the extent of future incremental project modification costs and administrative effort contribute uncertainty to the incremental impact estimates (Exhibit 4-8 provides a complete list).

141. In this chapter we quantify only the incremental administrative effort to consider critical habitat as part of section 7 consultations for the species. As described in Chapter 2, once critical habitat is designated, some additional effort is likely to be required during the section 7 consultation process to consider the potential for projects to result in adverse modification. This is reflected in additional hours spent in communication with the Service and on activities such as report-writing and project documentation.
142. Exhibit 4-1 summarizes the forecast incremental impacts by proposed critical habitat unit.

EXHIBIT 4-1. TOTAL FORECAST INCREMENTAL IMPACTS BY UNIT (2013-2032, PRESENT VALUE, SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE	ANNUALIZED
1 - Lower Elk River	\$350,000	\$31,000
2 - Green River	\$450,000	\$39,000
TOTAL	\$800,000	\$70,000
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

143. The present value of total incremental cost of critical habitat designation is \$800,000 assuming a seven percent discount rate, or \$70,000 on an annualized basis. Exhibit 4-2 provides the estimated incremental impacts by activity. Transportation activities are likely to be subject to the greatest incremental impacts at \$320,000 over 20 years, followed by timber management, agriculture, and grazing activities together at \$260,000 (present values over 20 years assuming a seven percent discount rate).

EXHIBIT 4-2. FORECAST INCREMENTAL IMPACTS BY ECONOMIC ACTIVITY (2013-2032, PRESENT VALUE, SEVEN PERCENT DISCOUNT RATE)

ACTIVITY	PRESENT VALUE	ANNUALIZED
Resource Extraction	\$150,000	\$13,000
Timber Management, Agriculture, and Grazing	\$260,000	\$23,000
Transportation	\$320,000	\$29,000
Other In-Stream Work	\$50,000	\$4,400
Water Quality/Sewage Management	\$18,000	\$1,600
TOTAL	\$800,000	\$70,000
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

4.2 SECTION 7 CONSULTATION FORECAST

Direct Incremental Impacts

144. As discussed in Chapter 1, this analysis focuses on the following threats to critical habitat: (1) resource extraction and utilities; (2) timber management, agriculture, and grazing; (3) other in-stream work; (4) transportation (roads, highways, bridges); and (5) water quality/sewer management.
145. In this analysis, we apply the best available information in order to forecast the likely frequency and geographic distribution of projects subject to section 7 consultation within the study area. Information referenced to identify future activity levels included public comments submitted on the Proposed Rule, agency planning documents (e.g., energy development plans and transportation plans), and communication with Federal and State agencies such as the Corps, NRCS, FERC, Departments of Transportation, the Service, and State and local government officials.
146. In some cases, specific information on the location and frequency of future projects was not available. In these instances, we relied on historical information describing activity levels in combination with discussions with the relevant permitting or regulatory agency. For example, as described in Chapter 3, a number of the activities evaluated in this analysis are subject to CWA section 404 permitting. The Corps maintains the ORM2 database, a web-based geospatial database application for tracking and managing all aspects of the Corps regulatory process. The ORM2 database facilitates the processing and documentation of permit applications and enforcement activities overseen by the regulatory program by creating, storing and tracking all permit application data and related information in a single system.
147. The Corps' Huntington District and the Corps' Louisville District have not yet provided ORM2 data for our study area. In this analysis, we therefore rely on the historic consultation record for the co-occurring mussels as the best available information to forecast consultations on 404-permitted projects across the study area, along with interviews and information collected by other relevant parties, where possible.
148. In the remainder of this section, we describe the consultation forecasts for each of the affected land- and water-use activities. Direct incremental impacts associated with these forecast consultations are assumed to be limited to administrative costs because the Service does not anticipate recommending additional conservation efforts to avoid adverse modification over and above those recommended to avoid jeopardy to the species, and because Unit 1 is occupied by the darter and Unit 2 is entirely occupied by listed mussel species.¹⁴⁴ As noted above, once critical habitat is designated, some additional effort is likely to be required as part of section 7 consultation to consider adverse modification.

¹⁴⁴ US Fish and Wildlife Service, Incremental Effects Memorandum, September 28, 2012. See Appendix D; written communication with the Kentucky Field Office on December 12, 2012; personal communication with Monte McGregor of the Kentucky Department of Fish & Wildlife Resources on December 12, 2012.

Indirect Incremental Impacts

149. In addition to the direct incremental impacts of critical habitat designation, potential exists for indirect impacts; that is, impacts of the designation that may occur outside of the section 7 consultation process. State or local regulations may require conservation of diamond darter based on the presence of critical habitat. Based on conversations with State and local governments, including WVDEP and KYDW, we conclude that the designation of critical habitat will not influence management practices related to State regulations above the level of conservation required by the presence of the diamond darter in Unit 1 or the listed mussel species in Unit 2.¹⁴⁵

4.2.1 RESOURCE EXTRACTION

150. As described in Chapter 3, coal mining, oil and gas exploration and drilling, and natural gas and other utility pipelines have the potential to impact the diamond darter and its critical habitat through direct disturbance of habitat during construction or through degradation of water quality through increased levels of sedimentation, conductivity and other pollutants. Any such project occurring within the study area is likely to incur incremental administrative costs associated with consideration of critical habitat during section 7 consultation. As previously stated, no incremental project modifications due to the designation of critical habitat are anticipated. Exhibit 4-3 presents total incremental administrative costs related to resource extraction and utilities activity by unit within the study area.

EXHIBIT 4-3. FORECAST INCREMENTAL IMPACTS TO RESOURCE EXTRACTION AND UTILITY PIPELINE ACTIVITY (2013-2032, PRESENT VALUE, SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE	ANNUALIZED
1	\$56,000	\$5,000
2	\$89,000	\$7,900
TOTAL	\$150,000	\$13,000
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

Coal Mining

151. For all potential future SMCRA- and Army Corps-permitted mining operations within the study area, we expect that the listing and critical habitat designation of the diamond darter will lead to formal consultations with the Service.¹⁴⁶ Proposed critical habitat Unit 1 for the diamond darter occurs in Clay and Kanawha Counties, West Virginia. This analysis forecasts coal mining projects based on the historical level of SMCRA permitting within the Unit 1 study area.¹⁴⁷ In the last 30 years, nine SMCRA permits have been issued for

¹⁴⁵ Personal communication with Ben Lowman, WVDEP, on December 6, 2012; personal communication with Sandy Gruzsky, KYDW, on November 30, 2012.

¹⁴⁶ Personal communication with the Service on December 18, 2012.

¹⁴⁷ As described in Chapter 3, only those mining projects requiring Section 404 permits will be required to consult with the Service. Because the Corps is unable to predict the future level of mining activity in the study area, we consider the

coal mining projects within the Unit 1 study area.¹⁴⁸ Based on this historical permitting rate, we estimate six formal consultations related to coal mining to occur in the Unit 1 study area over the next 20 years. Mining operations are not expected to impact diamond darter critical habitat in the Unit 2 study area.¹⁴⁹

Oil and Gas Exploration and Drilling

152. The Service lists oil and gas exploration and drilling as a threat in both units in the Proposed Rule. However, there is no Federal nexus associated with most of these projects. In this analysis, we base our projection of future consultations on the historical consultation record for listed mussels within the Unit 1 study area and on the historical rate of section 404 permitting in the Unit 2 study area over the last five years.¹⁵⁰ As no such consultations or permits have occurred, this analysis does not forecast consultations related to oil and gas exploration and drilling.

Natural Gas and Other Utility Pipelines

153. As previously described in Chapter 3 of this report, no major pipeline construction activity has been licensed by FERC within the study area since 2009, and no projects are in the planning or construction stages.¹⁵¹ Considerable uncertainty surrounds the level of future construction of natural gas pipelines and storage facilities due to several factors, including uncertainty of level of demand for natural gas.
154. In this analysis, we base our projection of future consultations on the historical consultation record for listed mussels within the Unit 1 study area and on the historical rate of section 404 permitting in the Unit 2 study area over the last five years.¹⁵² In the Unit 1 study area, four informal consultations have been conducted on pipeline activity: three projects replacing or constructing new waterlines and one project to construct a new sewer line. In the Unit 2 study area, the Corps has permitted seven water line projects and one natural gas pipeline since 2008. The Corps also identified one pending water line permit expected to be issued in 2013.¹⁵³ Based on these historical rates, we anticipate 16 informal consultations in the Unit 1 study area and 33 formal consultations in the Unit 2 study area over 20 years.

historical level of permitting activity in the study area. However, this information is not yet available from the Corps' Huntington District. Therefore, estimated costs presented in this Draft Economic Analysis will be updated once we receive this information.

¹⁴⁸ Written communication with the Service on November 7, 2012.

¹⁴⁹ Personal communication with the Service on December 18, 2012.

¹⁵⁰ In both States, the Corps' ORM2 database contains information on the number of 404 permits that have been issued for oil and gas activities within the study area. However, this information is not yet available from the Corps' Huntington District. Estimated costs presented in this Draft Economic Analysis will be updated once we receive this information.

¹⁵¹ FERC's Approved Projects List, accessed at <http://www.ferc.gov/industries/gas/indus-act/pipelines/approved-projects.asp> on December 19, 2012.

¹⁵² In both States, the Corps' ORM2 database contains information on the number of 404 permits that have been issued for utility pipeline activities within the study area. However, this information is not yet available from the Corps' Huntington District.

¹⁵³ Operations & Maintenance Business Information Link (OMBIL) Regulatory Module version 2 (ORM2). Received from U.S. Army Corps of Engineers, Louisville District, on January 17, 2013.

155. Additionally, we forecast consultations based on known planned or ongoing projects associated with NiSource natural gas pipeline crossings in the Unit 1 study area. As described in Chapter 3, NiSource estimates that the six natural gas pipelines that cross the Elk River will result in 10 informal consultations.

4.2.2 TIMBER MANAGEMENT, AGRICULTURE, AND GRAZING

156. Silviculture production, agriculture, and grazing operations pose threats to the diamond darter and its habitat due to associated sedimentation, pesticide use, and direct substrate disturbance through road construction and livestock trampling.¹⁵⁴ As discussed in Chapter 3, these operations are exempt from section 404 permitting requirements under section 404(f) of the CWA if operations comply with mandatory Corps BMPs.¹⁵⁵ Therefore, we do not forecast any future consultations on timber management, agriculture, and grazing associated with section 404 permitting. We do, however, forecast two consultations associated with reviewing NRCS' programmatic consultation with the Service and 9.5 informal consultations per year (related to EQIP, WHIP, and WRP activities), or approximately 190 informal consultations over 20 years, within the study area associated with activities funded through NRCS.¹⁵⁶ Background on these forecasts are provided in Chapter 3. Exhibit 4-4 presents incremental costs of section 7 consultations associated with these activities by unit. NRCS did not report any previous P.L. 566 projects within the study areas.

EXHIBIT 4-4. FORECAST INCREMENTAL IMPACTS TO TIMBER MANAGEMENT, AGRICULTURE, AND GRAZING ACTIVITY (2013-2032, PRESENT VALUE, SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE	ANNUALIZED
1	\$56,000	\$5,000
2	\$200,000	\$18,000
TOTAL	\$260,000	\$23,000
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

157. As described in Chapter 3, NRCS' EQIP and WHIP programs are common within counties containing proposed critical habitat.¹⁵⁷ In response to the high number of NRCS funded projects in these States, NRCS in both States has undergone programmatic consultations to streamline the section 7 process and reduce administrative burden on NRCS, the Service, and recipients of NRCS funds. Because of the conservation-oriented

¹⁵⁴ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43906. July 26, 2012.

¹⁵⁵ Personal and written communication with Barbara Breshock, West Virginia Division of Forestry, on December 12, 2012; personal communication with Pam Snyder, Kentucky Division of Forestry, on December 13, 2012.

¹⁵⁶ Personal and written communication with Jerome Faulkner, Kentucky NRCS, on December 27, 2012; written communication with the Service on November 7, 2012.

¹⁵⁷ Personal and written communication with Casey Shrader, Kentucky NRCS, on December 15, 2012.

nature of most NRCS funded projects and because the programmatic consultations in both States have significantly reduced the need for section 7 consultations on NRCS projects, the analysis anticipates that any future consultations related to EQIP, WHIP, and WRP funded projects will be informal.¹⁵⁸

158. However, each State's programmatic consultation will be reviewed each year and revised to consider newly listed species and designated critical habitat within the States.¹⁵⁹ As such, once the diamond darter is listed and critical habitat is designated, the programmatic consultations will require review to consider the diamond darter and its habitat. Because the diamond darter has already been included in the programmatic for West Virginia, the review associated with this should be minimal. The analysis anticipates incremental administrative costs associated with consideration of diamond darter critical habitat during the annual review of West Virginia and Kentucky NRCS' programmatic consultations. Therefore, we forecast one informal section 7 consultation per year in each State associated with the review of the NRCS programmatic consultations, requiring between 60 and 80 hours of WVDOT and Service staff time for each review.¹⁶⁰
159. Representatives from West Virginia NRCS do not anticipate NRCS-funded silviculture, agriculture, and grazing projects in the Unit 1 study area over the next 20 years. As such, we do not forecast any consultations in Unit 1 beyond the annual review of the State's programmatic consultation.
160. For NRCS Kentucky, we were able to obtain historical project information at the county level. More geographically specific information was not available. For a more precise calculation of potential future projects within the study area, as described below, we only included a portion of the total consultations reported by NRCS in each county based on the percentage of private lands in each county overlapping the Unit 2 study area, as described below. For each informal forecast consultation, we anticipate a level of effort for NRCS staff similar to an informal consultation. However, the Service expects these consultations to result in only a half hour of Service staff time per consultation.¹⁶¹
- **Edmonson County.** Throughout Edmonson County, between 2009 and 2012, 47 EQIP or WHIP funded projects occurred that would trigger an informal consultation to consider potential effects on the diamond darter and its critical habitat. About four percent of private lands in Edmonson County overlap the Unit 2 study area.¹⁶² Therefore, we anticipate 1.8 consultations in Edmonson County every four years, or nine consultations over 20 years.

¹⁵⁸ Personal and written communication with Casey Shrader, Conservation Biologist, Kentucky NRCS, and former Conservation Biologist at West Virginia NRCS, on December 15, 2012

¹⁵⁹ Personal and written communication with Casey Shrader, Kentucky NRCS, on December 15, 2012.

¹⁶⁰ Estimates of staff effort based on personal communication with the Service on February 8, 2013.

¹⁶¹ Estimates of staff effort based on personal communication with the Service on February 8, 2013.

¹⁶² 18.2 percent of Edmonson County overlaps the Unit 2 study area. However, a large portion of the overlapping area occurs within the boundaries of MCNP. As NRCS only funds projects on private lands, no NRCS-related consultations will occur in MCNP.

- **Green County.** From 2009 to 2012, 19 EQIP or WHIP funded projects occurred that would trigger an informal consultation to consider potential effects on the diamond darter and its critical habitat within Green County. About 70 percent of private lands in Green County overlaps the Unit 2 study area. We therefore forecast 13 informal consultations in Green County every four years, or 65 informal consultations over 20 years.
- **Hart County.** Between 2009 and 2012, 39 EQIP or WHIP funded projects occurred throughout Hart County that would trigger an informal consultation to consider potential effects on the diamond darter and its critical habitat. As about 60 percent of private lands in Hart County overlaps the Unit 2 study area, we anticipate 23 informal consultations in Hart County every four years, or 115 informal consultations over 20 years.

4.2.3 OTHER IN-STREAM WORK

161. As described in Chapter 3, impoundments, dams, diversions, dredging, channelization, and other in-stream work can affect the diamond darter by altering stream hydrology and flow levels, degrading water quality through excessive siltation, and cause direct disturbances of in-stream habitats and riparian corridors.¹⁶³ Any such project occurring within the study area is likely to incur incremental administrative costs associated with the consideration of critical habitat during section 7 consultation. As previously stated, incremental project modifications due to the designation of critical habitat are not anticipated, as any conservation measures the Service requests to avoid jeopardy of the diamond darter in Unit 1 and listed mussel species occupying the entirety of Unit 2 should be sufficient to avoid adverse modification of critical habitat.¹⁶⁴
162. In order to forecast section 7 consultations for other in-stream activities in the study area, we reviewed the consultation history provided for co-occurring mussel species in the Unit 1 study area and the historical section 404 permitting record within the Unit 2 study area.¹⁶⁵ Three consultations occurred over the past five years; assuming this rate remains steady, in this analysis we forecast that 12 formal consultations will be carried out over the next 20 years related to Corps-permitted activities. Additionally, MCNP anticipates that 10 projects at the national park will result in informal consultation over the next 20 years, and two additional projects will result in formal consultations.¹⁶⁶ Exhibit 4-5 summarizes the total incremental administrative costs related to impoundment, dam, diversion, dredging, channelization, recreation, and other in-stream projects by unit within the study area.¹⁶⁷

¹⁶³ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43914.

¹⁶⁴ Written communication with the Kentucky Field Office on December 12, 2012; Personal communication with Monte McGregor of the Kentucky Department of Fish & Wildlife Resources on December 12, 2012; Personal communication with the Service on the kick-off call, on October 18, 2012.

¹⁶⁵ We are awaiting a response and detailed information from the ORM2 database from the Huntington Corps Office.

¹⁶⁶ Personal communication with Bobby C. Carson, Chief, Science and Resources Management Division, Mammoth Cave National Park, on February 13, 2013.

¹⁶⁷ *Ibid.*

EXHIBIT 4-5. FORECAST INCREMENTAL IMPACTS TO OTHER IN-STREAM WORK ACTIVITY (2013-2032, PRESENT VALUE, SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE	ANNUALIZED
1 - Elk River	\$0	\$0
2 - Green River	\$50,000	\$4,400
TOTAL	\$50,000	\$4,400
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

4.2.4 TRANSPORTATION

163. Road and bridge construction and maintenance activities pose threats to the diamond darter and its habitat due to increased sedimentation from runoff from paved or gravel surfaces, alteration of stream hydrology, and direct substrate disturbance.¹⁶⁸ Similar transportation projects occurring within the study area are likely to incur incremental administrative costs associated with the consideration of critical habitat during section 7 consultation. As previously stated in Chapter 3, no incremental project modifications due to the designation of critical habitat are anticipated. Exhibit 4-6 presents total incremental administrative costs related to transportation activity by unit within the study area.

EXHIBIT 4-6. FORECAST INCREMENTAL IMPACTS TO TRANSPORTATION ACTIVITY (2013-2032, PRESENT VALUE, SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE	ANNUALIZED
1 - Elk River	\$230,000	\$20,000
2 - Green River	\$93,000	\$8,200
TOTAL	\$320,000	\$29,000
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

164. The majority of section 7 consultations related to transportation projects are expected to occur within the Unit 1 study area in West Virginia. Using the Six-Year Plan from WVDOT, this analysis forecasts planned or ongoing road and bridge construction projects located within the study area and describes the geographical and temporal distribution of consultation costs related to these projects within the next 20 years.¹⁶⁹ Conversations with WVDOT and the Service indicate that approximately one-third of replacement projects on bridges crossing the Elk River will result in formal consultation.¹⁷⁰ The remaining two-thirds of these projects will result in informal consultations, requiring only a half hour of WVDOT staff time and a half hour of Service

¹⁶⁸ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 43916.

¹⁶⁹ Written communication with Lovell Facemire, WVDOT, on December 11, 2012.

¹⁷⁰ Personal communication with the Service on February 8, 2013; written communication with Lovell Facemire, WVDOT, on December 11, 2012.

staff time per consultation.¹⁷¹ Consultations on all other projects located within a quarter-mile buffer from the Elk River stream bank will also be informal, requiring the same low level of effort.¹⁷² All other projected transportation projects within the West Virginia study area, including guard rail installations, pipe replacements, and bridge rehabilitation and replacement, will be covered under the programmatic consultation and will only require a half hour of WVDOT staff time and no Service involvement.¹⁷³

165. Based on this information, we forecast that, over the next 20 years, a total of six formal consultations, 2,218 informal consultations, and 2,767 projects covered by WVDOT's programmatic agreement. While the total number of forecast informal consultations is high, WVDOT officials expect that they will involve a low level of effort, as described above, due to their repetitive nature.¹⁷⁴ Specifically, efforts for most consultations will likely be routine and consist of verifying that construction is compliant with BMPs, appropriate measures are taken to protect water quality, and direct disturbance of habitat is kept to a minimum.¹⁷⁵ Additionally, the Service and WVDOT expect to review the State's programmatic consultation annually, requiring between 60 and 80 hours of WVDOT and Service staff time for each review.¹⁷⁶
166. In the Kentucky portion of the study area, the KTC Highway Plan identified 12 planned or ongoing projects related to transportation activities in the Unit 2 study area that will take place over the next six years.¹⁷⁷ Conversations with KTC indicate eight additional bridge crossing projects on the Green River are the only transportation activities that will require a formal section 7 consultation over the next 20 years, while paving projects and minimal maintenance projects will not result in consultation.¹⁷⁸ Based on these historical levels of activity, the analysis anticipates a total of eight formal and 40 informal consultations related to transportation activities will occur at some point over the next 20 years within the Kentucky portion of the study area.

4.2.5 WATER QUALITY/SEWER MANAGEMENT

167. As described in Chapter 3, WVDEP and KYDW engage in triennial reviews with EPA Regions 3 and 4, respectively, in which all State water quality standards are evaluated to

¹⁷¹ Personal communication with the Service on February 8, 2013.

¹⁷² Personal communication with the Service on February 8, 2013; written communication with Lovell Facemire, WVDOT, on December 11, 2012.

¹⁷³ *Ibid.* and the Memorandum of Understanding between the Federal Highway Administration, the West Virginia Department of Transportation, and the U.S. Fish and Wildlife Service, received from WVDOT on January 3, 2013.

¹⁷⁴ *Ibid.* and Personal communication with Jason Workman, WVDOT, on January 3, 2013.

¹⁷⁵ *Ibid.*

¹⁷⁶ Estimates of staff effort based on personal communication with the Service on February 8, 2013.

¹⁷⁷ KTC Highway Plan web application available at <<http://maps.kytc.ky.gov/SYP/>> accessed on December 28, 2012; Personal communication with Dave Harmon, KTC, on December 14, 2012.

¹⁷⁸ Personal communication with Dave Harmon, KTC, on December 6, 2012. Conversations with KTC indicate that paving projects and minimal maintenance projects do not require consultation.

determine consistency with aquatic species and human health needs. With each triennial review, EPA Regions 3 and 4 enter into consultation with the Service.¹⁷⁹

168. We therefore forecast one informal consultation every three years in each State, amounting to seven informal consultations in each State over the next 20 years associated with triennial review of water quality standards. Incremental administrative costs associated with these consultations amount to \$18,000 over the next 20 years (using a seven percent discount rate), or \$1,600 on an annualized basis. Exhibit 4-7 summarizes this information.

EXHIBIT 4-7. FORECAST INCREMENTAL IMPACTS TO WATER QUALITY/SEWER MANAGEMENT ACTIVITY (2013-2032, PRESENT VALUE, SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE	ANNUALIZED
1 - Elk River	\$9,200	\$810
2 - Green River	\$8,600	\$760
TOTAL	\$18,000	\$1,600
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

169. WVDEP and KYDW do not treat critical habitat differently than areas that are not designated but are occupied by listed species. In the case of the diamond darter, since all proposed critical habitat units are occupied by the diamond darter or listed mussel species, WVDEP and KYDW confirm that the presence of the listed species, not critical habitat, would be responsible for any changes in water quality standards.¹⁸⁰ Furthermore, as the entire critical habitat is occupied by the darter or listed mussel species, WVDEP and KYDW do not expect the presence of critical habitat to generate additional considerations in decisions to designate water bodies to special classifications, such as section 303(d) Impaired Waters, Tier 3 waters, OSRWs, or any other use-classification. That is, critical habitat would not generate additional actions above and beyond the presence of the diamond darter or listed mussel species in assigning special use-classifications. In the event that a stream were added to a State's section 303(d) list or another special designation due to, at least in part, the presence of the diamond darter, the change in water quality standards would be considered a baseline effect resulting from the listing of the species.¹⁸¹
170. Lastly, because no Federal nexus exists related to septic system management, we do not forecast any direct or indirect incremental impacts related to this activity.

¹⁷⁹ Personal communication with Ben Lowman, WVDEP, on December 6, 2012; personal communication with Sandy Gruzsky, KYDW, on November 30, 2012.

¹⁸⁰ *Ibid.*

¹⁸¹ *Ibid.*

4.3 KEY ASSUMPTIONS AND UNCERTAINTIES

171. The economic impacts presented in this chapter are based on a number of assumptions that may affect the estimates. Exhibit 4-8 presents the key assumptions and the extent to which they may lead to under- or over-estimates of the potential incremental impacts of the proposed critical habitat designation.

EXHIBIT 4-8. KEY ASSUMPTIONS ASSOCIATED WITH THE ESTIMATED INCREMENTAL IMPACTS OF CRITICAL HABITAT DESIGNATION FOR THE DIAMOND DARTER

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
We forecast that no incremental project modifications will result from the critical habitat designation.	May result in an underestimate of costs.	Potentially significant. Although unlikely based on discussions with the Service, if the Service requires project modifications due specifically to adverse modification considerations, costs estimated in this analysis could rise significantly. This assumption is most likely to affect forecast impacts in Unit 1.
We forecast that no indirect impacts will result from critical habitat designation.	May result in an underestimate of costs.	Probably minor. Although unlikely based on discussions with WVDEP and KYDW, if State or local laws and regulations are affected by the critical habitat designation, estimated costs may increase significantly. This assumption is most likely to affect forecast impacts to water quality activities in the Unit 2 study area.
We forecast future consultations based on the historic consultation rate with the Service. We assume that this information is complete and that no other projects will occur in the study area during the timeframe of this analysis.	Unknown. May overestimate or underestimate incremental impacts.	Probably minor. This assumption affects only the forecast administrative consultation costs. This assumption is most likely to affect forecast impacts to activities the Unit 1 study area. The number of projects that will occur in the study area is dependent forecast economic activity in the region, and is therefore difficult to accurately predict.
For transportation projects in West Virginia resulting in informal consultation, we assume that the incremental effort on each of these consultations will be limited to one-half hour of Service time and one-half hour of WVDOT time.	Unknown. May overestimate or underestimate incremental impacts.	Probably minor. This assumption affects only the forecast administrative consultation costs. WVDOT officials expect consultations will involve a low level of effort due to their repetitive nature, and that little or no effort will be focused specifically on consideration of adverse modification of diamond darter habitat.

4.4 ECONOMIC BENEFITS OF CRITICAL HABITAT DESIGNATION FOR THE DIAMOND DARTER

172. 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 diamond darter resulting from this designation.
173. Quantification and monetization of species conservation benefits requires information on the incremental change in the probability of diamond darter conservation that is expected to result from the designation. As described in this chapter and previously in Chapter 3, modifications to future projects are unlikely beyond the baseline given the extensive baseline protections already provided to the species and the characteristics of the specific projects projected to occur over the 20-year timeframe of the analysis.
174. Other benefits may also be achieved through designation of critical habitat. For example, the public may hold a value for habitat conservation, beyond its willingness to pay for conservation of a specific species. Studies have been done that 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). Again, because the designation of critical habitat for the diamond darter is unlikely to preserve new areas or protect wildlife above existing baseline protections, such benefits are unlikely.
175. 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. Ancillary benefits are unlikely given that no changes in behavior to protect such resources are anticipated to result from the designation.

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APPENDIX A | SMALL BUSINESS AND ENERGY IMPACTS ANALYSES

176. This appendix considers the extent to which incremental impacts from critical habitat designation may be borne by small entities and the energy industry. The analysis presented in Section A.1 is conducted pursuant to the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996. The energy analysis in Section A.2 is conducted pursuant to Executive Order No. 13211.
177. The analyses of impacts to small entities and the energy industry rely on the estimated incremental impacts resulting from the proposed critical habitat designation. The incremental impacts of the rulemaking are most relevant for the small business and energy impacts analyses because they reflect costs that may be avoided or reduced based on decisions regarding the composition of the Final Rule.

A.1 RFA/SBREFA ANALYSIS

178. When a Federal agency proposes regulations, the RFA requires the agency to prepare and make available for public comment an analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions as defined by the RFA).¹⁸² 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 the designation of diamond darter critical habitat to affect small entities.
179. To ensure broad consideration of impacts on small entities, the Service has prepared this small business analysis without first making the threshold determination in the Proposed Rule regarding whether the proposed critical habitat designation could be certified as not having a significant economic impact on a substantial number of small entities. This small business analysis will therefore inform the Service's threshold determination.

A.1.1 OVERVIEW OF RFA APPLICABILITY

180. This analysis is intended to improve the Service's understanding of the potential effects of the Proposed Rule on small entities and to identify opportunities to minimize these impacts in the final rulemaking. The Act requires the Service to designate critical habitat for threatened and endangered species to the maximum extent prudent and determinable. Section 4(b)(2) of the Act requires that the Service designate critical habitat "on the basis

¹⁸² 5 U.S.C. § 601 et seq.

of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impacts, of specifying any particular area as critical habitat." This section grants the Secretary [of the Interior] discretion to exclude any area from critical habitat if (s)he determines "the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat." However, the Secretary may not exclude an area if it "will result in the extinction of the species."

181. Three types of small entities are defined in the RFA:

- **Small Business** - Section 601(3) of the RFA defines a small business as having the same meaning as small business concern under section 3 of the Small Business Act. This includes any firm that is independently owned and operated and is not dominant in its field of operation. The Small Business Administration (SBA) has developed size standards to carry out the purposes of the Small Business Act, and those size standards can be found in 13 CFR 121.201. The size standards are matched to NAICS industries. The SBA definition of a small business applies to a firm's parent company and all affiliates as a single entity.
- **Small Governmental Jurisdiction** - Section 601(5) defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000. Special districts may include those servicing irrigation, ports, parks and recreation, sanitation, drainage, soil and water conservation, road assessment, etc. When counties have populations greater than 50,000, those municipalities of fewer than 50,000 can be identified using population reports. Other types of small government entities are not as easily identified under this standard, as they are not typically classified by population.
- **Small Organization** - Section 601(4) defines a small organization as any not-for-profit enterprise that is independently owned and operated and not dominant in its field. Small organizations may include private hospitals, educational institutions, irrigation districts, public utilities, agricultural co-ops, etc.

182. The courts have held that the RFA/SBREFEA requires Federal agencies to perform a regulatory flexibility analysis of forecast impacts to small entities that are directly regulated. In the case of *Mid-Tex Electric Cooperative, Inc., v. Federal Energy Regulatory Commission (FERC)*, FERC proposed regulations affecting the manner in which generating utilities incorporated construction work in progress in their rates. The generating utilities that expected to be regulated were large businesses; however, their customers -- transmitting utilities such as electric cooperatives -- included numerous small entities. In this case, the court agreed that FERC simply authorized large electric generators to pass these costs through to their transmitting and retail utility customers, and FERC could therefore certify that small entities were not directly impacted within the definition of the RFA.¹⁸³

183. Similarly, *American Trucking Associations, Inc. v. Environmental Protection Agency* addressed a rulemaking in which EPA established a primary national ambient air quality

¹⁸³ 773 F. 2d 327 (D.C. Cir. 1985).

standard for ozone and particulate matter.¹⁸⁴ 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.

184. The SBA in its guidance on how to comply with the RFA recognizes that consideration of indirectly affected small entities is not required by the RFA, but encourages agencies to perform a regulatory flexibility analysis even when the impacts of its regulation are indirect.¹⁸⁵ "If an agency can accomplish its statutory mission in a more cost-effective manner, the Office of Advocacy [of the SBA] believes that it is good public policy to do so. The only way an agency can determine this is if it does not certify regulations that it knows will have a significant impact on small entities even if the small entities are regulated by a delegation of authority from the Federal agency to some other governing body."¹⁸⁶
185. The regulatory mechanism through which critical habitat protections are enforced is section 7 of the Act, which directly regulates only those activities carried out, funded, or permitted by a Federal agency. By definition, Federal agencies are not considered small entities, although the activities they may fund or permit may be proposed or carried out by small entities. Given the SBA guidance described above, this analysis considers the extent to which this designation could potentially affect small entities, regardless of whether these entities would be directly regulated by the Service through the Proposed Rule or by a delegation of impact from the directly regulated entity.
186. This screening analysis focuses on small entities that may bear the incremental impacts of this rulemaking quantified in Chapter 4 of this economic analysis. As discussed in greater detail in Chapters 2, 3, and 4, incremental impacts of the designation of critical habitat are likely to be limited to administrative costs of section 7 consultations. Small entities may participate in section 7 consultation as a third party (the primary consulting parties being the Service and the Federal action agency). It is therefore possible that the small entities may spend additional time considering critical habitat due to the need for a section 7 consultation for the diamond darter. Additional incremental costs of consultation that would be borne by the Federal action agency and the Service are not relevant to this screening analysis as these entities (Federal agencies) are not small.

A.1.2 ANALYSIS OF IMPACTS TO SMALL ENTITIES

187. As described in Chapters 3 and 4, activities that may be affected by the designation include: resource extraction; timber management, agriculture, and grazing; in-stream activities; transportation; and water quality and sewer management.

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

¹⁸⁵ Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act, pg. 20.

¹⁸⁶ *Ibid.*, pg. 21.

188. We do not expect critical habitat designation to result in impacts to small entities for transportation and water quality/sewage management activities, as consultations considering these activities do not involve third parties.
189. Estimated incremental costs that may be borne by small entities consist of administrative impacts of section 7 consultation related to resource extraction; timber management, agriculture, and grazing; and impoundments, dams, diversions, dredging, channelization, and other in-stream work. Annual incremental impacts represent less than one percent of average annual revenues of small entities undertaking these activities. These potential impacts are described in greater detail below.
- **Resource Extraction.** In Chapter 4 of this analysis, we discuss the potential for diamond darter critical habitat to affect resource extraction and utility activities. While impacts are not expected related to oil and gas exploration and drilling, administrative costs related to six consultations on coal mining and 50 consultations on utilities may involve small entities as third-party project proponents. It is uncertain whether third parties involved in mining consultations will be small; however we conservatively assume that each forecast consultation on mining and utilities will involve a small entity. The incremental cost of consultation is approximately \$880 to \$5,300. This cost represents less than 0.1 percent of annual revenues for mining companies.¹⁸⁷

While it is unlikely that future mining consultations will involve small government entities, some third-parties to utility pipeline consultations may be counties or water districts that are considered small. Small counties that may bear administrative costs associated with utilities include Clay County, West Virginia, and Green, Edmonson, and Hart Counties, Kentucky, all of which serve populations of less than 50,000. The cost to each county to participate in a consultation ranges from approximately \$880 to \$8,800. This cost represents less than one percent of annual tax revenues.^{188,189}
 - **Timber Management, Agriculture, and Grazing.** In this analysis, we forecast consultations on these activities, as discussed in Chapter 4. We forecast 190 such

¹⁸⁷ Annual revenues related to development activities are estimated using Risk Management Association (RMA), *Annual Statement Studies: Financial Ratio Benchmarks 2012 to 2013*, 2012. For each NAICS code, RMA provides the net sales and the number of entities falling within several sales categories: \$0 to \$1 million, \$1 to 3 million, \$3 to \$5 million, \$5 to 10 million, or \$10 to \$25 million. Based on the number of entities and total net sales falling within each sales category, we developed an estimate of the weighted average net sales (revenues) per small entity. For coal mining firms (NAICS code 212111), revenues are estimated at \$12 million annually. For counties, we conservatively assume annual tax revenues are \$1 million; actual revenues are likely to be higher.

¹⁸⁸ We assume all the affected county entities have tax revenues of at least \$1 million annually. Population statistics: US Census *Quickfacts*, accessed at <http://quickfacts.census.gov/qfd/states/01/01035.html> on January 2, 2013.

¹⁸⁹ In Chapter 4, we estimate that approximately 60 consultations will occur across all counties (small and large) over the 20-year time period of the analysis. However, 10 of these consultations are borne by NiSource, which is not a small entity. So, for the purposes of this distributional analysis, we assume affected small entities (likely counties) will participate in approximately 50 consultations over 20 years, or under three consultations per year. The full cost to a third party of a single consultation is \$880. If we assume that a single county participates in multiple consultations in a single year, the administrative costs of such activity are still likely to be less than one percent of annual tax revenues (e.g., 10 consultations x \$880/\$1,000,000 = 0.88 percent of annual revenues).

projects that may involve small entities within the study area.¹⁹⁰ Assuming that all timber management, agriculture, and grazing impacts are borne by 190 small private entities, this amounts to 9.5 affected entities per year. The per entity impact, ranging from approximately \$880 to \$22,000, represents less than one percent of annual revenues.^{191,192}

- **Impoundments, Dams, and Diversions, Dredging, Channelization, and Other In-Stream Activity.** In this analysis, we forecast consultations on these activities, as discussed in Chapter 4. We forecast 12 such projects that may involve small entities within the study area.¹⁹³ We also make the conservative assumption that the project proponents will be small local government entities, specifically, small counties serving populations of less than 50,000. Assuming that all impacts to in-stream activity are borne by four small counties, this amounts to less than one affected entity per year. Small counties that may bear administrative costs associated with utilities include Clay County, West Virginia, and Green, Edmonson, and Hart Counties, Kentucky, all of which serve populations of less than 50,000. The cost to each county to participate in a consultation ranges from approximately \$880 to \$8,800. This cost represents less than one percent of annual revenues.^{194,195}

190. Exhibit A-1 presents the results of this analysis. It provides the relevant small entity thresholds by NAICS code, the total number of entities and small entities, and the estimated incremental impacts as a percentage of annual revenues.

¹⁹⁰ Chapters 3 and 4 discuss forecast consultations between the NRCS and the Service related to annual review of NRCS programmatic consultations in each State. Because these consultations do not involve third-parties, no impacts to small entities are expected related to these consultations.

¹⁹¹ Annual revenues related to development activities are estimated using Risk Management Association (RMA), *Annual Statement Studies: Financial Ratio Benchmarks 2012 to 2013*, 2012. For each NAICS code, RMA provides the net sales and the number of entities falling within several sales categories: \$0 to \$1 million, \$1 to 3 million, \$3 to \$5 million, \$5 to 10 million, or \$10 to \$25 million. Based on the number of entities and total net sales falling within each sales category, we developed an estimate of the weighted average net sales (revenues) per small entity (within the following NAICS codes: 112111, 113310, 111910, 111150) at \$3.3 million annually.

¹⁹² In Chapter 4, we estimate that approximately 190 consultations will occur over the 20-year time period of the analysis. For the purposes of this distributional analysis, we assume 190 individual small entities will participate in approximately one consultation at some point over 20 years. The full cost to a third party of a single consultation is \$880. If we assume that a single entity participates in multiple consultations in a single year, the administrative costs of such activity are still likely to be less than one percent of annual revenues (e.g., 25 consultations x \$880/\$3,300,000 = 0.66 percent of annual revenues).

¹⁹³ In Chapter 4 we forecast 24 consultations, 12 of which are related to other in-stream work carried out by MCNP. As a Federal entity, MCNP is by definition not small. Therefore, we do not include impacts associated with these consultations in this distributional analysis.

¹⁹⁴ We assume all the affected county entities have tax revenues of at least \$1 million annually. Population statistics: US Census *Quickfacts*, accessed at <http://quickfacts.census.gov/qfd/states/01/01035.html> on January 2, 2013.

¹⁹⁵ In Chapter 4, we estimate that approximately 12 consultations will occur across all counties (small and large) over the 20-year time period of the analysis. For the purposes of this distributional analysis, we assume affected small entities (likely counties) will participate in approximately 12 consultations over 20 years, or less than one consultation per year. The full cost to a third party of a single consultation is \$880. If we assume that a single county participates in multiple consultations in a single year, the administrative costs of such activity are still likely to be less than one percent of annual tax revenues (e.g., 10 consultations x \$880/\$1,000,000 = 0.88 percent of annual revenues).

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

ACTIVITY	INDUSTRY (NAICS CODES)	SMALL ENTITY SIZE STANDARD (MILLIONS OF DOLLARS)	TOTAL NUMBER OF ENTITIES	NUMBER OF SMALL ENTITIES	NUMBER OF AFFECTED SMALL ENTITIES ¹ (PERCENT OF TOTAL SMALL ENTITIES)	INCREMENTAL ECONOMIC IMPACTS TO SMALL BUSINESSES	IMPACTS AS % OF ANNUAL REVENUES ²
Impoundments, Dams, Diversions, Dredging, Channelization, and In-Stream Transportation Structures	Other In-Stream Work (Clay County, WV; Edmonson, Hart, and Green Counties, KY)	Small governmental jurisdictions representing populations less than 50,000	-	-	12 entities over 20 years (less than one entity per year)	\$880 to \$8,800 per entity ^{3,6}	0.09% to 0.9%
Resource Extraction	Utility Pipeline Installation (Clay County, WV; Edmonson, Hart, and Green Counties, KY)	Small governmental jurisdictions representing populations less than 50,000	-	-	50 entities over 20 years (less than three entities per year)	\$880 to \$8,800 per entity ^{4,6}	0.09% to 0.9%
	Bituminous Coal and Lignite Surface Mining (212111)	500 employees	22	14	6 (43%)	\$880 to \$5,300 per entity ⁶	<0.1%
Timber Management, Agriculture, and Grazing	Beef Cattle Grazing and Farming (112111)	0.75	70	69	190 (82%)	\$880 to \$22,000 per entity ^{5,6}	0.03% to 0.66%
	Forest Nurseries and Gathering of Forest Products (113210)	7.0	2	2			
	Logging (113310)	500 employees	31	31			
	Tobacco Farming (111910)	0.75	104	104			
	Hay Farming (111940)		11	11			
	Corn Farming (111150)		14	14			

Notes:

1. To estimate the number of affected small entities, this analysis assumes one small entity per forecast section 7 consultation.
2. Annual revenues related to development activities are estimated using Risk Management Association (RMA), Annual Statement Studies: Financial Ratio Benchmarks 2012 to 2013, 2012. For each NAICS code, RMA provides the net sales and the number of entities falling within several sales categories: \$0 to \$1 million, \$1 to 3 million, \$3 to \$5 million, \$5 to 10 million, or \$10 to \$25 million. Based on the number of entities and total net sales falling within each sales category, we developed an estimate of the weighted average net sales (revenues) per small entity: for counties, annual tax revenues are assumed to be \$1 million; for coal mining firms, revenues are estimated at \$12 million annually; for companies involved in timber management, agriculture, and grazing, revenues are estimated at \$3.3 million annually. For counties, we conservatively assume annual tax revenues are \$1 million; actual revenues are likely to be higher.
3. We are uncertain in what year consultations on in-stream activities will occur over the next 20 years. For the purposes of this analysis, we assume affected small entities (likely counties) will participate in approximately 12 consultations over 20 years, or less than one consultation per year. However, if we assume that a single county participates in multiple consultations in a single year, the administrative costs of such activity are still likely to be less than one percent of annual tax revenues (e.g., 10 consultations x \$880/\$1,000,000 = 0.88 percent of annual revenues).
4. We are uncertain in what year consultations on utility pipelines will occur over the next 20 years. For the purposes of this analysis, we assume affected small entities (likely counties) will participate in approximately 50 consultations over 20 years, or less than three consultations per year. However, if we assume that a single county participates in multiple consultations in a single year, the administrative costs of such activity are still likely to be less than one percent of annual tax revenues (e.g., 10 consultations x \$880/\$1,000,000 = 0.88 percent of annual revenues).
5. We are uncertain in what year consultations on forestry, agriculture, and grazing will occur over the next 20 years. For the purposes of this analysis, we assume affected small entities will participate in approximately 190 consultations over 20 years. However, if we assume that a single entity participates in multiple consultations in a single year, the administrative costs of such activity are still likely to be less than one percent of annual revenues (e.g., 25 consultations x \$880/\$3,300,000 = 0.66 percent of annual revenues).
6. For these activities, we conservatively estimate that all administrative costs of consultation will be incurred by a small entity in a single year. Therefore, we use the total, undiscounted third party incremental costs of consultation.

Source: Dialog search of File 516, Dun and Bradstreet, "Duns Market Identifiers," on January 3, 2013.

A.2 UMRA ANALYSIS

191. Title II of UMRA requires agencies to assess the effects of their regulatory actions on State, local, and Tribal governments and the private sector.¹⁹⁶ 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.
192. As stated in the Proposed Rule, “the designation of critical habitat does not impose a legally binding duty on non-Federal Government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, maybe indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency.”¹⁹⁷ Therefore, this rule does not place an enforceable duty upon State, local, or Tribal governments, or the private sector.

A.3 FEDERALISM IMPLICATIONS

193. 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.”¹⁹⁸ “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.”¹⁹⁹ 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.

¹⁹⁶ 2 U.S.C. § 1531 et seq.

¹⁹⁷ 77 FR 43906.

¹⁹⁸ 64 FR 43255.

¹⁹⁹ *Ibid.*

194. 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.
195. State or local governments may be indirectly affected by the proposed rulemaking 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 2, 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. Incremental economic impacts of the designation will likely be limited to minor 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 critical habitat is also not expected to have substantial indirect impacts on State or local governments.

A.4 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY

196. 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.”²⁰⁰
197. 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 (1,000 cubic feet) 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;

²⁰⁰ 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.²⁰¹

198. As discussed in Section 4.2.1 of this report, we do not anticipate the proposed critical habitat designation to impact coal mining, oil extraction, or drilling activities taking place in the study area. Thus, none of these outcomes are anticipated.

²⁰¹ *ibid.*

APPENDIX B | SENSITIVITY OF RESULTS TO DISCOUNT RATE

199. This appendix summarizes the costs of diamond darter conservation quantified in Chapter 4 of this report. It presents impacts assuming an alternative real discount rate of three percent (the main text of the report assumes a real discount rate of seven percent).²⁰² Exhibit B-1 through B-6 summarize potential undiscounted incremental impacts of the designation overall and by activity, including: resource extraction; timber management, agriculture, and grazing; other in-stream work; transportation; and water quality/sewer management (as described in Chapter 4).

EXHIBIT B-1. SUMMARY OF TOTAL INCREMENTAL IMPACTS BY UNIT (2012\$)

UNIT	PRESENT VALUE	ANNUALIZED COSTS
1 - Elk River	\$490,000	\$32,000
2 - Green River	\$620,000	\$41,000
Total	\$1,100,000	\$73,000
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

EXHIBIT B-2. SUMMARY OF INCREMENTAL IMPACTS TO RESOURCE EXTRACTION BY UNIT (2012\$)

UNIT	PRESENT VALUE	ANNUALIZED COSTS
1 - Elk River	\$77,000	\$5,000
2 - Green River	\$120,000	\$8,100
Total	\$200,000	\$13,000
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

²⁰² A more detailed discussion of how to calculate present and annualized values, as well as the relevant discount rates, is provided in Chapter 2 of this report.

EXHIBIT B-3. SUMMARY OF INCREMENTAL IMPACTS TO TIMBER MANAGEMENT, AGRICULTURE, AND GRAZING ACTIVITIES BY UNIT (2012\$)

UNIT	PRESENT VALUE	ANNUALIZED COSTS
1 - Elk River	\$79,000	\$5,200
2 - Green River	\$290,000	\$19,000
Total	\$370,000	\$24,000
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

EXHIBIT B-4. SUMMARY OF INCREMENTAL IMPACTS TO OTHER IN-STREAM WORK BY UNIT (2012\$)

UNIT	PRESENT VALUE	ANNUALIZED COSTS
1 - Elk River	\$0	\$0
2 - Green River	\$70,000	\$4,600
Total	\$70,000	\$4,600
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

EXHIBIT B-5. SUMMARY OF INCREMENTAL IMPACTS TO TRANSPORTATION BY UNIT (2012\$)

UNIT	PRESENT VALUE	ANNUALIZED COSTS
1 - Elk River	\$320,000	\$21,000
2 - Green River	\$130,000	\$8,600
Total	\$450,000	\$30,000
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

EXHIBIT B-6. SUMMARY OF INCREMENTAL IMPACTS TO WATER QUALITY/SEWER MANAGEMENT BY UNIT (2012\$)

UNIT	PRESENT VALUE	ANNUALIZED COSTS
1 - Elk River	\$13,000	\$820
2 - Green River	\$12,000	\$800
Total	\$25,000	\$1,600
Note: Entries may not sum to totals reported due to rounding. Estimates are rounded to two significant digits.		

APPENDIX C | UNDISCOUNTED IMPACTS BY ECONOMIC ACTIVITY

200. This appendix summarizes undiscounted impacts by year for each economic activity. These details are provided in accordance with OMB guidelines for developing benefit and cost estimates. OMB directs the analysis to: “include separate schedules of the monetized benefits and costs that show the type and timing of benefits and costs, and express the estimates in this table in constant, undiscounted dollars.”²⁰³ Exhibit C-1 summarizes potential undiscounted incremental impacts of the designation overall and by activity, including: resource extraction; timber management, agriculture, and grazing; other in-stream work; transportation; and water quality/sewer management (as described in Chapter 4).

²⁰³ Office of Management and Budget, Circular A-4, September 17, 2003, p. 18. The reference to “constant” dollars indicates that the effects of general price level inflation (the tendency of all prices to increase over time) should be removed through the use of an inflation adjustment index.

EXHIBIT C-1. SUMMARY OF INCREMENTAL IMPACTS BY YEAR BY ACTIVITY (2012\$)

YEAR	RESOURCE EXTRACTION	TIMBER MANAGEMENT, AGRICULTURE, AND GRAZING	OTHER IN-STREAM WORK	TRANSPORTATION	WATER QUALITY/ SEWAGE MANAGEMENT
2013	\$25,000	\$25,000	\$30,000	\$4,700	\$2,400
2014	\$11,000	\$25,000	\$30,000	\$4,700	\$2,400
2015	\$11,000	\$25,000	\$32,000	\$4,700	\$0
2016	\$11,000	\$25,000	\$33,000	\$4,700	\$2,400
2017	\$11,000	\$25,000	\$32,000	\$4,700	\$2,400
2018	\$14,000	\$25,000	\$29,000	\$4,700	\$0
2019	\$14,000	\$25,000	\$28,000	\$4,700	\$2,400
2020	\$14,000	\$25,000	\$30,000	\$4,700	\$2,400
2021	\$14,000	\$25,000	\$30,000	\$4,700	\$0
2022	\$14,000	\$25,000	\$30,000	\$4,700	\$2,400
2023	\$14,000	\$25,000	\$30,000	\$4,700	\$2,400
2024	\$14,000	\$25,000	\$30,000	\$4,700	\$0
2025	\$14,000	\$25,000	\$30,000	\$4,700	\$2,400
2026	\$14,000	\$25,000	\$30,000	\$4,700	\$2,400
2027	\$14,000	\$25,000	\$30,000	\$4,700	\$0
2028	\$11,000	\$25,000	\$30,000	\$4,700	\$2,400
2029	\$11,000	\$25,000	\$30,000	\$4,700	\$2,400
2030	\$11,000	\$25,000	\$30,000	\$4,700	\$0
2031	\$11,000	\$25,000	\$30,000	\$4,700	\$2,400
2032	\$11,000	\$25,000	\$30,000	\$4,700	\$2,400

**APPENDIX D | INCREMENTAL EFFECTS MEMORANDUM FOR THE
ECONOMIC ANALYSIS FOR PROPOSED RULE TO DESIGNATE
CRITICAL HABITAT FOR THE DIAMOND DARTER**

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241



September 28, 2012

Memorandum

To: Martin Miller, Chief, Division of Endangered Species, Northeast Region, Hadley, Massachusetts

From: Deborah Carter, Project Leader, West Virginia Field Office, Elkins, West Virginia
Deborah Carter

Subject: Incremental Effects Memorandum for the Economics Analysis of the Proposed Rule to Designate Critical Habitat for the Diamond Darter

Introduction

The U. S. Fish and Wildlife Service (Service) has published a proposed rule in the *Federal Register* to designate critical habitat for the diamond darter (*Crystallaria cincotta*) under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) (Act). This designation was proposed concurrently with a proposal to list the species as endangered under the Act (77 FR 43906). The purpose of this memorandum is to provide information to serve as a basis for conducting an economic analysis of the proposed critical habitat designation.

Determining the economic impacts of critical habitat designation involves evaluating the "without critical habitat" baseline versus the "with critical habitat" scenario. Impacts of a designation equal the difference, or the increment, between these two scenarios. Measured differences between the baseline (the world without critical habitat) and the designated critical habitat (world 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, Federal action agencies, and in some instances, State and local governments or private third parties. These are the "incremental effects" that serve as the basis for the economic analysis.

One important function of this memorandum is to provide detailed information about the Service's analysis under section 7 of the Act of the differences between Federal agency actions required to avoid jeopardy versus actions that may be required to avoid adverse modification of critical habitat. The jeopardy analysis is focused not only on population viability, but also on the habitat conditions that support it. The jeopardy analysis considers the range-wide status of the

diamond darter, the factors responsible for that status, and the species' survival and recovery needs. It also characterizes the condition of the diamond darter in the area affected by the proposed Federal action (i.e., the action area), and the survival and recovery role of the action area in the conservation of the diamond darter range-wide. That context is then used to determine the significance of adverse and beneficial effects of the proposed Federal action, and any cumulative effects for purposes of making the jeopardy determination. The jeopardy analysis also considers any conservation measures that may be proposed by a Federal action agency to minimize or compensate for adverse project effects to the diamond darter or to promote its recovery.

In contrast, the key factor in the adverse modification to critical habitat determination is whether, with implementation of the proposed Federal action, the affected critical habitat will continue to, or have the capability to, serve its intended conservation role for the diamond darter. This conservation role can be met by retaining or regaining the proper function of those physical and biological features of the habitat necessary to support the diamond darter's life cycle needs. Activities that may destroy or adversely modify critical habitat are those that would alter those physical and biological features to an extent that appreciably reduces the intended conservation function of the designated critical habitat unit.

The information provided below is intended to identify all possible differences with and without critical habitat designation for the diamond darter under the two different section 7 standards for jeopardy and adverse modification of critical habitat.

Background

We have proposed to designate a total of 197.1 river kilometers (km) (122.5 river miles [mi]) of critical habitat in two units: Unit 1 in Kanawha and Clay Counties, West Virginia and Unit 2 in Edmonson, Hart, and Green Counties, Kentucky. The two proposed critical habitat units are based on the species' known occurrence records, as well as unoccupied habitat that will allow for eventual translocation or reintroduction of the species to the unoccupied sites essential for the diamond darter's conservation. The geographic distribution of the proposed critical habitat units was based on both the current and the historical distribution of the species.

West Virginia: Unit 1 includes 45.0 km (28.0 mi) of currently occupied diamond darter habitat within the Elk River from the confluence with King Shoals Run near Wallback Wildlife Management Area downstream to the confluence with an unnamed tributary entering the Elk River on the right descending bank adjacent to Knollwood Drive in Charleston, West Virginia. All habitat within this unit is under public control or ownership. The State of West Virginia owns or has a public easement on the streambed and banks of the Elk River up to the ordinary high water mark which is the boundary of the proposed designated critical habitat. The water is also publicly owned. The majority of lands adjacent to this unit are privately owned. This reach of the Elk River currently also supports populations of the following five federally endangered mussel species: northern riffleshell (*Epioblasma torulosa rangiana*), snuffbox (*E. triquetra*), pink mucket (*Lampsilis abrupta*), rayed bean (*Villosa fabalis*), and clubshell mussel (*Pleurobema clava*). Critical habitat has not been designated for any of these species.

Kentucky: Unit 2 includes 152.1 km (94.5 mi) of currently unoccupied diamond darter habitat within the Green River from Roachville Ford near Greensburg (River Mile 294.8) downstream to the end of Cave Island in Mammoth Cave National Park (NP) (River Mile 200.3). The boundary of the proposed designated critical habitat includes the streambed up to the ordinary high water mark of the river. In Kentucky, landowners own the land under streams (e.g., the stream channel or bottom) in the designated units, but the water is under State jurisdiction. Approximately 16.3 km (10.1 mi) of this unit is publicly owned and is contained within the 20,750-hectare (ha) (51,274-acre [ac]) Mammoth Cave NP. The remainder of the unit, 135.8 km (84.4 mi), is privately owned. Through the U.S. Department of Agriculture's Conservation Reserve Program and other conservation programs, the Nature Conservancy owns or has easements on approximately 794.4 ha (1,962.9 ac) within the watershed, either adjacent to or in close proximity to the river. In addition, Western Kentucky University owns or manages 526 ha (1,300 ac) along the Green River in Hart County as part of the Upper Green River Biological Preserve. This reach of the Green River currently also supports populations of the following nine federally endangered mussel species: northern riffleshell (*Epioblasma torulosa rangiana*), snuffbox (*E. triquetra*), pink mucket (*Lampsilis abrupta*), ring pink (*Obovaria retusa*), rough pigtoe (*Pleurobema plenum*), clubshell (*P. clava*), fanshell (*Cyprogenia stegaria*), spectaclecase (*Cumberlandia monodonta*), and sheepnose (*Plethobasus cyphus*). Critical habitat has not been designated for any of these species.

Summary of Previous Consultations

In the past five years, there have been no formal consultations that addressed impacts to any of the federally listed mussel species that occur within the reach of the Elk River proposed for diamond darter critical habitat. There have been eight informal consultations on the mussel species within the area proposed as critical habitat in the Elk River. Two of these consultations are ongoing; at least one of these will involve a formal consultation and completion of an associated multi-species Habitat Conservation Plan. All of these informal consultations for the Elk River have addressed federally listed mussel species as well as concerns regarding the diamond darter as either a candidate species or a species of concern. There is also one project which was the subject of a 1995 formal consultation on the clubshell mussel and which may need re-initiation of consultation if the diamond darter listing is finalized. Within that same five-year time frame, there have been no formal consultations that addressed impacts to any of the federally listed mussel species that occur within the reach of the Green River proposed for diamond darter critical habitat. Three informal consultations on federally listed mussel species have been completed, and two consultations are ongoing. One of these will likely proceed to a formal consultation, whereas the other will likely be completed informally.

Federal agency actions within the proposed critical habitat units that have been the subject of these previous consultations in units 1 and 2 included the construction and management of gas and water pipelines that require section 404 Clean Water Act permits from the U.S. Army Corps of Engineers (USACE); construction and maintenance of roads, highways, and bridges by the Federal Highway Administration; construction and maintenance activities within Mammoth Cave NP by the National Park Service; and issuance of coal mining permits by State permitting agencies that are overseen by the Office of Surface Mining. Private project proponents that

required permits or authorization from these agencies included Western Kentucky University, oil and gas development companies, public service districts that manage water and sewer lines, and coal mining companies.

Appendix A provides more detail on these previous consultations. We expect that the types of future projects and project proponents will be similar to those described above, and that the frequency of future consultations will be consistent with the number of past consultations.

Incremental Effects from Additional Section 7 Consultations

There are several existing laws and regulations in place in both proposed critical habitat units that can be considered baseline environmental protections, and therefore should not be considered incremental effects in the economic analysis. These laws provide pre-existing triggers for section 7-related consultations regardless of the designation of critical habitat. Both critical habitat units are subject to the Federal Clean Water Act (33 U.S.C. 1251 *et seq.*) (CWA). Therefore, all projects that will directly affect both proposed critical habitat units through instream dredging or filling require consultation between the USACE and the Service as a result of the need for a CWA section 404 permit. Projects that involve potential indirect effects such as non-point source discharges from habitat disturbances adjacent to the proposed critical habitat units that cause increased sedimentation and erosion may or may not require consultation, depending on the type of activity proposed and whether or not it is conducted on Federal or private lands. For example, land disturbing projects that occur on Federal lands such as Mammoth Cave NP will require consultation between NPS and the Service, but those types of projects on private lands would not require consultation.

The entire area proposed for critical habitat within unit 1 is occupied by the diamond darter, and any project that could adversely affect this area would require a section 7 jeopardy consultation as a result of the existing triggers for consultation discussed above. The proposed designation of critical habitat within the Elk River would not alter these existing triggers or result in the need for any additional consultations above the baseline protections. We, therefore, do not anticipate any incremental effects in regard to additional section 7 consultations in currently occupied habitat for the diamond darter.

In addition to the occupied critical habitat unit proposed in West Virginia, we have also proposed to designate an unoccupied critical habitat unit located within a reach of the Green River, Kentucky that was historically occupied but is currently unoccupied by the diamond darter. Federally funded, permitted, or conducted actions that either occur within or could affect this one unit will now require consultation between the Federal action agency and the Service on the diamond darter due to the designation of critical habitat. Consultation for this species within this unit would not otherwise be required because the diamond darter would not have been considered present and, therefore, would not be affected by any proposed actions. These additional section 7 destruction or adverse modification to critical habitat consultations could constitute an incremental effect. However, consultation under the Act is already required for Federal projects affecting this reach due to the presence of the nine federally listed mussel species. Therefore, the impacts attributed to the need for section 7 consultation within the unoccupied portions of proposed critical habitat for the diamond darter would not be incremental to the impacts from listing the diamond darter because section 7 consultations would already be

required to determine whether those projects jeopardize the mussel species. We, therefore, do not anticipate significant incremental effects in regard to additional section 7 consultations in currently unoccupied habitat for the diamond darter.

Incremental Effects from Additional Proposed Management Actions

There is a close relationship between the health of the diamond darter and the health of its habitat. Alterations of habitat that diminish the value (e.g., actions which alter hydrology, water quality, or suitability of substrate) and the amount of diamond darter habitat would likely affect its population size and ability to recruit, cause further range declines, and could appreciably reduce the species' likelihood of survival and recovery in the wild. Such habitat alterations could, therefore, constitute jeopardy to the species. In most cases, the results of consultation on projects in occupied diamond darter habitat under the adverse modification and jeopardy standards are likely to be similar because the diamond darter's entire life history is reliant on the presence of all the primary constituent elements (PCEs) being present within one contiguous stream reach. For a species such as the diamond darter, that has a restricted range and small population, the species' survival and recovery is closely tied to the maintenance of the PCEs within the small, restricted area that supports the species entire life history processes. Modifications to the critical habitat PCEs are closely tied to adverse effects to the species; and projects that adversely modify the PCEs would also likely result in reduction in numbers, reproduction, or range of the species. Therefore, activities that would require consultation on possible adverse modification of darter critical habitat are the same as activities that would require consultation on possible jeopardy to the species. Thus, project modifications that minimize impacts to the species to avoid jeopardy would coincidentally minimize impacts to critical habitat. Accordingly, in occupied critical habitat, it is unlikely that an analysis would identify a difference between measures needed to avoid the destruction or adverse modification of critical habitat and measures needed to avoid jeopardy for the species. We, therefore, do not anticipate significant incremental effects in regard to developing and implementing conservation actions in currently-occupied habitat for the diamond darter.

Similarly, the measures recommended to avoid both jeopardy and adverse modification are likely to be similar to measures proposed to avoid adverse effects to the federally listed mussel species present within both critical habitat units. Management recommendations made to avoid adverse effects during the previous consultations described above include using enhanced sedimentation and erosion control measures, avoiding water quality degradation through the use of spill and run-off prevention and control measures, avoiding instream disturbances through the use of project alternatives such as directional drilling, conducting project activities away from the river, and minimizing disturbances to and fill of lands adjacent to the river and stream tributaries. These previously recommended management actions for mussels are similar to the list of management actions to avoid threats to the critical habitat PCEs outlined in the *Special Management Considerations or Protection* section of the diamond darter proposed rule to protect the primary constituent elements of diamond darter critical habitat. We, therefore, do not anticipate significant incremental effects in developing and implementing conservation actions in currently unoccupied habitat for the diamond darter.

There is one management recommendation that may be made for mussels that is not appropriate for diamond darters. For some projects, surveys may be conducted to determine whether federally listed mussels are present within the proposed project area. If no mussels are found then

additional management actions such as avoiding direct impacts to the stream bed, may not be needed. This management recommendation is not appropriate for the diamond darter because the fish are much more mobile than freshwater mussels, and diamond darters may use different habitat areas during different seasons or times of the day. In addition, surveying for diamond darter presence is not possible in unoccupied critical habitat. However, evaluations could still be conducted to determine whether the proposed project area contained suitable potential habitat for the diamond darter (e.g., appropriate substrates). Further analysis would also be required to determine whether the proposed project would alter the PCEs of the critical habitat unit. A determination would then be made regarding whether additional conservation measures, similar to the ones described above, should be employed. This slightly different approach from the mussel surveys should not result in significant incremental effects in developing and implementing conservation actions in either unit.

There is potential for implementation of greater conservation measures due to the educational component of critical habitat. For example, non-Federal project proponents not typically involved in listed aquatic species recovery or not familiar with the consultation process under the Act, may become more aware of the diamond darter's presence as a result of the higher public profile associated with the critical habitat designation. These non-Federal project proponents and stakeholders may be more likely to coordinate with the Service to incorporate avoidance and recovery measures into their actions, thereby potentially increasing the conservation value of the proposed critical habitat designation. Federal or State agencies may also be more likely to prioritize conservation actions in watersheds containing the proposed critical habitat. Potential actions could include enhanced enforcement or implementation of sediment and erosion control measures on forestry projects conducted in critical habitat watersheds, or increased focus on implementing water quality protections and other conservation practices in critical habitat watersheds by Federal and State agencies such as the Natural Resource Conservation Service or the Kentucky and West Virginia Departments of Environmental Protection. There may be both incremental benefits and costs associated with these enhanced measures.

Incremental Effects from Additional Administrative Effort

Because critical habitat for the diamond darter is proposed concurrently with a proposal to list the species as endangered under the Act, we have no previous history with which to estimate the amount of administrative effort associated with formal consultations on this species. All previous consultations within the past five years in both proposed diamond darter critical habitat units have been informal consultations addressing the federally listed mussel species. Conservation recommendations for the diamond darter as a candidate species or species of concern were incorporated into all the informal consultations within the last five years for the proposed Elk River critical habitat unit. As discussed above, most of the anticipated management recommendations to avoid adverse modification to diamond darter critical habitat will be similar to the management recommendations to avoid jeopardy to the diamond darter within the proposed Elk River critical habitat unit, and will also be similar to management recommendations made to avoid and minimize adverse effects to the federally listed mussel species that are present within both proposed critical habitat units. Therefore, the additional administrative effort the Service will expend to address adverse modifications in its section 7 consultations will consist of the time required to add text regarding adverse modification to the consultations in unit 1; and the time required to incorporate information on an additional species,

as well as the time required to add text regarding adverse modification to consultations in unit 2. With the exception of projects that proceed to formal consultation, this additional administrative effort should not be significant.

Appendix A:
Summary of Previous Consultations within Proposed Diamond Darter Critical Habitat

Unit 1: Elk River, Kanawha and Clay Counties, West Virginia

In the last five years, there have been no formal consultations that addressed impacts to any species within the reach of the Elk River proposed for diamond darter critical habitat. In that same time frame, there have been eight informal consultations to species within the area proposed as critical habitat. Two of these consultations are ongoing and have not yet been resolved. All of the informal consultations addressed potential effects to federally listed mussel species as well as concerns regarding the diamond darter as either a candidate species or a species of concern. There is also one project that was the subject of a 1995 formal consultation on the clubshell mussel and that may need re-initiation of consultation as a result of the diamond darter listing. Details on these consultations are as follows:

1. NiSource multi-regional Habitat Conservation Plan: Discussions ongoing. This project involves existing and proposed natural gas company maintenance and construction activities over the next 50 years in three Service regions and may affect numerous listed species. The company has at least five existing gas lines crossing the Elk River that may need to be replaced over the life of the permit and additional crossings may be proposed. We have had multiple discussions with the company recommending that they avoid impacts by using directional drilling, completely avoiding or minimizing the number of additional crossings, and implementing enhanced sediment and erosion control measures. Discussions are ongoing. USACE Clean Water Act section 404 permits would be required.
2. NiSource/Columbia Gas Transmission: Letter provided December 2010. The company proposed conducting some work adjacent to an existing right-of-way that would affect a small tributary of the Elk River. The company agreed to implement enhanced sediment and erosion control measures, retain riparian buffers, and employ spill prevention measures. Consultation was concluded with a “may affect, not likely to adversely affect” determination. A USACE Clean Water Act section 404 permit was required.
3. West Virginia American Water: Letters provided November 2010 and August 2011. The company proposed replacing three waterline crossings in the Elk River. We recommended avoiding impacts to the bed of the river through methods such as directional drilling. We had additional discussions with the company where they indicated they did not want to directional drill, but we have not received an official response from them or concluded the consultation. USACE Clean Water Act section 404 permits would be required.
4. West Virginia Army National Guard (WVANG)/West Virginia Division of Highways (WVDOT): Letter provided November 2010. The WVANG proposed constructing a bridge over the Elk River in order to provide a new access route to publicly-owned Coonskin Park while providing more security to the existing WVANG facility near the

existing entrance to the park. We worked with the WVANG and the WVDOH to design the bridge so that no piers or fill were placed in the river, and to develop plans for enhanced erosion control and spill/road run-off prevention. Consultation was concluded with a “may affect, not likely to adversely” affect determination. The Federal Highway Administration may provide funding for construction. USACE Clean Water Act section 404 permits would have been required if impacts to the river had not been avoided.

5. Elk Valley Public Service District: Letter provided August 2009. The company proposed to construct a sewer line expansion along the banks of the Elk River. We recommended that they implement enhanced sediment and erosion control measures. Consultation was concluded with a “may affect, not likely to adversely affect” determination. Federal grant funding may have been involved.
6. NiSource, Cobb Station Expansion: Letter provided August 2009. The company proposed construction of a gas line crossing in the Elk River, as well as additional construction and development adjacent to the river. We recommended that avoidance measures such as directional drilling be employed and that they implement enhanced sediment and erosion control measures. The gas line crossing was dropped from the project proposal and consultation was concluded with a “may affect, not likely to adversely affect” determination. USACE Clean Water Act section 404 permits would have been required if impacts to the river had not been avoided.
7. Queen Shoals Public Service District: Letters provided August and November 2009. The company proposed to construct a water line extension crossing in the Elk River. We recommended that avoidance measures such as directional drilling be employed and that they implement enhanced sediment and erosion control measures. The company complied with our recommended measures and consultation was concluded with a “may affect, not likely to adversely” affect determination. USACE Clean Water Act section 404 permits would have been required if impacts to the river had not been avoided.
8. Leatherwood Water Line Extension: Letter provided August 2009. The company proposed to construct a water line extension crossing in the Elk River. We recommended that avoidance measures such as directional drilling be employed and that they implement enhanced sediment and erosion control measures. The company complied with our recommended measures and consultation was concluded with a “may affect, not likely to adversely affect” determination. USACE Clean Water Act section 404 permits would have been required if impacts to the river had not been avoided.
9. Consol Energy, Tate Creek/Wolfpen Knob Mine: Letter provided September 2006. The company proposed to construct a coal mine and slurry holding pond on a tributary of the Elk River upstream of the proposed critical habitat reach. A formal consultation addressing possible jeopardy to the clubshell mussel was completed in June 1995 with the Service’s issuance of a non-jeopardy biological opinion for a USACE Clean Water Act section 404 permit. Monitoring of the mussel population was included as a term and condition of the BO. The diamond darter was not included in this consultation. In 2006, the USACE extended the permit through 2023. The West Virginia Division of

Environmental Protection subsequently also renewed the Surface Mining Control and Reclamation Act (SMCRA) and West Virginia State coal mining permits. Service concerns outlined in the 2006 letter included water quality degradation, and the effects of siltation and fill on the Elk River. Additional measures to address these outstanding concerns may need to be developed if consultation is re-initiated. The company has not yet initiated action under the permit.

Unit 2: Green River, Edmonson, Hart, and Green Counties, Kentucky

In the past five years, there have been a total of six consultations that addressed potential effects to the federally listed species within the reach of the Green River proposed for diamond darter critical habitat. Three of these consultations were concluded informally. The other three consultations are ongoing. One of the ongoing consultations may result in a formal consultation for federally listed mussel species, and another consists of a potential violation of the Endangered Species Act (Act). In addition to federally listed mussel species, these consultations also addressed three species that were present within the action area of the projects, but are not present within the proposed critical habitat for the diamond darter: the Indiana bat (*Myotis sodalis*), the Kentucky Cave shrimp (*Palaemonias ganteri*), and the potato bean (*Apios priceana*). Details on these consultations are as follows:

1. Green River Valley Water District, potential violation of the Act: Consultation/investigation developing. The Green River Valley Water District performed some maintenance to a dam site that is located along a spring that empties into the Green River in Hart County. Large amounts of sediment were released into the Green River mainstem where listed mussels are present. The Service Law Enforcement office in Louisville is investigating.
2. Green River Valley Water District: Letter provided July 2012. Consultation is ongoing and will likely go formal. The water district wants to install a new intake structure in the Green River. We requested surveys, and endangered mussels were found. A USACE Clean Water Act section 404 permit will be required. This project is complicated by the potential violation of the Act summarized in item #1.
3. Western Kentucky University (WKU), canoe ramp: Letter provided October 2011. WKU requested to construct a new, gravel canoe launch on the Green River in Hart County. Impact area totaled 0.03 hectare (0.07 acre). Due to the small footprint and results of recent mussel surveys in the area, we concurred with a "may affect, not likely to adversely affect" determination for listed mussels. Potential habitat for Indiana bat, not designated as critical habitat, consisting of 10 to 20 trees, had to be removed. WKU assumed bat presence and made a payment (\$507.50) to the Indiana Bat Conservation Fund through a Memorandum of Agreement (MOA) to account for a loss of the habitat and to achieve compliance with the Act. A USACE Clean Water Act section 404 permit was required.
4. Mammoth Cave NP, Green River crossing rehabilitation: Letter provided April 2011. Mammoth Cave NP proposed to lower and re-grade the concrete aprons that serve as the

ferry ramps on each side of the Green River, which would allow the ferry to operate when the river is at low levels. Dredging would not be required. Mammoth Cave NP also proposed to pave and expand the north and south parking lots (each side of the river) to accommodate more vehicles and establish safer conditions for travelers. Mussel surveys in 2009 determined that no listed mussels were present within the project area or about 245 meters (804 feet) downstream. Best management practices (BMPs) were used to minimize/avoid sedimentation. Consultation was concluded with a “may affect, not likely to adversely affect” determination for listed mussels, Kentucky cave shrimp, and Price's potato bean.

5. Mammoth Cave NP, repainting Houchins and Green River Ferries: Letter provided March 2010. This project involved removing each ferry boat from the Green River and transporting them to an area away from the river (parking lots) for service. The ferries were sand-blasted, cleaned, repaired, and all materials from the maintenance were collected, contained, and removed from the Mammoth Cave NP. Ferries were painted above the water line and returned to the river for service. Consultation was concluded with a “may affect, not likely to adversely affect” determination for listed mussels.
6. Kentucky Transportation Cabinet (KYTC), Reconstruction of I-65 in Hart County: Initial discussions in 2008. Consultation ongoing. This project includes widening of the existing bridge and eventual road construction at the I-65 crossing of the Green River in Hart County. Consultation with the Federal Highway Administration and USACE is not complete, but mussel surveys have been completed for the impact area (upstream and downstream). Listed mussels (fanshell) were found upstream of the bridge. The project will likely conclude with a “may affect, not likely to affect” determination because no listed mussels are in the footprint of the project and the habitat is poor. Better habitat is upstream. KYTC will be using various sediment BMPs on the road construction to prevent indirect and cumulative effects. A closed drainage system is being used to divert water slowly into the Green River downstream of the bridge location. KYTC will likely enter into a MOA with the Service to address impacts to Indiana bats. The Service is awaiting word from the KYTC regarding whether they are going to proceed with the project, which is dependent upon availability of funding