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**DRAFT ECONOMIC ANALYSIS
OF CRITICAL HABITAT DESIGNATION
FOR THE APPALACHIAN ELKTOE**

April 2002

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PREFACE

The U.S. Fish and Wildlife Service has added this preface to all economic analyses of critical habitat designations:

"The standard best practice in economic analysis is applying an approach that measures costs, benefits, and other impacts arising from a regulatory action against a baseline scenario of the world without the regulation. Guidelines on economic analysis, developed in accordance with the recommendations set forth in Executive Order 12866 ("Regulatory Planning and Review"), for both the Office of Management and Budget and the Department of the Interior, note the appropriateness of the approach:

'The baseline is the state of the world that would exist without the proposed action. All costs and benefits that are included in the analysis should be incremental with respect to this baseline.'

"When viewed in this way the economic impacts of critical habitat designation involve 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 and the scenario in which critical habitat is designated may include (but are not limited to) changes in landuse, environmental quality, property values, or time and effort expended on consultations and other activities by federal landowners, federal action agencies, and in some instances, State and local governments and/or private third parties. Incremental changes may be either positive (benefits) or negative (costs).

"In *New Mexico Cattle Growers Ass'n v. U.S.F.W.S.*, 248 F.3d 1277 (10th Cir. 2001), however, the 10th Circuit recently held that the baseline approach to economic analysis of critical habitat designations that was used by the Service for the southwestern willow flycatcher designation was 'not in accord with the language or intent of the ESA.' In particular, the court was concerned that the Service had failed to analyze any economic impact that would result from the designation, because it took the position in the economic analysis that there was no economic impact from critical habitat that was incremental to, rather than merely co-extensive with, the economic impact of listing the species. The Service had therefore assigned all of the possible impacts of designation to the listing of the species, without acknowledging any uncertainty in this conclusion or considering such potential impacts as transaction costs, reinitiations, or indirect costs. The court rejected the baseline approach incorporated in that designation, concluding that, by obviating the need to perform any analysis of economic impacts, such an approach rendered the economic analysis requirement meaningless: 'The statutory language is plain in requiring some kind of consideration of economic impact in the CHD phase.'

"In this analysis, the Service addresses the 10th Circuit's concern that we give meaning to the ESA's requirement of considering the economic impacts of designation by acknowledging the uncertainty of assigning certain post-designation economic impacts (particularly section 7 consultations) as having resulted from either the listing or the designation. The Service believes that for many species the designation of critical habitat has a relatively small economic impact, particularly in areas where consultations have been ongoing with respect to the species. This is because the majority of the consultations and associated project modifications, if any, already consider habitat impacts and as a result, the process is not likely to change due to the designation of critical habitat. Nevertheless, we recognize that the nationwide history of consultations on critical habitat is not broad, and, in any particular case, there may be considerable uncertainty whether an impact is due to the critical habitat designation or the listing alone. We also understand that the public wants to know more about the kinds of costs consultations impose and frequently believe that designation could require additional project modifications.

"Therefore, this analysis incorporates two baselines. One addresses the impacts of critical habitat designation that may be 'attributable co-extensively' to the listing of the species. Because of the potential uncertainty about the benefits and economic costs resulting from critical habitat designations, we believe it is reasonable to estimate the upper bounds of the cost of project modifications based on the benefits and economic costs of project modifications that would be required due to consultation under the jeopardy standard. It is important to note that the inclusion of impacts attributable co-extensively to the listing does not convert the economic analysis into a tool to be considered in the context of a listing decision. As the court reaffirmed in the southwestern willow flycatcher decision, 'the ESA clearly bars economic considerations from having a seat at the table when the listing determination is being made.'

"The other baseline, the lower boundary baseline, will be a more traditional rulemaking baseline. It will attempt to provide the Service's best analysis of which of the effects of future consultations actually result from the regulatory action under review - i.e. the critical habitat designation. These costs will in most cases be the costs of additional consultations, reinitiated consultations, and additional project modifications that would not have been required under the jeopardy standard alone as well as costs resulting from uncertainty and perceptual impacts on markets."

DATED: March 20, 2002

EXECUTIVE SUMMARY

1. The purpose of this report is to identify and analyze the potential economic impacts that may result from the proposed critical habitat designation for the Appalachian elktoe (*Alasmidonta raveneliana*). This report was prepared by Industrial Economics, Incorporated, for the U.S. Fish and Wildlife Service's Division of Economics.
2. Section 4(b)(2) of the Endangered Species Act (Act) requires the Service to designate critical habitat on the basis of the best scientific data available, after taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat. The Service may exclude areas from critical habitat designation when the benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.
3. The focus of this economic analysis is on section 7 of the Act, which requires Federal agencies to insure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. Federal agencies are required to consult with the Service whenever they propose an action that may affect a listed species or its designated critical habitat. Aside from the protection that is provided under section 7, the Act does not provide other forms of protection to lands designated as critical habitat. Because consultation under section 7 only applies to activities that are carried out, permitted, or funded by a Federal agency, the designation of critical habitat will not afford any additional protections for species with respect to such strictly private activities.

Proposed Critical Habitat

4. The Service has proposed critical habitat designation for the Appalachian elktoe (hereafter "elktoe") on portions of 11 rivers in North Carolina and Tennessee. The critical habitat area consists of 144.3 total river miles within six units: (1) Little Tennessee River; (2) Tuckasegee River; (3) Cheoah River; (4) Little River; (5) Pigeon River/West Fork Pigeon River; and (6) Toe River/North Toe River/South Toe River/Cane River/Nolichucky River. The lateral extent of proposed critical habitat is up to the ordinary high-water line on each river bank. All of the proposed critical habitat areas are currently occupied by the elktoe.

Framework and Economic Impacts Considered

5. This analysis first identifies land use activities within or in the vicinity of those areas being proposed for critical habitat that are likely to be affected by section 7 of the Act. To do this, the analysis evaluates a "without section 7" scenario and compares it to a "with section 7" scenario. The "without section 7" scenario constitutes the baseline of this analysis. It represents

the level of protection currently afforded the species under the Act, absent section 7 protective measures, which includes other Federal, State, and local laws. The “with section 7” scenario identifies land-use activities likely to involve a Federal nexus that may affect the species or its designated critical habitat, which accordingly have the potential to be subject to future consultations under section 7 of the Act.

6. Upon identifying section 7 impacts, the analysis proceeds to consider the subset of impacts that can be attributed exclusively to the critical habitat designation. To do this, the analysis adopts a “with and without critical habitat approach.” This approach is used to determine those effects found in the upper-bound estimate that may be attributed solely to the proposed designation of critical habitat. Specifically, the “with and without critical habitat” approach considers section 7 impacts that will likely be associated with the implementation of the *jeopardy* provisions of section 7 and those that will likely be associated with the implementation of the *critical habitat* provision of section 7. In many cases, impacts associated with the jeopardy standard remain unaffected by the designation of critical habitat and thus would not normally be considered an effect of a critical habitat rulemaking. The subset of section 7 impacts likely to be affected solely by the designation of critical habitat represent the lower-bound estimate of this analysis.
7. Two primary categories of potential costs are considered in the analysis. These are:
 - Costs associated with identifying the effect of the designation on a particular parcel or land use activity (e.g., technical assistance, section 7 consultations).
 - Costs associated with any modifications to projects, activities, or land uses resulting from the outcome of section 7 consultations with the Service.

Section 7 Costs

8. The majority of future section 7 consultations associated with the proposed critical habitat for the elk are likely to address road and bridge construction, Federal forestry activities, residential development, and hydropower relicensings. This analysis estimates that, over ten years, approximately four additional formal consultations and 71 to 89 informal consultations will occur on projects with the potential to affect the proposed critical habitat. In addition, it is expected that the Service will provide technical assistance to parties on 99 to 107 occasions. Many of these consultations are likely to result in Service recommendations for project modifications. Results of the economic analysis are summarized below in terms of landownership category:
 - **Federal Agencies:** It is likely that informal consultations will take place regarding activities on U.S. Forest Service lands located in three of the critical habitat units.

- **State, Local Government, and Private Landowners:** The activities most likely to result in section 7 consultations are road/bridge construction, residential development requiring a Federal permit (the vast majority of residential development activities that take place do not require any Federal permits or involve Federal funding), and hydropower relicensings. These activities are expected to take place on private lands, but may involve Federal funding, permitting, or authorization. Other activities on private land with no Federal nexus, such as most forestry, farming and grazing, as well as most private development, will not be subject to any additional consultations or project modifications. For all activities on private lands, if no Federal nexus exists, then the proposed critical habitat designation creates no additional impacts.
 - **Additional Impacted Parties:** Some small construction companies, developers, and hydropower owners/operators may be affected by modifications or delays to projects resulting from section 7 consultations.
9. The consultation history since the listing of the elktoe in 1996 indicates that the Service would continue to consult on the same range of activities in the absence of critical habitat designation. Furthermore, all units proposed for critical habitat designation are currently occupied by the elktoe, and are identified as essential to the conservation of the species in the *Recovery Plan for the Appalachian Elktoe*. Therefore, all of the projected technical assistance efforts, section 7 consultations, and project modifications presented in Exhibit ES-1 are likely to occur over the next ten years even if critical habitat is not designated. That is, there are no additional anticipated costs associated with designation of critical habitat for the elktoe over and above those that may be associated with implementation of the section 7 jeopardy provisions due to the listing of the species.

Section 7 Benefits

10. Since no additional costs associated solely with the designation of critical habitat are expected, benefits resulting solely from the designation of critical habitat are also not expected. However, there are categories of benefit that will be enhanced as a result of the listing of the species and, potentially, the designation of critical habitat. These potential benefits include improved ecosystem health, water quality and flood control, and conservation of river habitat for recreational uses such as fishing and tourism. It is difficult at this time to estimate the total benefit afforded by section 7 implementation on the proposed designation, since little information is available regarding the following: (1) the likely benefits of each consultation and modification; and (2) the extent to which such consultations and modifications would result from critical habitat.

Summary

11. Exhibit ES-1 provides a summary of expected total consultation and technical assistance costs associated with the listing and designation of critical habitat for the elktoe over a ten-year period.
12. Exhibit ES-2 provides a summary of the expected total costs per unit associated with the listing and designation of critical habitat for the elktoe over the same ten-year period.

Exhibit ES-1						
TOTAL SECTION 7 COSTS ASSOCIATED WITH THE LISTING AND DESIGNATION OF CRITICAL HABITAT FOR THE ELKTOE (TEN YEARS)						
Critical Habitat Impacts	Scenario	Costs to the Service	Costs to the Action Agency	Costs to Third Parties	Total Section 7 Costs	Costs Associated Solely with Critical Habitat Designation
Technical Assistance	<i>Low</i>	\$26,000	n/a	\$59,000	\$85,000	\$0
	<i>High</i>	\$73,000	n/a	\$161,000	\$234,000	\$0
Informal Consultations	<i>Low</i>	\$71,000	\$92,000	\$85,000	\$248,000	\$0
	<i>High</i>	\$276,000	\$347,000	\$258,000	\$881,000	\$0
Formal Consultation	<i>Low</i>	\$12,000	\$16,000	\$12,000	\$40,000	\$0
	<i>High</i>	\$24,000	\$26,000	\$16,000	\$66,000	\$0
Informal Consultation Project Modifications	<i>Low</i>	\$0	\$200,000	\$1,170,000	\$1,390,000	\$0
	<i>High</i>	\$0	\$550,000	\$2,030,000	\$2,620,000	\$0
Formal Consultation Project Modifications	<i>Low</i>	\$0	\$180,000	\$0	\$180,000	\$0
	<i>High</i>	\$0	\$1,320,000	\$0	\$1,320,000	\$0
Total Costs	<i>Low</i>	\$109,000	\$488,000	\$1,326,000	\$1,943,000	\$0
	<i>High</i>	\$373,000	\$2,243,000	\$2,465,000	\$5,121,000	\$0

Source: Based on past consultation records and conversations with Federal agencies potentially affected by the proposed critical habitat designation.

Note: Costs may not sum due to rounding.

Exhibit ES-2					
TOTAL SECTION 7 COSTS ASSOCIATED WITH THE LISTING AND DESIGNATION OF CRITICAL HABITAT FOR THE ELKTOE BY UNIT (TEN YEARS)					
UNIT	Informal Consultations	Formal Consultations	Informal Consultations with Project Modifications	Formal Consultations with Project Modifications	Total Section 7 Costs
Unit 1	\$46,000 - \$250,000	\$14,000 - \$22,000	\$200,000 - \$390,000	\$45,000 - \$330,000	\$305,000 - \$992,000
Unit 2	\$84,000 - \$417,000	\$0	\$595,000 - \$1,080,000	\$0	\$679,000 - \$1,497,000
Unit 3	\$32,000 - \$125,000	\$0	\$265,000 - \$390,000	\$0	\$297,000 - \$575,000
Unit 4	\$32,000 - \$195,000	\$0	\$200,000 - \$390,000	\$0	\$232,000 - \$585,000
Unit 5	\$39,000 - \$153,000	\$14,000 - \$22,000	\$120,000 - \$350,000	\$45,000 - \$330,000	\$218,000 - \$855,000
Unit 6	\$18,000 - \$97,000	\$28,000 - \$45,000	\$0	\$90,000 - \$660,000	\$136,000 - \$802,000
Note: Costs may not sum due to rounding.					

INTRODUCTION AND BACKGROUND

SECTION 1

13. In February 2001, the U.S. Fish and Wildlife Service (the Service) proposed designation of critical habitat for the Appalachian elktoe (*Alasmidonta raveneliana*) on various portions of 11 rivers in North Carolina and Tennessee. The purpose of this report is to identify and analyze potential economic impacts that could result from this designation. This report was prepared by Industrial Economics, Incorporated, under contract to the Service's Division of Economics.
14. Section 4(b)(2) of the Endangered Species Act (Act) requires the Service to designate critical habitat on the basis of the best scientific data available, after taking into consideration the economic impact, and any other relevant impact, of specifying a particular area as critical habitat.
15. Under the listing of a species, section 7(a)(2) of the Act requires Federal agencies to consult with the Service in order to ensure that activities they fund, authorize, permit, or carry out are not likely to jeopardize the continued existence of the species. The Service defines jeopardy as any action that would appreciably reduce the likelihood of both the survival and recovery of the species. For designated critical habitat, section 7(a)(2) also requires Federal agencies to consult with the Service to ensure that activities they fund, authorize, permit, or carry out do not result in destruction or adverse modification of critical habitat. Adverse modification of critical habitat is defined as any direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species.

1.1 Description of Species and Habitat¹

16. The Appalachian elktoe is a freshwater mussel with a thin, kidney shaped shell, which measures up to about 3.2 inches in length, 1.4 inches in height, and one inch in width. The shell's outer surface is yellowish-brown for juveniles and dark brown to greenish-black for adults. Some shells have striking rays, but many have only obscure greenish rays. The nacre (inside surface) is shiny and often white to bluish in color, with the central and beak cavity portions of the shell changing to a salmon, pinkish, or brownish color. The nacre of some specimens may be marked with irregular brownish blotches.
17. Like other freshwater mussels, the Appalachian elktoe feeds by filtering food particles from the water column. The specific food habits of the species are unknown, but other freshwater mussels have been documented to feed on detritus (decaying organic matter), diatoms (various minute algae), phytoplankton (microscopic floating aquatic plants), and zooplankton (microscopic floating aquatic animals). The reproductive cycle of the elktoe is similar to that of other native freshwater mussels. Males release sperm into the water column; the sperm are then taken in by the females through their siphons during feeding and respiration. The females retain the fertilized eggs in their gills until the larvae (glochidia) fully develop. The mussel glochidia are released into the water, and within a few days they must attach to the appropriate species of fish, which are then parasitized for a short time while the glochidia develop into juvenile mussels. They then detach from their "fish host" and sink to the stream bottom where they continue to develop, provided they land in a suitable substrate with the correct water conditions. The elktoe's life span, the fish host species, and many other aspects of its life history are currently unknown.
18. The Appalachian elktoe is known only from the mountain streams of western North Carolina and eastern Tennessee, but available information suggests that the species once lived in the majority of the rivers and larger creeks of the upper Tennessee River system in North Carolina. The elktoe currently has a very fragmented distribution living in scattered pockets of suitable habitats in portions of the Little Tennessee River system, Pigeon River system, the Little River in North Carolina, and the Nolichucky River system in North Carolina and Tennessee.
19. The decline of this species can be attributed to factors such as siltation resulting from past logging, mining, agricultural, and construction activities; run-off and discharge of

¹ Information on the elktoe and its habitat is taken from the U.S. Fish and Wildlife Service, *Proposed Designation of Critical Habitat for the Appalachian Elktoe*, February 8, 2001 (66 FR 27) and the *Recovery Plan For The Appalachian Elktoe (Alasmidonta raveneliana)* Lea, 1996.

pollution from industrial, municipal, agricultural, other point and non-point sources; and habitat alteration resulting from impoundment, channelization, and dredging.

20. In identifying areas as critical habitat for the elktoe, the Service considered those physical and biological features which are essential to the conservation of the species. Although the information on the life history and microhabitat requirements of the elktoe is limited, this species has been reported from relatively shallow, medium-sized creeks and rivers with cool, clean, well-oxygenated, moderate to fast flowing water. The species is most often found in riffles, runs, and shallow flowing pools with stable, relatively silt-free, coarse sand and gravel substrate associated with cobbles, boulders, and/or bedrock. Based on the best available information, the primary constituent elements for the elktoe are:

- Permanent, flowing, cool, clean water;
- Geomorphically stable stream and river channels and banks;
- Pool, riffle, and run sequences within the channel;
- Sand, gravel, cobble, boulder, and bedrock substrates with no more than low amounts of fine sediment;
- Moderate to high stream gradient;
- Periodic natural flooding; and
- Fish hosts, with adequate living, foraging, and spawning areas for them.

1.2 **Proposed Critical Habitat**²

21. Based on the most recent data for the elktoe, there are currently six surviving populations: the Little Tennessee River and Tuckasegee River population, Cheoah River population, Pigeon River system population, Little River population, the Nolichucky River system population, and the Toe River system population. The proposed designation includes habitat for each of these populations, over 144.3 total river miles. The lateral extent of proposed critical habitat is up to the ordinary high-water line on each river bank.

² Information on the elktoe and its habitat is taken from the U.S. Fish and Wildlife Service, *Proposed Designation of Critical Habitat for the Appalachian Elktoe*, February 8, 2001 (66 FR 27) and the *Recovery Plan For The Appalachian Elktoe (Alasmidonta raveneliana)* Lea, 1996.

All of the proposed critical habitat areas are currently occupied by the elktoe. Descriptions of each critical habitat unit are provided below:

- **Unit 1: Macon County and Swain County, North Carolina.** Unit 1 encompasses 24.0 river miles from the main stem of the Little Tennessee River (Tennessee River system), at the Lake Emory Dam at Franklin, Macon County, North Carolina, downstream to the backwaters of Fontana Reservoir in Swain County, North Carolina.
- **Unit 2: Jackson County and Swain County, North Carolina.** Unit 2 encompasses 26.0 river miles from the main stem of the Tuckasegee River (Little Tennessee River system), at the N.C. State Route 1002 Bridge in Cullowhee, Jackson County, North Carolina, downstream to the N.C. Highway 19 Bridge, north of Bryson City, Swain County, North Carolina.
- **Unit 3: Graham County, North Carolina.** Unit 3 encompasses 9.3 river miles from the main stem of the Cheoah River (Little Tennessee River system), at the Santeetlah Dam, downstream to its confluence with the Little Tennessee River.
- **Unit 4: Transylvania County, North Carolina.** Unit 4 encompasses 4.7 river miles from the main stem of the Little River (French Broad River system), at the Cascade Lake Power Plant, downstream to its confluence with the French Broad River.
- **Unit 5: Haywood County, North Carolina.** Unit 5 encompasses 11.1 river miles from the main stem of the West Fork Pigeon River (French Broad River system), at the confluence of the Little East Fork Pigeon River, downstream to the confluence of the East Fork Pigeon River, and the main stem of the Pigeon River, from the confluence of the West Fork Pigeon River and the East Fork Pigeon River, downstream to the N.C. Highway 215 Bridge crossing, south of Canton, North Carolina.
- **Unit 6: Yancey County and Mitchell County, North Carolina, and Unicoi County, Tennessee.** Unit 6 encompasses 3.7 river miles of the North Toe River, Yancey and Mitchell Counties, North Carolina, from the confluence of Big Crabtree Creek, downstream to the confluence of the South Toe River; 14.1 river miles of the South Toe River, Yancey County, North Carolina, from the N.C. State Route 1152 Bridge, downstream to its confluence with the North Toe River; 21.6 river miles of the Toe River, Yancey and Mitchell Counties, North Carolina, from the confluence of the North Toe River and the South Toe River, downstream to the confluence of

the Cane River; 16.5 river miles of the Cane River, Yancey County, North Carolina, from the N.C. State Route 1381 Bridge, downstream to its confluence with the Toe River; and 13.5 river miles of the Nolichucky River from the confluence of the Toe River and the Cane River in Yancey County and Mitchell County, North Carolina, downstream to the U.S. Highway 23/19 W. Bridge southwest of Erwin, Unicoi County, Tennessee.

1.3 Framework for Analysis

22. The focus of this economic analysis is on section 7 of the Act, which requires Federal agencies to insure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. Federal agencies are required to consult with the Service whenever they propose an action that may affect a listed species or its designated critical habitat. Aside from the protection that is provided under section 7, the Act does not provide other forms of protection to lands designated as critical habitat. Because consultation under section 7 only applies to activities that are carried out, permitted, or funded by Federal agencies, the designation of critical habitat will not afford any additional protections for species with respect to such strictly private activities.
23. This analysis first identifies land use activities within or in the vicinity of those areas being proposed for critical habitat that are likely to be affected by section 7 of the Act. To do this, the analysis evaluates a “without section 7” scenario and compares it to a “with section 7” scenario. The “without section 7” scenario constitutes the baseline of this analysis. It represents the level of protection currently afforded the species under the Act, absent section 7 protective measures, which includes other Federal, State, and local laws. The “with section 7” scenario identifies land-use activities likely to involve a Federal nexus that may affect the species or its designated critical habitat, which accordingly have the potential to be subject to future consultations under section 7 of the Act.
24. Economic activities identified as likely to be affected under section 7 and the resulting impacts that section 7 can have on such activities constitute the upper-bound estimate of the proposed critical habitat economic analysis. By defining the upper-bound estimate to include both jeopardy and critical habitat impacts, the analysis recognizes the difficulty in sometimes differentiating between the two in evaluating only the critical habitat effects associated with the proposed rulemaking. This step is adopted in order to ensure that any critical habitat impacts that may occur co-extensively with the listing of the species (i.e., jeopardy) are not overlooked in the analysis.

25. Upon identifying section 7 impacts, the analysis proceeds to consider the subset of impacts that can be attributed exclusively to the critical habitat designation. To do this, the analysis adopts a “with and without critical habitat approach.” This approach is used to determine those effects found in the upper-bound estimate that may be attributed solely to the proposed designation of critical habitat. Specifically, the “with and without critical habitat” approach considers section 7 impacts that will likely be associated with the implementation of the *jeopardy* provisions of section 7 and those that will likely be associated with the implementation of the *critical habitat* provision of section 7. In many cases, impacts associated with the jeopardy standard remain unaffected by the designation of critical habitat and thus would not normally be considered an effect of a critical habitat rulemaking. The subset of section 7 impacts likely to be affected solely by the designation of critical habitat represent the lower-bound estimate of this analysis.
26. The critical habitat designation for the elktoe encompasses land under private, and Federal ownership, with Federal lands being managed by the U.S. Forest Service. For private lands subject to critical habitat designation, section 7 consultations and modifications to land uses and activities can only be required when a Federal nexus, or connection, exists. A Federal nexus arises if the activity or land use of concern involves Federal permits, Federal funding, or another form of Federal involvement. Section 7 consultations are not required for activities on non-Federal lands that do not involve a Federal nexus.
27. In addition to the lands contained within the proposed critical habitat designation, this report will examine adjacent activities sponsored or permitted by Federal agencies that may affect the elktoe and/or adversely modify the proposed critical habitat area.
28. This report estimates impacts of listing and critical habitat designation on activities that are "reasonably foreseeable," including, but not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public. Accordingly, the analysis bases estimates on activities that are likely to occur within a ten-year time horizon.

1.4 Methodological Approach

29. This report relies on a sequential methodology and focuses on distilling the salient and relevant aspects of potential economic impacts of designation. The methodology consists of:

- Determining the current and projected economic activity within and around the proposed critical habitat area;
- Considering how current and future activities that take place or will likely take place on the Federal and private land could adversely affect proposed critical habitat;
- Identifying whether such activities taking place on privately-owned property within the proposed critical habitat boundaries are likely to involve a Federal nexus;
- Evaluating the likelihood that identified Federal actions and non-Federal actions having a Federal nexus will require consultations under section 7 of the Act and, in turn, that such consultations will result in modifications to projects;
- Estimating per-unit costs of expected section 7 consultations, project modifications and other economic impacts associated with activities in or adjacent to areas proposed as critical habitat;
- Estimating the upper bound of total costs associated with the area proposed for the designation (including costs that may be attributed co-extensively with the listing of the species) and the lower bound of costs (i.e., costs attributable solely to critical habitat);
- Determining the benefits that may be associated with the designation of critical habitat; and
- Assessing the extent to which critical habitat designation will create costs for small businesses and/or affect property values as a result of modifications or delays to projects.

1.5 Information Sources

30. The information for this report came from communications with and review of publicly available data from the following entities:

- Fish and Wildlife Service, Asheville Field Office
- North Carolina Department of Transportation
- U.S. Environmental Protection Agency
- U.S. Federal Energy Regulatory Commission
- U.S. Department of Agriculture, Animal and Plant Health Service, North Carolina
- Tapoco-APGI
- U.S. Census Bureau
- U.S. Bureau of Economic Analysis
- U.S. Small Business Administration
- American Rivers Association
- Tennessee Valley Authority

RELEVANT BASELINE INFORMATION

SECTION 2

31. This section discusses the socioeconomic characteristics of regions proposed as critical habitat for the Appalachian elktoe. In addition, this section provides relevant information about regulations and requirements that exist in the baseline (i.e., the "without section 7" scenario) that are likely to impact the regional economy.

2.1 Socioeconomic Profile of the Critical Habitat Areas

32. This section summarizes key economic and demographic information for the nine counties (eight in North Carolina; one in Tennessee) containing proposed critical habitat for the elktoe. County level data are presented to provide context for the discussion of potential economic impacts, and to illuminate trends that may influence these impacts.
33. Because the units are located in small rivers that cross county barriers, county level data may not accurately reflect the socioeconomic characteristics of these areas immediately surrounding the proposed critical habitat for the elktoe.

2.1.1 Macon County, North Carolina

34. Proposed critical habit unit 1 is located on primarily private land in Macon County, North Carolina. Macon County's population in year 2000 was 29,811, accounting for about 0.4 percent of the State total. This population is spread over 516 square miles with an average density of 57.8 people per square mile. Although a relatively small proportion of the State's population resides in Macon, the county has experienced population growth of 26.8 percent over the last ten years, which is higher than the State-wide rate of 21.4 percent.³ Prominent industries in this county include services, retail trade, and construction. Of these

³ U.S. Census Bureau, "State and County QuickFacts: Macon County, North Carolina, 2000," <http://quickfacts.census.gov/qfd/states/37/37113.html>.

industries, services has been the fastest growing industry since 1989, followed by retail trade and construction, respectively. Total earnings of persons employed in Macon County increased from approximately \$166 million in 1989 to \$335 million in 1999, an average annual growth rate of 7.3 percent. Macon County's total personal income (TPI) and per capita personal income (PCPI) in 1999 ranked 68th and 42nd out of 100 counties in the State, respectively. Although the county's TPI makes up only 0.3 percent of the State total, its PCPI has an average annual growth rate of five percent, which is higher than the State rate of 4.8 percent, and the national rate of 4.4 percent.⁴

2.1.2 Swain County, North Carolina

35. Proposed critical habitat unit 1 is located on primarily private land in Swain County, North Carolina. Swain County's 2000 population was 12,968, accounting for about 0.16 percent of the State total. This population is spread over 528 square miles with an average density of 24.6 people per square mile. Since 1990, the county's population has increased by 15.1 percent, which is below the State rate of 21.4 percent.⁵

36. In 1999, Swain County had a total personal income (TPI) of \$211 million. This TPI ranked 93rd in the State and accounted for 0.1 percent of the State total. Swain's per capita personal income (PCPI) in 1999 was \$17,104 and ranked 97th in the State of North Carolina. This PCPI is 35 percent lower than the State average of \$26,417, and 40 percent lower than the national average of \$28,546. Total earnings of persons employed in Swain increased from about \$88.5 million in 1989 to \$152 million in 1999, an average annual growth rate of 5.6 percent. The largest industries in 1999 were services, retail trade, and State and local government. The services industry has been the fastest growing industry over the last ten years, followed by retail trade, and State and local government, respectively.⁶

⁴ U.S. Bureau of Economic Analysis, "Bearfacts: Macon, North Carolina, 1989-99," <http://www.bea.doc.gov/bea/regional/bearfacts/bf10/37/b1037113.htm>.

⁵ U.S. Census Bureau, "State and County QuickFacts: Swain County, North Carolina, 2000," <http://quickfacts.census.gov/qfd/states/37/37173.html>.

⁶ U.S. Bureau of Economic Analysis, "Bearfacts: Swain, North Carolina, 1989-99," <http://www.bea.doc.gov/bea/regional/bearfacts/bf10/37/b1037113.htm>.

2.1.3 Jackson County, North Carolina

37. Proposed critical habitat unit 2 is located on private land within Jackson County, North Carolina. Jackson County's 2000 population was 33,121, accounting for about 0.4 percent of the State total. This population is spread over 491 square miles with an average density of 67.5 people per square mile. Since 1990, the county's population has increased by 23.4 percent, which is slightly higher than the State rate of 21.4 percent.⁷

38. In 1999, Jackson County had a total personal income (TPI) of \$669 million. This TPI ranked 67th in the State and accounted for 0.3 percent of the State total. Jackson County's per capita personal income (PCPI) in 1999 was \$22,097 and ranked 48th in the State of North Carolina. This PCPI is 16 percent lower than the State average of \$26,417, and 23 percent lower than the national average of \$28,546. Total earnings of persons employed in Jackson increased from about \$211 million in 1989 to \$407 million in 1999, an average annual growth rate of 6.8 percent. The largest industries in 1999 were services, State and local government, and retail trade. The services industry has been the fastest growing industry over the last ten years, followed by retail trade.⁸

2.1.4 Graham County, North Carolina

39. Proposed critical habitat unit 3 is located on primarily Federally-owned land in Graham County, North Carolina. Graham County's 2000 population was 7,993, accounting for about 0.1 percent of the State total. This population is spread over 292 square miles with an average density of 27.4 people per square mile. Since 1990, the county's population has increased by 11.1 percent, which is below the State rate of 21.4 percent.⁹

40. In 1999, Graham County had a total personal income (TPI) of \$138 million. This TPI ranked 98th in the State and accounted for 0.1 percent of the State total. Graham County's per capita personal income (PCPI) in 1999 was \$18,116 and ranked 91st in the State. This PCPI is 31 percent lower than the State average of \$26,417, and 37 percent lower than the national average of \$28,546. Total earnings of persons employed in Graham

⁷ U.S. Census Bureau, "State and County QuickFacts: Jackson County, North Carolina, 2000," <http://quickfacts.census.gov/qfd/states/37/37099.html>.

⁸ U.S. Bureau of Economic Analysis, "Bearfacts: Jackson, North Carolina, 1989-99," <http://www.bea.doc.gov/bea/regional/bearfacts/bf10/37/b1037113.htm>.

⁹ U.S. Census Bureau, "State and County QuickFacts: Graham County, North Carolina, 2000," <http://quickfacts.census.gov/qfd/states/37/37075.html>.

County increased from about \$39 million in 1989 to \$76 million in 1999, an average annual growth rate of 6.8 percent. The largest industries in 1999 were construction, durable goods manufacturing, and State and local government. The services industry has been the fastest growing industry over the last ten years, followed by construction and durable goods manufacturing.¹⁰

2.1.5 Transylvania County, North Carolina

41. Proposed critical habitat unit 4 is located on private land in Transylvania County, North Carolina. Transylvania County's 2000 population was 29,334 accounting for about 0.4 percent of the State total. This population is spread over 378 square miles with an average density of 77.6 people per square mile. Since 1990, the county's population has increased by 14.9 percent, which is below the State rate of 21.4 percent.¹¹

42. In 1999, Transylvania County had a total personal income (TPI) of \$706 million. This TPI ranked 66th in the State and accounted for 0.3 percent of the State total. Transylvania's per capita personal income (PCPI) in 1999 was \$24,473 and ranked 23rd in the State of North Carolina. This PCPI is seven percent lower than the State average of \$26,417, and 14 percent lower than the national average of \$28,546. Total earnings of persons employed in Transylvania increased from about \$272.5 million in 1989 to \$394.5 million in 1999, an average annual growth rate of 3.8 percent. The largest industries in 1999 were services, and nondurable and durable goods manufacturing. The services industry has been the fastest growing industry over the last ten years, followed by durable goods manufacturing.¹²

2.1.6 Haywood County, North Carolina

43. A part of the West Fork Pigeon and Pigeon River proposed for designation is located in Haywood County, North Carolina. Haywood County's 2000 population was 54,033 accounting for about 0.7 percent of the State total. This population is spread over 554 square miles with an average density of 97.5 people per square mile. Since 1990, the

¹⁰ U.S. Bureau of Economic Analysis, "Bearfacts: Graham, North Carolina, 1989-99," <http://www.bea.doc.gov/bea/regional/bearfacts/bf10/37/b1037113.htm>.

¹¹ U.S. Census Bureau, "State and County QuickFacts: Transylvania, North Carolina, 2000," <http://quickfacts.census.gov/qfd/states/37/37175.html>.

¹² U.S. Bureau of Economic Analysis, "Bearfacts: Transylvania, North Carolina, 1989-99," <http://www.bea.doc.gov/bea/regional/bearfacts/bf10/37/b1037113.htm>.

county's population has increased by 15.1 percent, which is below the State rate of 21.4 percent.¹³

44. In 1999, Haywood County had a total personal income (TPI) of about \$1.2 billion. This TPI ranked 44th in the State of North Carolina and accounted for 0.6 percent of the State total. Haywood's per capita personal income (PCPI) in 1999 was \$22,301 and ranked 44th in the State. This PCPI is 16 percent lower than the State average of \$26,417, and 22 percent lower than the national average of \$28,546. Total earnings of persons employed in Haywood increased from about \$405 million in 1989 to \$581 million in 1999, an average annual growth rate of 3.7 percent. The largest industries in 1999 were services, State and local government, and nondurable goods manufacturing. The services industry has been the fastest growing industry over the last ten years, followed by State and local government.¹⁴

2.1.7 Yancey County, North Carolina

45. A part of the Toe River, Cane River, and Nolichucky River proposed for designation is located in Yancey County, North Carolina. Yancey County's 2000 population was 17,774 accounting for about 0.2 percent of the State total. This population is spread over 312 square miles with an average density of 57 people per square mile. Since 1990, the county's population has increased by 15.3 percent, which is below the State rate of 21.4 percent.¹⁵
46. In 1999, Yancey County had a total personal income (TPI) of about \$325 million. This TPI ranked 85th in the State and accounted for 0.2 percent of the State total. Yancey's per capita personal income (PCPI) in 1999 was \$19,277 and ranked 81st in the State. This PCPI is 27 percent lower than the State average of \$26,417, and 32 percent lower than the national average of \$28,546. Total earnings of persons employed in Yancey increased from about \$113 million in 1989 to \$158 million in 1999, an average annual growth rate of 3.4 percent. The largest industries in 1999 were services, nondurable goods manufacturing, and

¹³ U.S. Census Bureau, "State and County QuickFacts: Haywood, North Carolina, 2000, <http://quickfacts.census.gov/qfd/states/37/37087.html>.

¹⁴ U.S. Bureau of Economic Analysis, "Bearfacts: Haywood, North Carolina, 1989-99," <http://www.bea.doc.gov/bea/regional/bearfacts/bf10/37/b1037113.htm>.

¹⁵ U.S. Census Bureau, "State and County QuickFacts: Yancey, North Carolina, 2000, <http://quickfacts.census.gov/qfd/states/37/37199.html>.

State and local government. The farming industry has been the fastest growing industry in this county over the last ten years.¹⁶

2.1.8 Mitchell County, North Carolina

47. A part of the Toe River and the Nolichucky River proposed for designation is located in Mitchell County, North Carolina. Mitchell County's 2000 population was 5,687 accounting for about 0.2 percent of the State total. This population is spread over 221 square miles with an average density of 74 people per square mile. Since 1990, the county's population has increased by 8.7 percent, which is below the State rate of 21.4 percent.¹⁷

48. In 1999, Mitchell County had a total personal income (TPI) of about \$303 million. This TPI ranked 88th in the State of North Carolina and accounted for 0.1 percent of the State total. Mitchell's per capita personal income (PCPI) in 1999 was \$20,519 and ranked 65th in the State. This PCPI is 22 percent lower than the State average of \$26,417, and 28 percent lower than the national average of \$28,546. Total earnings of persons employed in Mitchell increased from about \$108 million in 1989 to \$176 million in 1999, an average annual growth rate of 5.1 percent. The largest industries in 1999 were services, durable goods manufacturing, and State and local government. The services industry has been the fastest growing industry in this county over the last ten years, followed by State and local government.¹⁸

2.1.9 Unicoi County, Tennessee

49. A part of the Nolichucky River proposed for designation is also located in Unicoi County. Unicoi County's 2000 population was 17,667 accounting for about 0.3 percent of the State total. This population is spread over 186 square miles with an average density of

¹⁶ U.S. Bureau of Economic Analysis, "Bearfacts: Yancey, North Carolina, 1989-99," <http://www.bea.doc.gov/bea/regional/bearfacts/bf10/37/b1037113.htm>.

¹⁷ U.S. Census Bureau, "State and County QuickFacts: Mitchell, North Carolina, 2000," <http://quickfacts.census.gov/qfd/states/37/37199.html>.

¹⁸ U.S. Bureau of Economic Analysis, "Bearfacts: Mitchell, North Carolina, 1989-99," <http://quickfacts.census.gov/qfd/states/37/37121.html>.

95 people per square mile. Since 1990, the county's population has increased by 6.8 percent, which is below the State rate of 16.7 percent.¹⁹

50. In 1999, Unicoi County had a total personal income (TPI) of about \$360 million. This TPI ranked 61st in the State and accounted for 0.3 percent of the State total. Unicoi's per capita personal income (PCPI) in 1999 was \$20,785 and ranked 39th in the State. This PCPI is 19 percent lower than the State average of \$25,548, and 27 percent lower than the national average of \$28,546. Total earnings of persons employed in Unicoi increased from about \$127 million in 1989 to \$176 million in 1999, an average annual growth rate of 3.3 percent. The largest industries in 1999 were services, nondurable and durable goods manufacturing, and transportation and public utilities. The construction industry has been the fastest growing industry in this county over the last ten years.²⁰

2.2 Baseline Elements

2.2.1 Recovery Plan

51. An important component of the regulatory baseline is the Recovery Plan for the Appalachian elktoe, published in 1996.²¹ The Recovery Plan establishes recovery criteria for the Appalachian elktoe and proposes actions to restore and maintain elktoe populations, such as developing a successful technique for reestablishing and augmenting populations. The ultimate goal of the Recovery Plan is "to recover the species to the point where it can be removed from the Federal list of Endangered and Threatened Wildlife and Plants." While the Recovery Plan imposes no binding restrictions on landowners and managers, it serves as an important information source for landowners regarding elktoe habitat areas.

2.2.2 Overlap with Other Listed Species

52. Generally, if a consultation is triggered for any listed species, the consultation process will also take into account all species known or thought to occupy areas on or near the project lands. As such, listing or critical habitat-related protections for other threatened

¹⁹ U.S. Census Bureau, "State and County QuickFacts: Unicoi, Tennessee, 2000, <http://quickfacts.census.gov/qfd/states/47/47171.html>.

²⁰ U.S. Bureau of Economic Analysis, "Bearfacts: Unicoi, Tennessee, 1989-99, <http://www.bea.doc.gov/bea/regional/bearfacts/bf10/37/b1037113.htm>.

²¹ U.S. Fish and Wildlife Service, *Recovery Plan for the Appalachian Elktoe (Alasmodonta raveneliana) Lea*, Atlanta, GA, August 1996.

or endangered species may benefit the elktoe as well (i.e., provide baseline protection). For example, one of the proposed elktoe critical habitat units, unit 1, overlaps significantly with occupied habitat of the little-wing pearl mussel. Many of the habitat requirements for these two species overlap, as both make use of cool, clear, high-gradient stream habitats with rock and gravel substrata and pool, riffle, and run sequences within the channel. Therefore, consultations conducted on behalf of the little-wing pearl mussel provide benefits (i.e., baseline protection) to the elktoe habitat. Unit 1 also overlaps with designated critical habitat for the spotfin chub, a small fish. Some of the primary constituent elements for each of these species also overlap. For instance, both species require clear waters with pool and riffle sequences and substrates with little sediment deposition. Therefore, consultations conducted on behalf of the spotfin chub provide benefits to the elktoe habitat. In addition, future consultations on the elktoe may occur in coordination with programmatic consultations and/or Habitat Conservation Plans (HCPs) for activities affecting other species.

2.2.3 State Statutes and Regulations

North Carolina Sedimentation Pollution Control Act

53. The North Carolina Sedimentation Pollution Control Act of 1973 establishes a Statewide program to control soil erosion and sedimentation. The primary goal of this program is to "permit development of North Carolina to continue with the least detrimental effects from pollution by sedimentation."²² The law covers certain land-disturbing activities, including residential and industrial development, road construction, and road maintenance (agricultural, forestry, and mining activities are covered by other legislation). The law provides a flexible approach to reduce erosion and sedimentation by leaving the decision of the most economical and effective methods for erosion and sedimentation control to the individual landowner's discretion. The key provision of the Act is a requirement that landowners prepare an erosion and sedimentation plan. At a minimum, this plan must provide a buffer zone along natural watercourses or lakes sufficient to contain visible sediment within the first 25 percent of the buffer strip; cut-and-fill slope angles no greater than sufficient to ensure proper stabilization; and ground cover sufficient to prevent erosion and any other measures necessary to prevent off-site sedimentation.

²² Sedimentation Pollution Control Act of 1973, N.C. Gen. Stat. §113A-51.

54. This statute will be applicable to all six critical habitat units for the elktoe due to the potential for road construction/maintenance, hydropower facility relicensing, and minor development activities over the next ten years. The Service maintains an internal policy that all project modifications will, at the very least, involve the implementation of an erosion and sedimentation control plan that complies with the State regulation. For more significant road construction and development activities, the Service may request measures in excess of those required by the State regulation. This regulation will impact the extent, location, and nature of future development within the six critical habitat units for the elktoe. Since stable river channels and banks, and substrates with no more than low amounts of fine sediment are some of the primary constituent elements essential for the conservation of the elktoe, application of the Sedimentation Pollution Control Act is likely to provide substantial baseline protection to the elktoe.

Dam Safety Control Act

55. The Dam Safety Law of 1967 was promulgated to “provide for the certification and inspection of dams in the interest of public health, safety, and welfare, in order to reduce the risk of failure of dams; to prevent injuries to persons, damage to downstream property and loss of reservoir storage; and to ensure maintenance of minimum stream flows of adequate quantity and quality below dams.”²³ The law covers both the construction of new dams and the repair, alteration, or removal of existing dams. The following dams are exempted from these provisions: (1) dams constructed by the U.S. Army Corps of Engineers, the Tennessee Valley Authority, or another U.S. agency if the agency designed or approved the plans and supervised the dam construction; (2) dams constructed with U.S. Soil Conservation Service funds if the agency designed or approved the plans and supervised the construction; (3) dams licensed by the Federal Energy Regulatory Commission (FERC) or with a FERC license pending; (4) dams operated by a medium or large power producer to generate electricity under the jurisdiction of the North Carolina Utilities Commission; (5) dams under single private ownership protecting only land under the same ownership and not posing a threat to human life or property below the dam; and (6) dams less than 15 feet in height or with less than a ten acre-feet impoundment capacity. However, this exemption “does not apply after the supervising Federal agency relinquishes authority for the operation and maintenance of the dam to a local entity.”²⁴

²³ Dam Safety Law of 1967, N.C. Gen. Stat. §143-215 (1995).

²⁴ Dam Safety Law of 1967, N.C. Gen. Stat. §143-215.26

56. A key provision of the Act is the requirement that an application be submitted to the Department prior to the commencement of any dam construction, repair, alteration, or removal action. This application must include a preliminary report providing a general description of the dam, a description of the properties downstream from the dam, maps showing the location of the dam, and preliminary design criteria.²⁵ Furthermore, the applicant must submit a final design report for approval. The final design report must include, among other requirements, criteria indicating dam safety and stability, provisions to protect upstream and downstream slopes from erosion, and provisions for maintaining minimum stream flow requirements.
57. This statute will influence activities on or near five of the critical habitat units for the elktoe, due to the existence of dams within or in close proximity to units 1 through 5. The Service views minimum stream flows as a key concern in regard to the operation of hydropower facilities and intends to impose minimum stream flow requirements on the facilities scheduled for relicensing. As such, this State regulation will most likely impact the extent, location, and nature of future dam construction and maintenance activities within five of the critical habitat units over the next ten years. Because permanent, flowing water is one of the primary constituent elements essential for the conservation of the elktoe, application of the Dam Safety Control Act is likely to provide substantial baseline protection to the elktoe.

Federal Power Act

58. The Federal Power Act (FPA) was promulgated in 1920.²⁶ The purpose of the FPA was to establish a regulatory agency, the Federal Power Commission (FPC), for non-federal hydropower generation and to require non-Federal hydropower owners/operators to obtain a license for the operation of the facility. Over the years, the FPC took responsibility for additional national regulatory issues and evolved into the Federal Energy Regulatory Commission (FERC), an independent Federal agency governing approximately 2,500 licenses for non-Federal hydropower facilities.²⁷ In 1986 the FPA was amended to, among other things, require FERC to give equal consideration to fish and wildlife concerns affected by hydropower facilities during the relicensing process.

²⁵ Dam Safety Rules, N.C. Admin. Code tit. 15A, §.0201(c) (April 1995).

²⁶ Federal Power Act, 16 U.S.C. §800 (1986).

²⁷ Federal Power Act Summary, American Rivers Organization, <http://www.amrivers.org/hydropowertoolkit/hydroreformtoolkitlawsfpa.htm>

59. Specifically, section 10(j) of the FPA was promulgated to ensure that FERC considers both power and non-power resources during the licensing process. As such, section 10(j) instructs FERC to actively solicit input regarding “adequate and equitable” fish and wildlife measures from Federal and State resource agencies.²⁸ FERC must consider these recommendations during the licensing process but does not have to incorporate the recommendations into the license if they “may be inconsistent with the purposes and requirements of the FPA” or if the recommendations are not supported by substantial evidence.
60. Furthermore, section 18 of the FPA provides that FERC require facility owners/operators to construct, maintain, and operate, at their own expense, fishways²⁹ if operation of the facility will impact the passage of fish species in the project area or planned for introduction in the area.³⁰ Section 18 of the FPA will likely be applicable to the relicensing of the Dillsboro Dam in unit 2. The Dillsboro Dam currently does not allow for upstream fish passage over the dam. The Service intends to proscribe fishways at the Dillsboro Dam during the relicensing process. Therefore, beyond the baseline protections applicable to all the dams bordering the elktoe habitat pursuant to the Sedimentation Pollution Control Act and the Dam Safety Control Act, the Federal Power Act provides additional baseline protection to elktoe located near the Dillsboro Dam.

Clean Water Act (CWA)

61. The purpose of the CWA is to restore the physical, biological, and chemical integrity of the waters of the United States using two basic mechanisms: 1) direct regulation of discharges pursuant to permits issued under the National Pollution Discharge Elimination System (NPDES) and Section 404 (discharge of dredge or fill materials); and 2) the Title III water quality program.³¹

²⁸ Federal Power Act, 16 U.S.C. §803(j) (1986).

²⁹ A fishway is a structure constructed at a dam that allows for fish species to pass over the dam without harm or injury. There are a variety of ways to establish a fishway, ranging from a step and pull system (fish swim along a slope with notches that act like stairs) to an elevator (fish swim into a large box that is lifted over the dam where the fish are released).

³⁰ Federal Power Act, 16 U.S.C. §811 (1986).

³¹ Clean Water Act, 33 U.S.C. §1251 (1987).

62. Under the NPDES program, EPA sets pollutant-specific limits on the point source discharges for major industries and provides permits to individual point sources that apply to these limits. EPA has delegated responsibility for the NPDES permitting program to most States.³² State-issued NPDES permits are treated as non-Federal actions. As such, the issuance of NPDES permits by States are not subject to the consultation requirements of the Act.
63. Under the water quality standards program (WQS), EPA has issued water quality criteria to establish limits on the ambient concentration of pollutants in surface waters that will still protect the health of the water body. States issues water quality standards that reflect the Federal water quality criteria and submit the standards to EPA for review. State water quality standards are subject to review every three years (triennial review). States apply the standards to NPDES discharge permits to ensure that discharges do not violate the water quality standards.³³
64. Under section 401 of the CWA, all applicants for a Federal license or permit to conduct activity that may result in discharge to navigable waters are required to submit a State certification to the licensing or permitting agency. The State certification must state that the discharge complies with the requirements of sections 301, 302, 303, 306, and 307 of the CWA. Section 404 of the CWA prescribes a permit program for the discharge of dredged or fill material into navigable waters. Specifically, pursuant to section 404, permit applicants are required to show that they have “taken steps to avoid wetland impacts, where practicable, minimized potential impacts to wetlands, and provided compensation for any remaining, unavoidable impacts through activities to restore or recreate wetlands.”³⁴
65. The Clean Water Act will influence activities on or near all six of the critical habitat units for the elktoe, due to the existence of road/bridge construction, residential development, and hydropower relicensing activities on or near all six units. Since water quality is important to the recovery of the elktoe, this statute will likely impact the extent, location, and nature of future activities on or near the proposed critical habitat units over the next ten years. As such, the Clean Water Act is likely to provide substantial baseline protection to the elktoe.

³² Clean Water Act, 33 U.S.C. §402.

³³ Clean Water Act, 33 U.S.C. §303, 305.

³⁴ Section 404 of the Clean Water Act: An Overview, <http://www.epa.gov/owow/wetlands/facts/fact10.html>

ECONOMIC IMPACTS OF SECTION 7 ACTIVITIES ON LAND USE SECTION 3

66. The previous two sections introduced the geographic areas where the Service is proposing to designate critical habitat for the Appalachian elktoe, the socioeconomic profile of these areas, and general trends associated with population, economic and urban growth. These sections also outlined the baseline level of protection afforded the elktoe's habitat, including existing State and Federal laws and policies. This section will identify the current land use activities within and/or affecting the proposed critical habitat designation as well as the location, nature, and extent of future activities that may be affected by section 7 implementation in the critical habitat area. The section concludes with estimates of consultations and other regulatory impacts on activities affecting the critical habitat designation. Importantly, these estimates include all section 7-related consultations and technical assistance calls associated with the proposed critical habitat area. As such, this section does not attempt to distinguish which impacts may be attributable co-extensively to the listing of the elktoe. Therefore, the estimates in this section reflect the upper-bound of impacts caused by the designation.
67. Each section begins with a general description of the land uses and potential Federal nexuses affecting the 144.3 river miles of proposed critical habitat for the elktoe. This information is augmented by projections of projects likely to require section 7 consultation in each critical habitat unit over the next ten years.

3.1 Hydropower Relicensing Projects³⁵

68. Three major private power companies own and operate hydropower facilities in three of the six units proposed for critical habitat designation. Four facilities are operating on land bordering the proposed units, and the rest are operating outside the units, on tributaries upstream of the proposed critical habitat. Hydropower facilities can be largely categorized into two types: run-of-river operation, and peaking operation. A run-of-river operation allows the inflow from the river to simply run through the project without regulating flow. A peaking operation, on the other hand, regulates flow by storing up inflow of water during low demand periods and releasing it during peak demand periods. Several hydropower facilities are often grouped into "projects" and work in tandem to generate energy. As such, power companies apply for relicenses per project. Four dams on land bordering the proposed critical habitat area have licenses scheduled to expire in year 2005 or 2006.³⁶ Under the FPA, FERC issues licenses for privately owned hydropower facilities. Therefore, a Federal nexus exists for each project applying for relicense.
69. The Service's specific concerns regarding the relicensing projects include the implementation and maintenance of minimum flows, fish passageways,³⁷ and the temperature of released water. However, the Service's concerns are for the overall environmental health of the rivers.³⁸ Furthermore, each of the dams bordering the proposed critical habitat are subject to the requirements of the Dam Safety Control Act and the Federal Power Act. As a result, the hydropower facility owners/operators will consider the impacts of their actions on sensitive species, regardless of the Act. Therefore, the economic impacts associated with section 7 consultation requirements are less than they would be without these baseline regulations. Because, in this instance, it is difficult to separate economic impacts associated with these baseline regulations from the requirement of section 7, this analysis makes the conservative assumption that all of the costs for certain

³⁵ Personal communication with Biologists, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on November 11, 2001 and January 9, 2002; Interview with personnel from FERC on January 7, 2002 and February 25, 2002.

³⁶ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002.

³⁷ A fish passageway is a structure added to the dam that allows fish a chance to swim around the dam and reach upstream habitat.

³⁸ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002.

project modifications, except the costs for the installation of fish passageways, are attributed to section 7.

3.1.1 Unit 1

70. Duke Energy (Duke) owns a large portion of the land bordering this unit. Duke purchased the land with the intent to construct a dam. However, the plan is no longer valid, and Duke is looking to sell the land. The State of North Carolina or a conservation group may purchase the land, in which case it will be maintained as conservation land. However, future ownership is unclear at this point, and as a result, future activities are difficult to predict.³⁹
71. Although Duke is no longer planning to construct a new dam, it owns a run-of-river hydropower facility, the Franklin Dam, operating on the Little Tennessee River at the beginning of unit 1 in Macon County. Pursuant to FERC, the Service is in the process of consulting on the relicensing of this project and expects the consultation to remain informal.⁴⁰ Once issued, a license for a hydropower project lasts 30 to 50 years; therefore, FERC is not expected to further consult with the Service regarding this particular project over the next ten years. However, the Service may provide technical assistance through monitoring project operations and other maintenance matters in the future. Therefore, there may be two occasions in which the Service offers technical assistance regarding dam operations affecting this unit over the next ten years.⁴¹

³⁹ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002.

⁴⁰ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002; Interview with personnel from FERC on January 7, 2002 and February 25, 2002.

⁴¹ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002; Interview with personnel from FERC on January 7, 2002 and February 25, 2002.

3.1.2 Unit 2

72. A run-of-river facility, the Dillsboro Dam operates on land bordering the Tuckasegee River in unit 2. Duke Energy is considering removing the Dillsboro Dam because the operation costs exceed the financial benefits of operation.⁴² Furthermore, removal of this dam will allow for the creation of a trout fishery upstream from the dam and will create less hazard to recreational kayakers and canoers.⁴³
73. In addition to the Dillsboro Dam, six other hydropower facilities operate outside unit 2 that may adversely affect the elktoe and/or its critical habitat. Therefore, FERC is likely to consult with the Service regarding the relicensing of these facilities. Although there are seven separate facilities, some of the facilities are combined so that there are four projects being relicensed under FERC in this region.⁴⁴ Many of the projects are at an early stage of the relicensing process, and the Service is expected to conduct consultations with FERC regarding all four projects.
74. The Service is planning to make recommendations reflecting its overall concern for the health of the river, but does not foresee the need for substantial project modifications to protect solely the elktoe and its critical habitat.⁴⁵ Therefore, consultations regarding hydropower projects affecting critical habitat unit 2 are likely to remain informal. Once licenses are reissued, FERC is not expected to further consult with the Service regarding these projects over the next ten years. However, the Service may provide technical assistance, through monitoring of project operations and other maintenance matters in the future. Therefore, there may be ten occasions in which the Service offers technical assistance regarding dam operations affecting this unit over the next ten years.⁴⁶

⁴² Personal Communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, April 19, 2002.

⁴³ Personal Communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, April 19, 2002.

⁴⁴ Interview with personnel from FERC on January 7, 2002 and February 25, 2002.

⁴⁵ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002; Interview with personnel from FERC on January 7, 2002 and February 25, 2002.

⁴⁶ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002; Interview with personnel

3.1.3 Unit 3

75. Tapoco, Incorporated operates two peaking facilities on land bordering unit 3: the Santeelah Dam and the Cheoah Dam. The Santeelah Dam is located at the upper end of unit 3 on the Cheoah River. The water flowing into the dam is piped to a power plant on the Little Tennessee River. The other peaking facility, the Cheoah Dam, is located at the end of unit 3 on the Little Tennessee River. The Service is presently involved in consultations with FERC regarding the relicensing of these two projects.⁴⁷
76. In addition to these two facilities, the Fontana Dam, operated by the Tennessee Valley Authority, is on the Little Tennessee River. Although the Fontana Dam lies outside the proposed unit, it may affect downstream extent of elktoe habitat. The Service is planning to make recommendations reflecting its concern for the overall health of the riverine habitat, and does not foresee the need for substantial project modifications to protect the elktoe and its critical habitat.⁴⁸ Therefore, three informal consultations are expected over the next ten years regarding dam operations affecting this unit. Furthermore, the Service may provide technical assistance through monitoring project operations and other maintenance matters in the future. Therefore, there may be six occasions in which the Service offers technical assistance regarding dam operations affecting this unit over the next ten years.

3.1.4 Unit 4

77. The Cascade Power Plant is located on land bordering unit 4. This power plant is no longer under FERC jurisdiction because the company's decommission application has been approved and the State of North Carolina has taken over responsibility for the facility's operation. The facility will likely remain as a run-of-river dam and the Service expects the

from FERC on January 7, 2002 and February 25, 2002.

⁴⁷ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002; Interview with personnel from FERC on January 7, 2002 and February 25, 2002.

⁴⁸ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002.

consultation to remain informal. The Service expects to provide technical assistance through operations monitoring and maintenance on four occasions over the next ten years.⁴⁹

3.2 Road Construction and Bridge Replacement⁵⁰

78. The North Carolina Department of Transportation (NCDOT) performs a number of bridge replacement and road construction actions every year. Road and bridge construction and replacement projects may affect critical habitat if they cross rivers containing the elktoe, or if they are located nearby and have the potential to increase runoff into rivers and threaten water quality.⁵¹ Road construction projects can have a Federal nexus, since highway projects can be sponsored by the Federal Highway Administration; local and State road and bridge projects are funded with 80 percent reimbursement by the Federal Highway Administration (FHWA).⁵² NCDOT policy is to work closely with the Service to eliminate/limit the adverse impacts of road and bridge construction and replacement projects on any endangered species and/or their habitat.⁵³ Furthermore, Service policy is to refrain from requesting a formal consultation for road and bridge construction and replacement activities as long as elktoe are not found where the project is proposed and there are not any indirect effects to the elktoe as a result of the project.⁵⁴ As a result, past consultations for road and bridge projects have remained informal and have included erosion and

⁴⁹ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002.

⁵⁰ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on November 16, 2001 and January 9, 2002; Interview with personnel from NCDOT on January 11, 2002; Information from NCDOT, *Transportation Information Program: 2002-2008*, <http://apps.dot.state.nc.us/quickfind/Tipsearch/default.html>, last viewed January 11, 2002.

⁵¹ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002.

⁵² Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, November 16, 2001 in regard to the economic analysis of critical habitat designation for the Carolina heelsplitter.

⁵³ Personal communication with personnel from NCDOT, January 11, 2002.

⁵⁴ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, November 19, 2001.

sedimentation plans and other measures to eliminate the adverse effect of the projects. Based on this history, it is expected that a majority of the future consultations regarding road constructions and bridge replacements will remain informal.

3.2.1 Unit 1

79. The NCDOT is planning to pave a dirt road, Needmore Road, that parallels the Little Tennessee River. The NCDOT (FHWA) has already initiated an informal consultation with the Service for this project, and the Service has recommended that the paving proceed without widening the road in order to limit direct and indirect effects that typically result from road-widening activities.⁵⁵ Although an action plan has not been finalized for this project, the NCDOT expects that some of the project alternatives may require widening of the road footprint.⁵⁶ Therefore, the FHWA may request formal consultation for this project upon the completion of the assessment and selection of a preferred alternative.⁵⁷

3.2.2 Unit 2

80. The FHWA will likely need to consult with the Service regarding a proposed bridge replacement plan. This plan includes two bridges outside the proposed critical habitat in unit 2. In addition, several other bridge replacement plans exist for bridges on land bordering this unit. Therefore, four to five consultations are expected regarding bridge replacements over the next ten years.⁵⁸ Based on the past consultation history, the Service expects these consultations to remain informal.

⁵⁵ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002.

⁵⁶ Personal communication with personnel from NCDOT, January 11, 2002; Information from NCDOT, *Transportation Information Program: 2002-2008*, <http://apps.dot.state.nc.us/quickfind/Tipsearch/default.html>, last viewed January 11, 2002.

⁵⁷ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002.

⁵⁸ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002; Personal communication with personnel from NCDOT, January 11, 2002, Information from NCDOT, *Transportation Information Program: 2002-2008*, <http://apps.dot.state.nc.us/quickfind/Tipsearch/default.html>, last viewed January 11, 2002.

81. Furthermore, the Service has conducted informal consultations with the U.S. Army Corps of Engineers (ACOE) in the past on river crossings requiring section 404 permits under the Clean Water Act. Therefore, the Service expects to conduct informal consultations with the ACOE on any bridge replacement activities that may require a section 404 permit.

3.2.3 Unit 3

82. A replacement plan exists for a bridge over the Cheoah River on land bordering unit 3. Since this is a minor bridge replacement project (it involves the replacement of an existing structure with no other highway improvements associated with the project) and no elktoe have been found where the project is proposed, the NCDOT expects that they can address and eliminate any potential effects to the species through informal consultation.⁵⁹

3.2.4 Unit 5

83. The NCDOT has initiated an informal consultation regarding a bridge crossing over critical habitat in unit 5. Elktoe were found where the new crossing is proposed. Therefore, the potential for the project to adversely effect the species exists and the FHWA will likely request initiation of a formal consultation for this project.⁶⁰ In addition, approximately eight bridge replacements are planned over critical habitat in this unit over the next ten years. Therefore, the Service is likely to conduct one formal and eight informal consultations in this unit over the next ten years.

3.2.5 Unit 6

84. The NCDOT is planning to widen over 20 miles of Highway 19, bordering unit 6. US-19 directly crosses the Toe River, the Cane River, and 70 to 80 tributaries of these rivers. Furthermore, the highway is within the watersheds of these rivers. Current construction plans involve widening US-19 up to the Cane River but the project may eventually involve a crossing of the Cane River and may extend into other areas where the direct and indirect effects of the project may have the potential to affect the elktoe and

⁵⁹ Personal communication with personnel from NCDOT, January 11, 2002.

⁶⁰ Personal communication with personnel from NCDOT, January 11, 2002, Information from NCDOT, *Transportation Information Program: 2002-2008*, <http://apps.dot.state.nc.us/quickfind/Tipsearch/default.html>, last viewed January 11, 2002.

proposed critical habitat.⁶¹ The NCDOT is in the process of assessing the potential effects of this project in a biological assessment, and may request initiation of a formal consultation in the future.⁶² The NCDOT is also planning to replace seven bridges within the Nolichucky River system. Because all of these bridges are within the same river system and are likely to have similar effects on the elktoe and its habitat, they are being grouped into one consultation.⁶³ At least two of the seven bridges cross occupied habitat of the elktoe and are within the proposed critical habitat area. Therefore, the Service is expected to conduct a formal consultation for this project. Therefore, the Service is likely to conduct two formal consultations in this unit over the next ten years.⁶⁴

3.3 **Forestry**⁶⁵

3.3.1 Unit 1

85. The Service has conducted an informal consultation with the United States Forest Service (USFS) in the past regarding a timber sale on land within the watershed of unit 1. The potential effects of the project to the elktoe were addressed through the implementation of stormwater/erosion control measures and the consultation did not result in any significant project modifications. Based on the past consultation history with the USFS on timber harvests, the Service is likely to continue to conduct informal consultations with the USFS

⁶¹ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002.

⁶² Interview with personnel from NCDOT on January 11, 2002; Information from NCDOT, *Transportation Information Program: 2002-2008*, <http://apps.dot.state.nc.us/quickfind/Tipsearch/default.html>, last viewed January 11, 2002.

⁶³ Personal communication with personnel from NCDOT, January 11, 2002, Information from NCDOT, *Transportation Information Program: 2002-2008*, <http://apps.dot.state.nc.us/quickfind/Tipsearch/default.html>, last viewed January 11, 2002.

⁶⁴ Personal Communication, Biologists, Asheville Field Office, U.S. Fish and Wildlife Service. November 11, 2001, November 16, 2001, and January 9, 2002; Personal communication with personnel from NCDOT, January 11, 2002, Information from NCDOT, *Transportation Information Program: 2002-2008*, <http://apps.dot.state.nc.us/quickfind/Tipsearch/default.html>, last viewed January 11, 2002.

⁶⁵ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on November 16, 2001.

in the future. However, timber sales have been declining, and the Service expects that this will cause a decrease in the rate of consultation with the USFS in the future. Therefore, one informal consultation is anticipated for timber sale activities over the next ten years.⁶⁶ The Forest Service also anticipates conducting one informal consultation on forest conservation activities over the next ten years.

3.3.2 Unit 3

86. The Nantahala National Forest makes up 88 percent of the land bordering the Cheoah River proposed for critical habitat. The USFS' management plan for this forest focuses on species protection, including protection for elktoe populations where they occur.⁶⁷ Although future timber sales may lead to consultations with the USFS, the Service does not anticipate any adverse impact from these activities. Therefore, future consultations with the USFS will likely remain informal. As noted above, timber sales have been declining, and as a result, the Service expects a decrease in the rate of informal consultations regarding timber sales. Therefore, one informal consultation is anticipated for timber sale activities over the next ten years. The Forest Service also anticipates conducting one informal consultation on forest conservation activities over the next ten years.⁶⁸

3.3.3 Unit 6

87. The USFS owns the land bordering the upper portion of the proposed critical habitat of the Nolichucky River. Approximately 67 percent, 9.0 river miles, of the Nolichucky River proposed for designation is bordered by the Pisgah National Forest in North Carolina and the Cherokee National Forest in Tennessee. The Service has conducted one informal consultation with the USFS in the past regarding a timber sale from this forest.⁶⁹ However, the consultation did not result in any project modifications because the area was distant from

⁶⁶ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on November 16, 2001; Personal Communication, U.S. Forest Service, January 7, 2002 and March 7, 2002.

⁶⁷ Personal Communication, U.S. Forest Service, January 7, 2002 and March 7, 2002.

⁶⁸ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on November 16, 2001; Personal Communication, U.S. Forest Service, January 7, 2002 and March 7, 2002.

⁶⁹ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on November 16, 2001.

the river. Based on this consultation history, the USFS is likely to initiate informal consultations in the future regarding timber sales. Due to a decline in timber sales within this area, the Forest Service anticipates one to two informal consultations for timber sale activities over the next ten years.⁷⁰ The Forest Service also anticipates conducting one to two informal consultations on forest conservation activities over the next ten years.

3.4 Mining⁷¹

88. Several gem and gravel mining operations are found within the proposed critical habitat. Permits for mining operations are issued by the State unless the operations involve wetlands and/or discharges to surface water bodies. Activities within wetlands may require a section 404 permit by ACOE, and thereby can involve a Federal nexus. Direct discharges can require a NPDES permit, issued by the State. Unless the State proposes to issue a NPDES permit that is not in compliance with State and Federal water quality standards or terms of the NPDES permit are violated, U.S. EPA does not become involved in individual permitting actions. Therefore, consultations regarding NPDES permits are unlikely. There have been no consultations regarding NPDES or ACOE permits for mining operations within the proposed critical habitat area. Therefore, future consultations regarding mining operations are unlikely. However, the Service has provided technical assistance to North Carolina to ensure that discharges are in compliance with the necessary permits. Therefore, the Service expects three to six instances of technical assistance in the future regarding permit compliance for mining operations.

89. Major mining operations involving feldspar, quartz, and mica take place on lands bordering unit 6. The Service has provided technical assistance to the State regarding a mining company's proposal to construct a new discharge at a mineral processing facility. However, the NPDES permit issued was in compliance with the State's water quality standards and was handled by the State. The Service does not anticipate consultations regarding these mining operations as long as any NPDES permit issued is in compliance with State and Federal water quality standards or unless any of the mining activities require an ACOE permit.

⁷⁰ Personal Communication, U.S. Forest Service, January 7, 2002 and March 7, 2002.

⁷¹ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on November 16, 2002; Interview with personnel from EPA, on January 4, 2002.

3.5 Development

90. Most of the land adjoining the proposed critical habitat units is currently undeveloped or sparsely developed. However, Macon, Transylvania, and Jackson counties are experiencing some growth pressure, due in part to a market for retirement and vacation homes.⁷² Based on the consultation history and conversations with ACOE personnel, this report forecasts five to ten residential development projects affecting unit 1, ten to 15 projects affecting unit 2, and five to ten projects affecting unit 4 will require informal consultations with the Army Corps of Engineers over the next ten years.⁷³
91. Residential housing developments in this area can range from eight to ten homes up to 100 to 200 homes (typically developments in the 100 to 200 homes range are associated with the development of a golf course).⁷⁴ However, most residential developments typically range from 30 to 40 homes.⁷⁵ Residential development projects planned in wetland areas require Federal Clean Water Act section 404 permits from the Army Corps of Engineers (ACOE), and thus have a Federal nexus.
92. This analysis projects that the Service will provide technical assistance on residential development projects on approximately 60 occasions over the next ten years, based on the past consultation and technical assistance record. Based on the development pressure Macon, Jackson, and Transylvania counties are facing, it is anticipated that the Service will provide technical assistance to projects on 15 occasions in each of units 1, 2 and 4, and on five occasions in each of units 3, 5, and 6.⁷⁶

⁷² Personal communication with U.S. Army Corps of Engineers, Asheville Regulatory Field Office, North Carolina, February 27, 2002.

⁷³ Personal communication with U.S. Army Corps of Engineers, Asheville Regulatory Field Office, North Carolina, January 7, 2002; Personal communication with Union County Planning Department, January 7, 2002; and past consultation history for the elktoe.

⁷⁴ Personal communication with U.S. Army Corps of Engineers, Asheville Regulatory Field Office, North Carolina, February 5, 2002.

⁷⁵ Personal communication with U.S. Army Corps of Engineers, Asheville Regulatory Field Office, North Carolina, February 5, 2002.

⁷⁶ Personal communication with U.S. Army Corps of Engineers, Asheville Regulatory Field Office, North Carolina, February 27, 2002.

3.6 Wastewater Treatment⁷⁷

93. One of the communities adjacent to unit 2, Whittier, is planning to expand its wastewater treatment operations, resulting in greater discharges to the Tuckasegee river, which will require a NPDES permit modification. However, the community of Whittier is considering UV treatment of its wastewater, with the goal of reducing the adverse effect of this discharge. Additionally, since the State of North Carolina issues NPDES permits, the project will not require consultation as long as the permit is in compliance with State and Federal water quality standards and no Federal permits are required. However, the Service may provide technical assistance on this project and, therefore, it is anticipated that one technical assistance occasion will occur over the next ten years.

3.7 Indian Lands⁷⁸

94. Unit 2 includes 26.0 river miles of the Tuckasegee River (Little Tennessee River system) running through Jackson County and Swain County, North Carolina. Small parcels of land bordering this unit are owned by the Eastern Band of Cherokee (EBC) and maintained for residential purposes and heritage preservation. The Service has consulted with the Bureau of Indian Affairs (BIA) in the past regarding a timber management plan and overall land use. Project plans included maintenance of forested buffers and sedimentation/erosion control measures and the Service concurred with a “not likely to adversely affect” determination. Since current plans are for preservation of the area, future development activities that might warrant consultations are unlikely.
95. The U.S. EPA issues NPDES permits for discharges from Indian lands in unit 2. EPA is expected to initiate two consultations in the future regarding the issuance of NPDES permits in this area. The Service does not anticipate an adverse impact from discharges in this area since the EBC has an advanced discharge facility that utilizes UV treatment and their discharge is located on a tributary upstream of the reach of unit 2 that is proposed for critical habitat designation and is separated from unit 2 by an impoundment. Therefore, the Service expects these consultations to remain informal. EPA also expects at least one additional consultation with the Service regarding the funding and/or approval of

⁷⁷ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on November 16, 2002; Interview with personnel from EPA, on January 4, 2002.

⁷⁸ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on November 16, 2002; Interview with personnel from EPA, on January 4, 2002

enhancement activities for a water delivery system in the area. The Service expects this consultation to remain informal as well.

3.8 Recreation and Conservation⁷⁹

96. Some recreational activities such as white-water rafting, canoeing, and fishing take place within most of the units, especially in units 1 and 2. In fact, these recreational activities provide an important source of income for many residents in the areas surrounding the proposed habitat area. However, a Federal nexus does not exist for these activities, and thus no consultations are expected over the next ten years. The Service does anticipate providing technical assistance on recreation and conservation activities over the next ten years. Based on the number of hydropower facility relicenses, past consultation history, and Service estimates, ten to 12 occasions of technical assistance are anticipated over the next ten years.

97. In addition, the U.S. Department of Agriculture (USDA) may be required to consult with the Service regarding beaver control activities within unit 1. Because beaver control has a positive effect on riverine mussel species, the Service expects that future consultations with the USDA, if any, will be informal.

3.9 Agricultural Activities⁸⁰

98. Most of the private land bordering the designated habitat is rural in character, including farming and grazing. The Service is working with some ranchers to install fences along river banks and to provide alternative water sources or river access points for livestock where needed. However, this is done on a voluntary basis, since there is no Federal nexus for any of these agricultural activities. The Service anticipates engaging in similar agricultural technical assistance activities on three to six occasions over the next ten years.

⁷⁹ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on November 16, 2002; Interview with personnel from USDA, on January 16, 2002.

⁸⁰ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on November 16, 2002.

3.10 EPA Programmatic Consultations⁸¹

99. EPA is expected to consult with the Service regarding State water quality standards (WQS) under the Clean Water Act. Each State has to re-open its WQS every three years for EPA review and approval. Changes can take place within this three-year period that necessitate promulgation of new standards. Once promulgated, the State has responsibility and authority to issue permits for activities covered by the standard. Over the next ten years, EPA expects nine consultations per State regarding the WQS. Past consultations regarding WQS have remained informal, and the Service expects future consultations to remain informal.

3.11 Summary of Impacts

100. Exhibit 3-1 summarizes the potential for consultations and other impacts regarding activities affecting the elktoe and its proposed critical habitat. Importantly, these estimates reflect the consultation and technical assistance profiles associated with the geographic areas proposed for designation having a Federal nexus, regardless of whether these actions can be attributed co-extensively to the listing. As a result, these estimates are an upper-bound measure of the impacts associated with the proposed designation.
101. The next chapter provides estimates of the expected economic costs of these consultations, as well as forecast modifications.

⁸¹ Interview with personnel from EPA, on January 4, 2002.

Exhibit 3-1					
UPPER-BOUND ESTIMATE OF TOTAL CONSULTATIONS AND TECHNICAL ASSISTANCE ASSOCIATED WITH ACTIVITIES AFFECTING THE APPALACHIAN ELKTOE AND ITS PROPOSED CRITICAL HABITAT (TEN YEARS)					
Landowner or Manager	Current or Future Activities	Federal Nexus	Technical Assistance*	Future Consultations*	
				Formal	Informal
Private landowners	Relicensing of hydropower facilities	FERC	22	0	9
	Wastewater treatment	EPA NPDES permit	1	0	0
	EPA programmatic consultations	EPA oversight	n/a	0	18
	Road and bridge construction	DOT funding	n/a	4	13-14
	Mining		3-6	0	0
	Development	Section 404 Permit	60	0	20-35
	Recreation and Conservation	EPA oversight	10-12	0	2
	Agriculture		3-6	0	0
U.S. Forest Service	Commercial forestry	Federal land ownership	n/a	0	3-4
	Conservation activities	Federal land ownership	n/a	0	3-4
Indian Land	EPA programmatic consultations	EPA oversight	n/a	0	3
TOTAL			99-107	4	71-89
Sources: Personal communications with Service biologists and relevant Federal agencies, December 2001, January 2002, February 2002.					
* Note: Any potential future consultation or other impact attributable to critical habitat presumes a pre-existing Federal nexus as identified in the preceding column.					

**ESTIMATED COSTS OF SECTION 7 ACTIVITIES
FOR THE APPALACHIAN ELKTOE**

SECTION 4

102. This section presents the expected total economic cost of actions taken under section 7 of the Act associated with the geographic area proposed as critical habitat for the elktoe. First, this section defines the types of economic impacts likely to be associated with the proposed habitat, regardless of whether these impacts can be attributed co-extensively to other causes, such as the listing. Next, the analysis presents estimates of the number of technical assistance efforts, consultations, and project modifications that are likely to result from the designation of critical habitat for the elktoe and/or the listing, as well as the per-unit costs of each of these activities. Based on these estimates, a total cost estimate is derived. Finally, the costs attributable solely to the designation of critical habitat are evaluated.

103. It is important to note that the listing of the elktoe as endangered under the Act may have in the past, and continue to, result in impacts on land use activities that are not associated with section 7. For example, section 9 of the Act prohibits take of an endangered species, and section 10 outlines permitting procedures for entities whose activities do not involve a Federal nexus. Economic costs associated with these impacts are not included in this analysis because they are not associated with critical habitat.

4.1 Categories of Economic Impacts Associated with Section 7 Implementation

104. The following section provides an overview of the categories of economic impacts that are likely to arise due to the implementation of section 7 in the geographic area proposed as critical habitat for the elktoe.

4.1.1 Technical Assistance

105. Frequently, the Service responds to requests for technical assistance from State agencies, local municipalities, and private landowners and developers who may have questions regarding whether specific activities may affect critical habitat. Technical assistance costs represent the estimated economic costs of informational conversations between these entities and the Service regarding the designation of critical habitat for the elktoe. Most likely, such conversations will occur between municipal or private property owners and the Service regarding lands designated as critical habitat or lands adjacent to critical habitat. The Service's technical assistance activities are voluntary and occur in instances where a Federal nexus does not exist.

4.1.2 Section 7 Consultations

106. Section 7(a)(2) of the Act requires Federal agencies (Action agencies) to consult with the Service whenever activities that they undertake, authorize, permit, or fund may affect a listed species or designated critical habitat. There are scenarios under which the designation of critical habitat can result in section 7 consultations with the Service beyond those required by the listing. These include:

- New consultations, which can occur when activities involving a Federal nexus are proposed in critical habitat not thought to be currently occupied by the species; and
- Re-initiations of consultations, which result when consultations that previously occurred under the listing are re-initiated due to new information or circumstances generated by the designation.

107. In some cases, consultations will involve the Service and another Federal agency only, such as the U.S. Forest Service. More often, they will also include a third party involved in projects on non-Federal lands with a Federal nexus, such as State agencies and private landowners.

108. During a consultation, the Service, the Action agency, and the landowner/manager applying for Federal funding or permitting (if applicable) communicate in an effort to avoid/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, the potential effects to the species and designated critical

habitat associated with the activity that has been proposed, the Federal agency, and whether there is a private applicant involved.

109. Section 7 consultations with the Service may be either informal or formal. *Informal consultation*, which consists of informal discussions between the Service, the Action agency, and the applicant concerning an action that may affect a listed species or its designated critical habitat, is 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 the proposed action is likely to adversely affect the listed species or designated critical habitat in ways that cannot be resolved through informal consultation. Regardless of the type of consultation or proposed project, section 7 consultations can require substantial administrative effort on the part of all participants.

4.1.3 Project Modifications

110. The section 7 consultation process may generate modifications to a proposed project. These modifications may be agreed upon by the Action agency and the applicant and included in the project description as avoidance and minimization measures, or they may be included in the Service's biological opinion on the proposed action as discretionary conservation measures to assist the Federal agency in meeting their obligations under section 7(a)(1) of the Act.⁸² In some cases, the Service may determine that the project is likely to jeopardize the continued existence of the species and/or destroy or adversely modify its designated critical habitat. In these cases the Service will include reasonable and prudent alternatives to the proposed project. Reasonable and prudent alternatives are typically developed by the Service in cooperation with the Action agency and, when applicable, the applicant. Alternatively, the Action agency can develop their own reasonable and prudent alternatives, or seek an exemption for the project. All project modifications have the potential to impose some costs on the Action agency and/or the applicant.

⁸² Section 7(a)(1) requires Federal agencies to utilize their authorities to further the purposes of the Act by carrying out programs for the conservation of listed species.

4.2 Estimated Costs of Consultations and Technical Assistance

111. Estimates of the cost of an individual consultation were developed from a review and analysis of historical section 7 files from a number of Service field offices around the country. These files addressed consultations conducted for both listings and critical habitat designations. Cost figures were based on an average level of effort for consultations of low, medium, or high complexity, multiplied by the appropriate labor rates for staff from the Service and other Federal agencies.
112. Estimates take into consideration the level of effort of the Service, the Action agency, and the applicant during both formal and informal consultations, as well as the varying complexity of consultations. Informal consultations are assumed to involve a low to medium level of complexity. Formal consultations are assumed to involve a medium to high level of complexity. Costs associated with these consultations include the administrative costs associated with conducting the consultation, such as the cost of time spent in meetings, preparing letters, and in some cases, developing a biological assessment and biological opinion.
113. Cost estimates for technical assistance are based on analysis of past technical assistance efforts provided by the Asheville, NC, and Cookeville, TN Field Offices. The Service's protocol in North Carolina and Tennessee is to send any entity proposing development activity a letter listing the endangered, threatened, and proposed endangered/threatened species that are likely or known to exist in the county. In many cases, the Action agency can immediately demonstrate that the activity will have no effect on the species or habitat, and no further action is needed. This analysis considers these interactions to be technical assistance if they do not lead to further consultation between the Service, the Action agency, and/or the third party. Technical assistance costs represent the estimated economic costs of informational communications, letters and meetings between landowners or managers and the Service regarding the designation of critical habitat for the elktoe. Most likely, such conversations will occur between municipal or private property owners and the Service regarding areas designated as critical habitat or lands adjacent to critical habitat. Costs associated with these efforts include the opportunity cost of time spent in writing and conversation, as well as staff costs by involved parties.
114. Per-effort costs associated with formal consultations, informal consultations, and technical assistance calls are presented in Exhibit 4-1. The low and the high scenarios represent a reasonable range of costs for each type of interaction. For example, when the Service participates in technical assistance with a third party regarding a particular activity, the cost of the Service's effort is expected to be approximately \$260 to \$680. The cost of the third party's effort is expected to be approximately \$600 to \$1500.

Exhibit 4-1						
ESTIMATED ADMINISTRATIVE COSTS OF CONSULTATION AND TECHNICAL ASSISTANCE FOR THE ELKTOE (PER EFFORT)						
Critical Habitat Impact	Scenario	Service	Action Agency	Third Party	Biological Assessment	Total Cost
Technical Assistance Effort	<i>Low</i>	\$260	\$0	\$600	\$0	\$860
	<i>High</i>	\$680	\$0	\$1,500	\$0	\$2,180
Informal Consultation	<i>Low</i>	\$1,000	\$1,300	\$1,200	\$0	\$3,500
	<i>High</i>	\$3,100	\$3,900	\$2,900	\$4,000	\$13,900
Formal Consultation	<i>Low</i>	\$3,100	\$3,900	\$2,900	\$4,000	\$13,900
	<i>High</i>	\$6,100	\$6,500	\$4,100	\$5,600	\$22,300

Notes: Low and high estimates primarily reflect variations in staff wages and time involvement by staff. Technical assistance calls also have educational benefits to the landowner or manager and to the Service.

Sources: IEc analysis based on data from the Federal Government General Schedule Rates, 2002, Office of Personnel Management, and level of effort information from Biologists in the U.S. Fish and Wildlife Service, Asheville, NC and Cookeville, TN Fish and Wildlife Offices.

Note: Third parties are defined as State agencies, local municipalities, and private parties.

Note: Costs may not sum due to rounding.

115. Exhibit 4-2 reports estimates of total consultation costs associated with activities with the potential to affect the elktoe or its proposed critical habitat. Exhibit 4-3 reports technical assistance and consultation costs by critical habitat unit. These estimates were generated by multiplying the number of expected consultations or technical assistance calls (shown in Exhibit 3-1) by the per effort cost of these actions.

116. Based on this analysis, the upper-bound total cost of consultations, attributing all future consultation costs solely to the critical habitat designation for the elktoe, will range from \$373,000 to \$1,181,000. The Federal government will incur approximately half of the costs (\$217,000 to \$746,000), with the Service incurring costs of \$109,000 to \$373,000 and other Federal agencies incurring costs of \$108,000 to \$373,000. Upper-bound costs of consultation on the elktoe and designated critical habitat to the States of North Carolina, Tennessee, local municipalities, and private landowners/managers may range from \$156,000 to \$435,000 over the next ten years.

Exhibit 4-2

**ESTIMATED TOTAL CONSULTATION COSTS ATTRIBUTABLE TO
POTENTIAL FUTURE SECTION 7 CONSULTATIONS ON THE ELKTOE
AND DESIGNATION OF CRITICAL HABITAT FOR THE ELKTOE
(TEN YEARS)**

Action	Range	Costs to the Service	Costs to Other Federal Agencies	Costs to Third Parties	Total Costs
Technical Assistance	<i>Low</i>	\$26,000	\$0	\$59,000	\$85,000
	<i>High</i>	\$73,000	\$0	\$161,000	\$234,000
Informal Consultation	<i>Low</i>	\$71,000	\$92,000	\$85,000	\$248,000
	<i>High</i>	\$276,000	\$347,000	\$258,000	\$881,000
Formal Consultation	<i>Low</i>	\$12,000	\$16,000	\$12,000	\$40,000
	<i>High</i>	\$24,000	\$26,000	\$16,000	\$66,000
Total	<i>Low</i>	\$109,000	\$108,000	\$156,000	\$373,000
	<i>High</i>	\$373,000	\$373,000	\$435,000	\$1,181,000

Note: Third parties are defined as State agencies, local municipalities, and private parties.

Sources: IEC analysis based on data from the Federal Government General Schedule Rates, 2002, Office of Personnel Management, and information from biologists in the U.S. Fish and Wildlife Service, Asheville, NC and Cookeville, TN Field Offices.

Note: Costs may not sum due to rounding.

Exhibit 4-3					
ESTIMATED SECTION 7 TECHNICAL ASSISTANCE AND CONSULTATION COSTS FOR THE ELKTOE BY CRITICAL HABITAT UNIT (TOTAL OVER TEN YEARS)					
Land Use Activity		Informal Consultations^a	Formal Consultations^a	Total Costs	
Unit 1	Total Efforts	13 - 18	1	14 - 19	
	Total Cost of Efforts	\$46,000 - \$250,000	\$12,400 - \$15,600	\$60,000 - \$272,000	
Unit 2	Total Efforts	24 - 30	0	24 - 30	
	Total Cost of Efforts	\$84,000 - \$417,000	\$0	\$84,000 - \$417,000	
Unit 3	Total Efforts	9	0	9	
	Total Cost of Efforts	\$32,000 - \$125,000	\$0	\$32,000 - \$125,000	
Unit 4	Total Efforts	9 - 14	0	9 - 14	
	Total Cost of Efforts	\$32,000 - \$195,000	\$0	\$32,000 - \$195,000	
Unit 5	Total Efforts	11	1	12	
	Total Cost of Efforts	\$39,000 - \$153,000	\$14,000 - \$22,000	\$53,000 - \$175,000	
Unit 6	Total Efforts	5 - 7	2	7 - 9	
	Total Cost of Efforts	\$18,000 - \$97,000	\$28,000 - \$45,000	\$46,000 - \$142,000	
Subtotal of Informal and Formal Consultation Costs		71 - 89	4	75 - 93	
		\$251,000 - \$1,237,000	\$56,000 - \$89,000	\$307,000 - \$1,326,000	
Technical Assistance ^b				99 - 107	
				\$85,000 - \$234,000	
Total Number and Costs of Technical Assistance and Consultations		71 - 89	4	174 - 200	
		\$251,000 - \$1,237,000	\$56,000 - \$89,000	\$392,000 - \$1,559,000	
^a This analysis assumes that all of the consultations will involve costs to the Service, an Action agency, and a third party.					
^b Many of the technical assistance costs cannot be attributed to individual units. As such, total technical assistance costs have been reported separately.					
Note: Costs may not sum due to rounding.					

4.3 Estimated Number and Costs of Project Modifications

117. This analysis provides estimates of the number and cost of several types of project modifications that may occur as a result of consultations associated with the elktoe. The project modifications considered in this section reflect the types of modifications that have occurred as a result of past informal and formal consultations involving the elktoe.⁸³ It should be noted, however, that potential project modifications associated with hydropower facilities derive from what is commonly required under the FPA. Furthermore, many of the erosion and stormwater control project modifications derive from requirements pursuant to the North Carolina Sedimentation Pollution Control Act. Therefore, the cost of these project modifications cannot be attributed solely to the listing or designation for the elktoe because of the baseline requirements of these Federal and State regulations.⁸⁴ By including these costs in this analysis, the resultant total cost estimate is a very conservative estimate (i.e., more likely to overstate than understate costs) of the total economic impact of section 7 for the elktoe. Furthermore, this analysis does not consider potential short- and long-term cost savings associated with implementation of measures for the protection of stream habitat and conservation of the elktoe.

4.3.1 **Modifications Associated with Informal Consultations**

118. Informal consultations may generate certain types of minor project modifications. Most commonly, the Service recommends that the applicant institute erosion control and stormwater management measures and make minor design changes in order to protect the elktoe. Based on the consultation history for the elktoe, this analysis assumes that future informal consultations will result in the following categories of project modifications:

- **Erosion and Stormwater Control Measures.**⁸⁵ In order to ensure water quality, a primary constituent element for the elktoe, the Service often requests that the Action agency and/or the applicant install and maintain erosion and sediment control measures. Erosion and stormwater control measures may include providing buffer zones along stream banks, soil grading, seeding and/or mulching, limiting earth-moving activities, and time-of-year restrictions. These types of project modifications are typically included within erosion and sedimentation control plans pursuant to the

⁸³ Based on analysis of the consultation history since 1996 that consider the elktoe.

⁸⁴ Refer to section 2.2.3 for details on this baseline.

⁸⁵ Personal Communication with Biologists, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, March 15, 2002.

North Carolina Sedimentation Pollution Control Act. Furthermore, the CWA and State regulations require avoidance, minimization, and mitigation of avoidable impacts to streams and wetlands. Therefore, the cost of these project modifications cannot be attributed solely to the listing or designation of critical habitat for the elktoe because of these baseline requirements.⁸⁶ For example, time-of-year restrictions rarely result in additional erosion control costs and may reduce costs associated with maintenance, and possibly construction, of structural erosion control measures. The Service typically requests time-of-year restrictions that limit clearing and grubbing activities to the growing season so that cleared areas can be re-stabilized with vegetation, and/or monitoring turbidity levels to ensure compliance with State water quality standards for turbidity levels. The following categories of activities are likely to involve erosion and stormwater control measures:

(1) Road and bridge construction. Road and bridge construction projects with a FWHA nexus typically require erosion controls. The North Carolina Department of Transportation estimates that 75 percent of informal consultations related to bridge construction will lead to erosion control modifications beyond those required to comply with the North Carolina Sedimentation Pollution Control Act, and that these actions will cost \$20,000 to \$30,000 per river crossing.⁸⁷ Modifications for road construction projects may range from \$30,000 to \$50,000, depending on the extent of modifications and the length of the road. Such modifications are typically undertaken to avoid/minimize effects to streams and wetlands, which can yield savings on project costs. For instance, a project change that reduces the amount of wetland or stream alteration reduces mitigation costs that are required under the Clean Water Act and State regulations. Stream mitigation costs run approximately \$150/linear foot.⁸⁸ Typical highway construction projects can involve miles of stream impacts, costing millions of dollars in mitigation costs, so avoidance/minimization measures can result in substantial savings to the applicant that help to offset the cost of implementing

⁸⁶ Refer to section 2.2.3 for details on this baseline.

⁸⁷ Personal communication with North Carolina Department of Transportation, December 21, 2001 and January 11, 2002.

⁸⁸ Personal Communication with Biologists, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, March 15, 2002.

these measures.⁸⁹ The costs of modifications to road/bridge construction projects are likely to be borne by NCDOT, TNDOT, and/or the FHWA.

(2) Hydropower relicensing.⁹⁰

- Erosion and Stormwater Control Measures. Pursuant to the North Carolina Sedimentation Pollution Control Act, hydropower facility owners will likely need to implement erosion controls during the relicensing process. FERC estimates that 100 percent of informal consultations related to hydropower relicensing activities will lead to erosion control modifications in the range of \$30,000 to \$45,000. The cost of these erosion control measures will be borne by the hydropower facility owners/operators.
- Implementation and maintenance of minimum flows. Pursuant to North Carolina State regulations, all hydropower projects are required to maintain minimum flows of ten cfs.⁹¹ The Service plans to request the implementation and maintenance of at least 20 cfs minimum flows at each of the hydropower facilities bordering the proposed designation for the elktoe.⁹² The implementation of these modifications will likely cost from \$50,000 to \$65,000 per facility.⁹³ The cost of these modifications will also be borne by the hydropower facility owners/operators.

⁸⁹ Personal Communication with Biologists, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, March 15, 2002.

⁹⁰ Information on Hydropower project modifications was taken from the information on a another hydropower facility relicensing on the Pigeon River in North Carolina and Tennessee. River Renewal: Mitigation Packages, Hydropower Tool Kit, American Rivers Association, <http://www.amrivers.org/hydropowertoolkit/rmitpackages2.htm>.

⁹¹ Personal Communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, January 9, 2002.

⁹² Personal Communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, January 9, 2002.

⁹³ River Renewal: Mitigation Packages, Hydropower Tool Kit, American Rivers Association, <http://www.amrivers.org/hydropowertoolkit/rmitpackages2.htm>.

- Fish passageways. Pursuant to section 18 of the Federal Power Act, the Service has authority to prescribe fish passageways as necessary to protect species and their habitats.⁹⁴ The cost of fish passageways varies depending on the type of passageway desired or required. However, the Service designs fish passageways in the most cost effective and efficient manner to protect the species within the area of dams. The Service expects to prescribe fish passageways for all of the run-of-river hydropower dams within and surrounding the proposed critical habitat for the elktoe in order to provide for upstream passage of fish species.⁹⁵ However, since none of these fish are listed species, the cost of fish passageways may not be attributed to the listing or designation of critical habitat for the elktoe.⁹⁶

(3) Residential Development. The Service typically does not request erosion and sedimentation control for residential development activities beyond what is required pursuant to the North Carolina Sedimentation Pollution Control Act, but does typically request long-term stormwater control measures to protect the hydrology and water quality of the stream, that may go beyond those currently required by other regulations.⁹⁷ The ACOE estimates that 75 percent of stream and wetland fill projects associated with residential housing developments, as permitted by the Army Corps of Engineers, will involve stormwater control measures costing approximately \$1,000 per home or \$30,000 to \$40,000 per development, assuming a typical development will involve construction of 30 to 40 new homes and depending on the type of controls used.⁹⁸ For stormwater/erosion control for a large development project, the Service typically requests such measures as reduced paved road widths, elimination

⁹⁴ Personal Communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, April 19, 2002.

⁹⁵ Personal Communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, April 19, 2002.

⁹⁶ Personal Communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, April 19, 2002.

⁹⁷ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on March 15, 2002.

⁹⁸ Personal communication with U.S. Army Corps of Engineers, Asheville Regulatory Field Office, North Carolina, February 27, 2002.

of curb and gutter, maintenance of forested buffers, construction of rain gardens or other permeable areas as opposed to retention basins/ponds.⁹⁹

Housing developments can contain any number of homes, but they typically contain 30 to 40 units. As such, it is expected that 15 to 26 projects, involving construction of 30 to 40 homes each, will require additional stormwater controls at a cost of \$450,000 to \$1,040,000 over the next ten years. These costs are likely to be borne by the third party (i.e., the real estate developer). However, it should be noted that implementation of stormwater control measures such as reduced paved road widths and elimination of curb and gutter can result in substantial savings in paving and construction costs.¹⁰⁰ Furthermore, along with other stormwater measures (such as rain gardens and vegetated buffers), these stormwater control measures can eliminate the need for, and the cost of, construction of stormwater basins or other more traditional stormwater control structures that are generally used to maintain compliance with State and local sedimentation/erosion and stormwater control requirements.

- **Design Changes.** During the consultation process, the applicant may make changes in project plans in order to reduce impacts on the elktoe and its habitat. Future design changes are dependent on the nature and location of future projects, and the point in project planning when consultation is initiated.¹⁰¹ They are thus difficult to predict. This analysis assumes that design changes may occur in all types of projects, and that any deviation from the original plan is likely to involve some cost to the applicant. Action agencies anticipate that 30 percent of road and bridge construction projects will require design changes, and that altering project plans will represent a minor per-project cost, ranging from \$5,000 to \$10,000.¹⁰²

⁹⁹ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on March 15, 2002.

¹⁰⁰ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on March 15, 2002.

¹⁰¹ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on March 15, 2002.

¹⁰² Personal communication with North Carolina Department of Transportation, December 21, 2001; U.S. Army Corps of Engineers, Asheville Regulatory Field Office, North Carolina, January 7, 2002.

- **Conservation Measures.** Past consultations with the Forest Service regarding timber sales and conservation activities have involved conservation measures, such as designation of buffer zones and retainage of basal area in proposed harvest areas. Based on conversations with the Service and the U.S. Forest Service, half of the informal consultations involving timber harvests on Federal land are expected to require modification to meet similar erosion control guidelines.¹⁰³ However, according to the Forest Service, logging is rarely planned in riparian zones and the Forest Service automatically implements a 100 foot buffer on all streams pursuant to its Land Resource Management Plans for the forests.¹⁰⁴ Therefore, no additional conservation measures are expected as a result of either the listing of the elktoe or proposed designation of critical habitat.

4.3.2 Modifications Associated with Formal Consultations

119. The following list includes project modifications that are likely to be generated as a result of formal consultations on the elktoe and proposed critical habitat, based on conversations with the Service and Action agencies.
120. During formal consultation the Service assesses the effects to a species and/or critical habitat that cannot or were not addressed through informal consultation. If, as a result of formal consultation, the determination of the Service's biological opinion is "not likely to jeopardize the species and/or destroy or adversely modify designated critical habitat," the Service may request additional project changes either as discretionary "conservation measures" or as "reasonable and prudent measures (RPMs)" to minimize the effects of take to the species that may occur incidental to the project.¹⁰⁵ However, RPMs cannot change the scope, duration, or timing of the project and so it is unlikely they would involve project modifications. Rather, they typically involve relocation of the species out of an area where it is likely to be taken, and habitat protection and enhancement/restoration. The purpose of RPMs is to minimize the effects of take of the species.

¹⁰³ Personal communication with U.S. Forest Service, March, 2002 and with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on November 16, 2002.

¹⁰⁴ Personal communication with U.S. Forest Service, March, 2002.

¹⁰⁵ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on March 15, 2002.

Development and Road Construction/Maintenance Activities

- **Stormwater Control Measures.** In the context of formal consultations, the Service may request that the applicant implement additional stormwater control measures. Furthermore, N.C. DOT anticipates needing to implement erosion and control measures in excess of measures required by State regulations.¹⁰⁶ Since these are additional measures to minimize the direct and indirect effects of the project they are likely to be more costly than the erosion control measures suggested during informal consultation. Therefore, it is estimated that these measures will be \$40,000 to \$100,000 per project.¹⁰⁷
- **Water Quality Monitoring.** In order to ensure that the recommended erosion and stormwater control measures are adequate for protecting the elktoe and its critical habitat, the Service may request that the applicant monitor water quality at the project site for the duration of the project, and possibly for a period after the completion of the project. Monitoring activities may involve visual observations by agency personnel, installing sampling devices, operating gaging stations, and funding monitoring personnel. The Service and Action agencies expect that this monitoring will represent a minor per-project cost for future formal consultations, ranging from \$5,000 to \$30,000.¹⁰⁸
- **Habitat Protection, Restoration, and Enhancement.** Habitat protection, restoration, and enhancement projects may be conducted to help offset the loss of habitat and/or incidental take of species associated with the project and/or to help reduce the potential secondary and cumulative effects of the action. The Service estimates that these modifications may cost from \$0 to \$200,000 per project.¹⁰⁹

¹⁰⁶ Personal Communication, North Carolina Department of Transportation, North Carolina, January 11, 2002.

¹⁰⁷ Personal communication with North Carolina Department of Transportation, December 21, 2001 and January 11, 2002.

¹⁰⁸ Personal communication with North Carolina Department of Transportation, December 21, 2001.

¹⁰⁹ Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, November 30, 2001; Personal Communication with North Carolina Department of Transportation, December 21, 2001.

121. Based on discussions with the Service and various Action agencies, this analysis assumes that 100 percent of future formal consultations with the FHWA will require additional project modifications for erosion and stormwater control, water quality monitoring, and habitat restoration and enhancement.
122. Exhibit 4-4 presents per-effort estimates of total project modification costs associated with section 7 activities affecting the elktoe. Exhibits 4-5 and 4-6 present estimates of total project modification costs associated with section 7 activities affecting the elktoe. Exhibit 4-7 presents the project modifications for the elktoe by unit and type of modification.

Exhibit 4-4					
ESTIMATED ECONOMIC COSTS ASSOCIATED WITH POTENTIAL PROJECT MODIFICATIONS (PER PROJECT)					
Potential Project Modification (per project)	Activity	Informal		Formal	
		Low	High	Low	High
Erosion and Stormwater Control Measures	Residential development	\$30,000	\$40,000	n/a	n/a
	Hydropower relicensings	\$80,000	\$110,000	n/a	
	Road and bridge construction	\$20,000	\$50,000	\$40,000	\$100,000
Design Changes	Road and bridge construction	\$5,000	\$10,000	n/a	n/a
Water Quality Monitoring	Road and bridge construction	n/a	n/a	\$5,000	\$30,000
Habitat Restoration and Enhancement	Road and bridge construction	n/a	n/a	\$0	\$200,000
Source: Based on IEC review of past Biological Opinions and information from Service biologists, Asheville, NC and Cookeville, TN Field Offices.					
Note: Costs may not sum due to rounding.					

Exhibit 4-5				
ESTIMATED SECTION 7 PROJECT MODIFICATION COSTS FOR THE ELKTOE INFORMAL CONSULTATIONS (TOTAL OVER TEN YEARS)				
Types of Project Modifications	Land Use Activity Affected	Per-Effort Cost of Project Modification	Number of Consultations Recommending Modification	Total Costs of Project Modifications
Erosion and Stormwater Control	Road/Bridge Construction	\$20,000 - \$50,000	10 - 11	\$200,000 - \$550,000
	Residential Development	\$30,000 - \$40,000	15 - 26	\$450,000 - \$1,040,000
	Hydropower Relicensing	\$80,000 - \$110,000	9	\$720,000 - \$990,000
Design Changes	Road/Bridge Construction	\$5,000 - \$10,000	4	\$20,000 - \$40,000
Total Costs of Project Modifications				\$1,390,000 - \$2,620,000
Note: Costs may not sum due to rounding.				

Exhibit 4-6				
ESTIMATED SECTION 7 PROJECT MODIFICATION COSTS FOR THE ELKTOE FORMAL CONSULTATIONS (TOTAL OVER TEN YEARS)				
Types of Project Modifications	Land Use Activity Affected	Per-Effort Cost of Project Modification	Number of Consultations Recommending Modification	Total Costs of Project Modifications
Erosion and Stormwater Control	Road/Bridge Construction	\$40,000 - \$100,000	4	\$160,000 - \$400,000
Water Quality Monitoring	Road/Bridge Construction	\$5,000 - \$30,000	4	\$20,000 - \$120,000
Habitat Restoration and Enhancement	Road/Bridge Construction	\$0 - \$200,000	4	\$0 - \$800,000
Total Costs of Project Modifications				\$180,000 - \$1,320,000
Note: Costs may not sum due to rounding.				

123. In order to arrive at an estimate of total costs of future project modifications likely to be recommended as a result of section 7 activities for the elktoe, this analysis assumes that some percentage of the total consultations for each activity will result in modifications. The total number of consultations likely to recommend project modifications are calculated by multiplying the total number of consultations for each activity (Exhibit 3-1) by the percentage of consultations recommending the modifications for each activity as follows:

- Residential Development (informal): 75% (15 - 26 consultations)
- Road/Bridge Construction (informal): 75% (10 - 11 consultations); (formal): 100% (4 consultations).
- Hydropower (informal): 100% (9 consultations).
- Design changes (Road/Bridge Construction only): (informal) 30 %.

124. To calculate the number of consultations likely to recommend project modifications by unit, a weighted average of the above results was used to accurately associate future consultations with the relative size of each unit:

- Residential Development: Unit 1, 25% (4 - 7 consultations); Unit 2, 50% (7 - 12 consultations); Unit 4, 25% (4 - 7 consultations).

- Hydropower Facilities (100%): Unit 1 (1); Unit 2 (4); Unit 3 (3); Unit 4 (1).
- Road Construction: Unit 2, 30% (3 consultations); Unit 3, 8% (1 consultations); Unit 5, 62% (6 - 7 consultations).
- Formal Road/bridge Consultations: Unit 1 (1 consultations), Unit 5 (1 consultations), Unit 6 (2 consultations).

Exhibit 4-7			
ESTIMATED SECTION 7 PROJECT MODIFICATION COSTS FOR THE ELKTOE BY CRITICAL HABITAT UNIT (TOTAL OVER TEN YEARS)			
Unit Affected	Consultations Recommending Modification	Types of Project Modifications	Total Costs of Project Modifications
Unit 1	6 - 9	Erosion/Stormwater Controls	\$240,000 - \$490,000
	1	Water Quality Monitoring	\$5,000 - \$30,000
	1	Habitat Restoration and Enhancement	\$0 - \$200,000
Unit 2	14 - 19	Erosion/Stormwater Controls	\$590,000 - \$1,070,000
	1	Design Changes	\$5,000 - \$10,000
Unit 3	4	Erosion/Stormwater Controls	\$260,000 - \$380,000
	1	Design Changes	\$5,000 - \$10,000
Unit 4	5 - 8	Erosion/Stormwater Controls	\$200,000 - \$390,000
Unit 5	7 - 8	Erosion/Stormwater Controls	\$160,000 - \$450,000
	2	Design Changes	\$10,000 - \$20,000
	1	Water Quality Monitoring	\$5,000 - \$30,000
	1	Habitat Restoration and Enhancement	\$0 - \$200,000
Unit 6	2	Erosion/Stormwater Controls	\$80,000 - \$200,000
	2	Water Quality Monitoring	\$10,000 - \$60,000
	2	Habitat Restoration and Enhancement	\$0 - \$400,000
Total Costs of Project Modifications			\$1,570,000 - \$3,940,000
Note: Costs may not sum due to rounding.			

4.3.3 Estimated Total Costs of Project Modifications

125. Exhibit 4-8 presents estimates of total expected project modification costs associated with section 7 activities affecting the elktoe. These cost estimates were calculated by multiplying the number of expected consultations likely to require modifications by the per-effort cost of these actions. As previously noted, this analysis assumes that 75 percent of informal consultations and 100 percent of formal consultations on development and road and bridge construction projects, plus 100 percent of hydropower relicensing projects, will require modifications. It also assumes that programmatic consultations and consultations with Action agencies other than FERC, ACOE, and DOT will not lead to modifications. Based on the number of future consultations and per-project costs identified previously, the upper-bound total cost of modifications attributable to potential future consultations on the elktoe and designated critical habitat is estimated to range from \$1,390,000 to \$2,620,000 for informal consultations and from \$180,000 to \$1,320,000 for formal consultations over the next ten years.

4.4 Data Limitations

126. Rather than generating speculative estimates of the cost of potential modifications to specific projects, this analysis models modifications to average, or “typical”, projects likely to affect the elktoe and proposed critical habitat for the species. Actual modification costs for specific projects could vary significantly from these forecast averages according to the specific characteristics of individual projects and consultation outcomes.

4.5 Total Section 7 Costs

127. The cost estimates presented in Exhibit 4-9 are a function of the assumed number of technical assistance, consultations, and project modifications associated with activities with the potential to affect the elktoe or its proposed critical habitat, along with the per-effort costs outlined above. Based on this analysis, the total upper-bound estimate of section 7 costs associated with the listing and proposed critical habitat designation for the elktoe may range from \$1,943,000 to \$5,121,000.

Exhibit 4-8						
UPPER-BOUND ESTIMATE OF TOTAL PROJECT MODIFICATION COSTS ASSOCIATED WITH THE LISTING AND DESIGNATION OF CRITICAL HABITAT FOR THE ELKTOE (TEN YEARS)						
Action	Activity	Number of Consultations Requiring Modifications	Scenario	Project Modification Costs	Party Paying for Modifications	
Informal Consultation Project Modifications	Residential Development	15-26	<i>Low</i>	\$450,000	Private developers (third party)	
			<i>High</i>	\$1,040,000*		
	Road and Bridge Construction	10-11	10-11	<i>Low</i>	\$200,000	Department of Transportation (action agency)
				<i>High</i>	\$550,000	
		4	4	<i>Low</i>	\$20,000	
				<i>High</i>	\$40,000	
	Hydropower Relicensing	9	9	<i>Low</i>	\$720,000	Hydropower owners/operators
				<i>High</i>	\$990,000	
Total	34-46	34-46	<i>Low</i>	\$1,390,000		
			<i>High</i>	\$2,620,000		
Formal Consultation Project Modifications	Residential Development	0	<i>Low</i>	\$0	Private developers (third party)	
			<i>High</i>	\$0*		
	Road and Bridge Construction	4	4	<i>Low</i>	\$180,000	Department of Transportation (action agency)
				<i>High</i>	\$1,320,000	
	Total	4	4	<i>Low</i>	\$180,000	
				<i>High</i>	\$1,320,000	
Total Project Modification Costs		38 - 50	<i>Low</i>	\$1,570,000		
			<i>High</i>	\$3,940,000		
<p>Note: Third parties are defined as State agencies, local municipalities, and private parties.</p> <p>* The number of consultations requiring modifications is based on the assumption that 75 percent of informal consultations and 100 percent of formal consultations with ACOE and U.S. DOT, plus 100 percent of informal consultations with FERC, will require project modifications.</p> <p>Note: Costs may not sum due to rounding.</p> <p>Sources: IEc analysis based on data from the Federal Government General Schedule Rates, 2002, Office of Personnel Management, and information from biologists in the U.S. Fish and Wildlife Service, Asheville, NC and Cookeville, TN Field Offices.</p>						

4.6 Economic Impacts Associated Solely with the Designation of Critical Habitat

128. The cost estimates presented in Exhibit 4-9 are an indication of the total costs that may be associated with future potential section 7 consultations on the elktoe and its designated critical habitat over the next ten years. These represent costs likely to be incurred by the Service, Federal Action agencies, and non-Federal third parties for activities having a Federal nexus, which would require consultation under section 7 of the Act. However, the listing of the elktoe and the resultant Federal responsibility to avoid projects that would jeopardize the continued existence of the species is likely to trigger all of the impacts presented in the above analysis. Thus, for the following reasons, it is expected that all future consultations would occur absent critical habitat designation:

- The consultation history in North Carolina and Tennessee since the listing of the elktoe in 1996 indicates that the Service would consult on the same range of activities and would make the same recommendations in the absence of critical habitat designation.
- The Service considers all units proposed for critical habitat designation to be occupied by the elktoe, and all are identified as critical for the conservation of the species in the *Recovery Plan for the Appalachian Elktoe*. As described above, the Service's protocol in North Carolina and Tennessee under the listing is to send a letter identifying the elktoe to any entity proposing a development activity in a county containing known or likely habitat for the elktoe. This protocol ensures that the Service consults on the full range of activities with the potential to affect the elktoe under the jeopardy standard, and that critical habitat designation will not afford any significant additional regulatory protection.

129. Therefore, the technical assistance efforts, section 7 consultations, and project modifications presented in Exhibits 4-9 and 4-10 are likely to occur over the next ten years even if critical habitat is not designated. There are no additional anticipated costs associated with designation of critical habitat for the elktoe over those that may be associated with the listing of the elktoe under the ESA.

Exhibit 4-9						
TOTAL SECTION 7 COSTS ASSOCIATED WITH THE LISTING AND DESIGNATION OF CRITICAL HABITAT FOR THE ELKTOE (TEN YEARS)						
Critical Habitat Impacts	Scenario	Costs to the Service	Costs to the Action Agency	Costs to Third Parties	Total Section 7 Costs	Costs Associated Solely with Critical Habitat Designation
Technical Assistance	<i>Low</i>	\$26,000	n/a	\$59,000	\$85,000	\$0
	<i>High</i>	\$73,000	n/a	\$161,000	\$234,000	\$0
Informal Consultations	<i>Low</i>	\$71,000	\$92,000	\$85,000	\$248,000	\$0
	<i>High</i>	\$276,000	\$347,000	\$258,000	\$881,000	\$0
Formal Consultation	<i>Low</i>	\$12,000	\$16,000	\$12,000	\$40,000	\$0
	<i>High</i>	\$24,000	\$26,000	\$16,000	\$66,000	\$0
Informal Consultation Project Modifications	<i>Low</i>	\$0	\$200,000	\$1,170,000	\$1,390,000	\$0
	<i>High</i>	\$0	\$550,000	\$2,030,000	\$2,620,000	\$0
Formal Consultation Project Modifications	<i>Low</i>	\$0	\$180,000	\$0	\$180,000	\$0
	<i>High</i>	\$0	\$1,320,000	\$0	\$1,320,000	\$0
Total Costs	<i>Low</i>	\$109,000	\$488,000	\$1,326,000	\$1,943,000	\$0
	<i>High</i>	\$373,000	\$2,243,000	\$2,465,000	\$5,121,000	\$0

Source: Based on past consultation records and conversations with Federal agencies potentially affected by the proposed critical habitat designation. Costs may not sum due to rounding.

Exhibit 4-10					
TOTAL SECTION 7 COSTS ASSOCIATED WITH THE LISTING AND DESIGNATION OF CRITICAL HABITAT FOR THE ELKTOE BY UNIT (TEN YEARS)					
UNIT	Informal Consultations	Formal Consultations	Informal Consultations with Project Modifications	Formal Consultations with Project Modifications	Total Section 7 Costs
Unit 1	\$46,000 - \$250,000	\$14,000 - \$22,000	\$200,000 - \$390,000	\$45,000 - \$330,000	\$305,000 - \$992,000
Unit 2	\$84,000 - \$417,000	\$0	\$595,000 - \$1,080,000	\$0	\$679,000 - \$1,497,000
Unit 3	\$32,000 - \$125,000	\$0	\$265,000 - \$390,000	\$0	\$297,000 - \$515,000
Unit 4	\$32,000 - \$195,000	\$0	\$200,000 - \$390,000	\$0	\$232,000 - \$585,000
Unit 5	\$39,000 - \$153,000	\$14,000 - \$22,000	\$120,000 - \$350,000	\$45,000 - \$330,000	\$218,000 - \$855,000
Unit 6	\$18,000 - \$97,000	\$28,000 - \$45,000	\$0	\$90,000 - \$660,000	\$136,000 - \$802,000
Note: Costs may not sum due to rounding.					

4.7 Potential Impacts on Small Businesses

130. Under the Regulatory Flexibility Act (as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever a Federal agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions).¹¹⁰ However, no 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.¹¹¹ SBREFA amended the Regulatory Flexibility Act to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have a significant economic impact on a substantial number of small entities. Accordingly, the following represents a screening level analysis of the potential effects of critical habitat designation on small entities to assist the Secretary in making this certification.
131. Even though, as stated above in section 4.6, proposed designation of critical habitat for the elktoe is not expected to result in any effects beyond those that would already occur due to the listing of the species, this analysis includes all the potential effects of future section 7 consultations in determining whether potential future section 7 consultations associated with the listing of the elktoe and this proposed critical habitat designation could potentially affect a "substantial number" of small entities in counties supporting critical habitat areas. That is, this analysis is not assessing the effects of critical habitat, it is assessing the effects of potential future consultations, whether or not they would occur as a result of critical habitat designation. It also quantifies the probable number of small businesses that experience a "significant effect." While SBREFA does not explicitly define either "substantial number" or "significant effect," the Small Business Administration (SBA) and other Federal agencies have interpreted these terms to represent an impact on 20 percent or more of the small entities in any industry and an effect equal to three percent or more of a business' annual sales.¹¹²

¹¹⁰ Regulatory Flexibility Act, 5 U.S.C. 601 et. seq.

¹¹¹ Thus, for a regulatory flexibility analysis to be required, impacts must exceed a threshold for "significant impact" **and** a threshold for a "substantial number of small entities." See 5 U.S.C. 605 (b).

¹¹² See U.S. Small Business Administration, The Regulatory Flexibility Act: An Implementation Guide for Federal Agencies, 1998. Accessed at: www.sba.gov/advo/laws/rfaguide.pdf on December 3, 2001.

4.7.1 Estimated Number of Small Businesses Affected: The “Substantial Number” Test

132. Based on the past consultation history for the elktoe, road/bridge construction, residential development, and hydropower are the primary activities anticipated to be affected by future section 7 consultations that could affect small businesses. To be conservative, (i.e., more likely to overstate impacts than understate them), this analysis assumes that a unique company will undertake each of the projected consultations in a given year, and so the number of businesses affected is equal to the total annual number of consultations (both formal and informal).¹¹³ This analysis also limits the universe of potentially affected entities to include only those within the counties in which critical habitat units lie; this interpretation produces far more conservative results than including all entities nationwide.

133. For road/bridge construction activities, a small business is one that has less than \$27.5 million in annual receipts. For residential development activities, a small business is one that has annual receipts less than five million dollars.

134. First, the *number* of small businesses affected is estimated. As shown in Exhibits 4-11 and 4-12, the following calculations yield this estimate:¹¹⁴

- Estimate the number of businesses within the study area affected by section 7 implementation annually (assumed to be equal to the number of annual consultations);
- Calculate the *percent* of businesses in the affected industry that are likely to be small;
- Calculate the *number* of affected small businesses in the affected industry;
- Calculate the *percent* of small businesses likely to be affected by critical habitat.

¹¹³ While it is possible that the same business could consult with the Service more than once, it is unlikely to do so during the one-year time frame addressed in this analysis. However, should such multiple consultations occur, they would concentrate effects of the designation on fewer entities. In such a case, the approach outlined here likely would overstate the number of affected businesses.

¹¹⁴ Note that because these values represent the probability that small businesses will be affected during a one-year time period, calculations may result in fractions of businesses. This is an acceptable result, as these values represent the probability that small businesses will be affected by future section 7 consultations.

Exhibit 4-11

**ESTIMATED ANNUAL NUMBER OF SMALL BUSINESSES
POTENTIALLY AFFECTED BY THE LISTING AND
DESIGNATION OF CRITICAL HABITAT FOR THE ELK TOE:
THE "SUBSTANTIAL" TEST**

Industry Name	Development/Real Estate	SIC 6552
Annual number of affected businesses in industry (Equal to number of annual consultations)	By formal consultation	0
	By informal consultation	4
Total number of <i>all</i> businesses in industry within study area		47
Number of <i>small</i> businesses in industry within study area		44
Percent of businesses that are small (Number of small businesses)/(Total Number of businesses)		94%
Annual number of small businesses affected (Number affected businesses)*(Percent of small businesses)		3.7
Annual percentage of small businesses affected (Number of small businesses affected)/(Total number of small businesses); >20 percent is substantial		9%

Exhibit 4-12		
ESTIMATED ANNUAL NUMBER OF SMALL BUSINESSES POTENTIALLY AFFECTED BY THE LISTING AND DESIGNATION OF CRITICAL HABITAT FOR THE ELKTOE: THE "SUBSTANTIAL" TEST		
Industry Name	Heavy Construction: Highway and Street Const ructio n	SIC 1611
Annual number of affected businesses in industry (Equal to number of annual consultations)	By formal consultation	1
	By informal consultation	1
Total number of <i>all</i> businesses in industry within study area		75
Number of <i>small</i> businesses in industry within study area		72
Percent of businesses that are small (Number of small businesses)/(Total Number of businesses)		96%
Annual number of small businesses affected (Number affected businesses)*(Percent of small businesses)		1.9
Annual percentage of small businesses affected (Number of small businesses affected)/(Total number of small businesses); >20 percent is substantial		3%

135. These calculations reflect conservative assumptions and nonetheless yield estimates that are still far less than the 20 percent threshold that would be considered “substantial.” As a result, this analysis concludes that a significant economic impact on a substantial number of small entities will not result from potential future section 7 consultations on the elktoe and the designation of critical habitat for the species. Nevertheless, an estimate of the number of small businesses that will experience effects at a significant level is provided below.

4.7.2 Estimated Effects on Small Businesses: The “Significant Effect” Test

136. Costs of potential future section 7 consultations on the elktoe and critical habitat to small businesses consist primarily of the cost of participating in section 7 consultations and the cost of project modifications. To calculate the likelihood that a small business will experience a significant effect from these consultations, the following calculations were made:

- Calculate the per-business cost. This consists of the unit cost to a third party of participating in a section 7 consultation (formal or informal) and the unit cost of associated project modifications. *To be conservative, this analysis uses the high-end estimate for each cost.*
- Determine the amount of annual sales that a company would need to have for this per-business cost to constitute a “significant effect.” This is calculated by dividing the per-business cost by the three percent “significance” threshold value.
- Estimate the likelihood that small businesses in the study area will have annual sales equal to or less than the threshold amount calculated above. This is estimated using national statistics on the distribution of sales within industries.¹¹⁵
- Based on the probability that a single business may experience significant effects, calculate the expected value of the number of businesses likely to experience a significant effect.
- Calculate the percent of businesses in the study area within the affected industry that are likely to be affected significantly.

137. Calculations for costs associated with potential future section 7 consultations on the elktoe are provided in Exhibits 4-13 and 4-14 below.

¹¹⁵ This probability is calculated based on national industry statistics obtained from the Robert Morris Associated *Annual Statement of Studies: 2001-2002* and from comparison with the SBA definitions of small businesses.

Exhibit 4-13			
ESTIMATED ANNUAL EFFECTS ON SMALL BUSINESSES: THE "SIGNIFICANT EFFECT" TEST			
Industry	Development/Real Estate	SIC 6552	
		<i>Formal Consultations with Project Modifications</i>	<i>Informal Consultations</i>
			<i>Informal Consultations with Project Modifications</i>
Annual Number of Small Businesses Affected (from Exhibit 4-11)		0	4
Per-Business Cost		\$4,100	\$2,900
Level of Annual Sales Below which Effects Would Be Significant (Per-Business Cost / 3%)		\$137,000	\$97,000
Probability that Per-Business Cost is Greater than 3% of Sales for Small Business ¹¹⁶		6%	97%
Probable Annual Number of Small Businesses Experiencing Significant Effects (Number Small Businesses)* (Probability of Significant Effect)		0	0.9
Total Annual Number of Small Businesses Bearing Significant Costs in Industry		0	0.9
Total Annual Percentage of Small Businesses Bearing Significant Costs in Industry		0%	2%

¹¹⁶ This probability is calculated based on national industry statistics obtained from the *RMA Annual Statement Studies: 2001-2002*, which provides data on the distribution of annual sales in an industry within the following ranges: \$0-1 million, \$1-3 million, \$3-5 million, \$5-10, \$10-25 million, and \$25+ million. This analysis uses the ranges that fall within the SBA definition of small businesses (i.e., for industries in which small businesses have sales of less than \$5.0 million, it uses \$0-1 million, \$1-3 million, and \$3-5 million) to estimate a distribution of sales for small businesses. It then calculates the probability that small businesses have sales below the threshold value using the following components: (1) all small businesses (expressed as a percentage of all small businesses) in ranges whose upper limits fall below the threshold value experience the costs as significant; (2) for the range in which the threshold value falls, the percentage of companies in the bin that fall below the threshold value is calculated as $[(\text{threshold value} - \text{range minimum}) / (\text{bin maximum} - \text{range minimum})] \times \text{percent of small businesses captured in range}$. This percentage is added to the percentage of small businesses captured in each of the lower ranges to reach the total probability that small businesses have sales below the threshold value. Note that in instances in which the threshold value exceeds the definition of small businesses (i.e., the threshold value is \$10 million and the definition of small businesses is sales less than \$5.0 million), all small businesses experience the effects as significant.

Exhibit 4-14				
ESTIMATED ANNUAL EFFECTS ON SMALL BUSINESSES: THE "SIGNIFICANT EFFECT" TEST				
Industry	SIC 1611			
	<i>Formal Consultations with Project Modifications</i>	<i>Informal Consultations with Project Modifications</i>	<i>Informal Consultations</i>	<i>Formal Consultations</i>
Heavy Construction: Highway and Street Construction				
Annual Number of Small Businesses Affected (from Exhibit 4-12)	1	1	1	1
Per-Business Cost	\$334,100	\$62,900	\$2,900	\$4,100
Level of Annual Sales Below which Effects Would Be Significant (Per-Business Cost / 3%)	\$11,137,000	\$2,097,000	\$97,000	\$137,000
Probability that Per-Business Cost is Greater than 3% of Sales for Small Business	71%	86%	43%	1%
Probable Annual Number of Small Businesses Experiencing Significant Effects (Number Small Businesses)* (Probability of Significant Effect)	0	0.6	0.1	0
Total Annual Number of Small Businesses Bearing Significant Costs in Industry	0	0.6	0.1	0
Total Annual Percentage of Small Businesses Bearing Significant Costs in Industry	0%	1%	0%	0%

138. Because the costs associated with potential future section 7 consultations on the elktoe are likely to be significant for 4.4 small businesses per year (approximately seven percent of the small businesses in the residential development industry and less than one percent in the highway construction industry in the affected counties), this analysis concludes that a significant economic impact on a substantial number of small entities will not result from future section 7 consultations and the designation of critical habitat for the elktoe. This is true even when all of the effects of section 7 consultation on these activities were attributed solely to the critical habitat designation.

4.7.3 Effect of Critical Habitat Designation on Hydropower Facilities

139. Of the 11 dams potentially affected by the designation, one is owned by the Tennessee Valley Authority (TVA), eight are owned by Duke Energy, and two are owned by Tapoco-APGI. Because it is possible to identify the specific businesses potentially affected by future section 7 consultations, this analysis determines whether these businesses meet the SBA definition of small (annual output of less than four million megawatt hours¹¹⁷) in order to determine the likelihood that this designation will meet the standards set forth in SBREFA/RFA.
140. The TVA produced 161.4 million megawatt hours (MWhrs) of electricity in 2001, and well over 100 million MWhrs in each of the two previous years.¹¹⁸ It is therefore safe to conclude that the TVA is not a small business. While smaller than the TVA, Duke Energy also exceeds the definition for small businesses, as its hydropower dams in northwestern North Carolina alone produced an annual average of 8.6 million MWhrs of electricity since the early 1940s.¹¹⁹
141. Tapoco-APGI owns a total of four hydropower dams in North Carolina and Tennessee, which produced a long-term average output of 1.5 million Mwhrs of electricity.¹²⁰ This output falls within the SBA threshold. Therefore, Tapoco-APGI may be defined as a small business using SBA standards.
142. Information on the number of small hydropower owners/operators within the eight North Carolina counties and one Tennessee county containing proposed critical habitat for the elktoe is currently unavailable. As such, we are unable to assess whether the designation of critical habitat for the elktoe will significantly effect small hydropower owners/operators.

¹¹⁷ Small Business Size Standards Matched to SIC codes, <http://www.sba.gov/regulations/siccodes/siccodes.html#dive>, accessed on January 11, 2002.

¹¹⁸ Information from TVA's Annual Reports, <http://www.tva.gov/finance/reports/index.htm>.

¹¹⁹ FERC project profile, U.S. Fish and Wildlife Service, Asheville Field Office, January 8, 2001.

¹²⁰ Correspondence with personnel from Tapoco-APGI, on January 18, 2002.

POTENTIAL BENEFITS OF PROPOSED CRITICAL HABITAT

SECTION 5

143. There is little disagreement in the published economics literature that real social welfare benefits can result from the conservation and recovery of endangered and threatened species (Bishop (1978, 1980), Brookshire and Eubanks (1983), Boyle and Bishop (1986), Hageman (1985), Samples *et al.* (1986), Stoll and Johnson (1984). Such benefits have also been ascribed to preservation of open space and biodiversity (see examples in Pearce and Moran (1994) and Fausold and Lillieholm (1999) both of which are associated with species conservation. Likewise, a regional economy can benefit from the preservation of healthy populations of endangered and threatened species, and the habitat on which these species depend.
144. It is not feasible, however, to fully describe and accurately quantify these benefits in the specific context of this economic analysis. For example, most of the studies in the economics literature do not allow for the separation of the benefits of listing (including the Act's take provisions) from the benefits of critical habitat designation. The discussion presented in this report provides examples of potential benefits, which derive primarily from the listing of the species, based on information obtained in the course of developing the economic analysis. It is not intended to provide a complete analysis of the benefits that could result from section 7 of the Act in general or critical habitat designation in particular. In short, the Service believes that the benefits of critical habitat designation are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.
145. The primary goal of listing a species under the ESA is to preserve the species and the ecosystems upon which it depends. However, various economic benefits, measured in terms of regional economic performance and enhanced national social welfare, also result from species preservation. Regional economic benefits can be expressed in terms of jobs created, regional industrial and commercial sector revenues, and overall economic activity. National social welfare values reflect both use and non-use (i.e., existence) values. For

example, use values might include the recreational use of habitat area preserved as a result of the elktoe. Existence values are not derived from direct use of the species, but instead reflect the satisfaction and utility people derive from the knowledge that a species exists.

146. The following examples represent potential benefits derived from the listing of the elktoe and, potentially, critical habitat:¹²¹

- **Ecosystem health.** Elktoe are believed to be key indicators of overall ecosystem health, including water quality. Individuals of this species continually siphon and help purify water by removing large quantities of organic particles and other contaminants from the water column. Actions to protect the elktoe may benefit other organisms, such as mollusks and game and non-game fish; freshwater mussels are a staple in the diets of many fish, birds, turtles and small mammals and their shells provide cover, nesting, and rearing habitat for aquatic insects, crayfish, and bottom-dwelling fish.
- **Recreational benefits.** Protecting critical habitat for the elktoe may result in preservation of creek and river habitat suitable for recreational uses such as canoeing, fishing, and white-water rafting. Conservation of river habitat for recreational use may lead to increased tourism and contribute to the expansion of a tourist economy in certain counties.
- **Flood control.** Preserving natural environments can also reduce FEMA and county expenditure on bank stabilization and other flood control programs, as well as reducing the impacts of floods that do occur.
- **Additional Benefits**
 - Protection of human and livestock drinking water supplies;
 - Reduced costs of reservoir maintenance, drinking water treatment, future stream restoration/maintenance; and
 - Protection/enhancement of property values.

¹²¹ Personal communication with North Carolina Department of Transportation, December 21, 2001; Personal communication with Biologist, Asheville Fish and Wildlife Office, U.S. Fish and Wildlife Service, North Carolina, on March 15, 2002.

147. The benefits identified above arise primarily from the protection afforded to the elktoe under the Federal listing. Critical habitat designation may provide some additional benefits beyond listing. For example, designation may provide an educational benefit, by increasing awareness of the extent of elktoe habitat. Critical habitat also provides a legal definition of the extent of elktoe habitat, which may reduce the uncertainty Federal agencies face in determining if a section 7 consultation is necessary for an activity with a Federal nexus.
148. The quantification of total economic benefits attributable to the designation of critical habitat is, at best, difficult. Future consultations - and any associated project modifications - are expected to be associated with the listing of the species, rather than the critical habitat designation. Thus, designation of critical habitat is not expected to increase the probability of recovery for the species. In this case, the additional benefits of designating critical habitat for the elktoe may be limited to educational/informational benefits, increased support for existing conservation efforts, and reduced uncertainty regarding the extent of elktoe habitat.

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