

**FINAL ECONOMIC ANALYSIS  
OF CRITICAL HABITAT DESIGNATION  
FOR FIVE CUMBERLANDIAN MUSSELS**

August 2004

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## EXECUTIVE SUMMARY

1. The purpose of this report is to identify and analyze potential economic impacts associated with the proposed designation of critical habitat for the Cumberland elktoe (*Alasmidonta atropurpurea*), oyster mussel (*Epioblasma capsaeformis*), Cumberlandian combshell (*Epioblasma brevidens*), purple bean (*Villosa perpurpurea*), and rough rabbitfoot (*Quadrula cylindrica strigillata*), hereafter referred to as the mussels. This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service's (Service) Division of Economics.
2. Section 4(b)(2) of the Endangered Species Act (the 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.

### ***KEY FINDINGS***

- The present value cost of the proposed designation of critical habitat for the 5 Cumberlandian Mussels is forecast to be **\$5.8 million to \$14.3 million** (seven percent discount rate).
- This analysis forecasts approximately 900 informal and 100 formal section 7 consultations regarding the mussels over the next ten years. Most of the cost of this proposed designation (62 percent) is comprised of the administrative costs associated with consultations.
- This analysis predicts that transportation and dam/reservoir activities will be the activities most heavily impacted by section 7 consultation for the mussels.
- Most consultation activity (and related costs) will occur in Unit 9 Big South Fork (28 percent). The high costs in Unit 9 Big South Fork are due primarily to the potential relocation of a future water supply reservoir. After Unit 9 Big South Fork the highest costs occur in Area 3 Rockcastle River (11 percent), Unit 5 Clinch River (eight percent), Unit 1 Duck River (six percent), Area 1 French Broad River (six percent), and Unit 4 Powell River (six percent).
- State, and local agencies will bear approximately 50 percent of the costs of the proposed designation; Federal agencies will bear approximately 32 percent; private entities will incur another 15 percent. The Service is anticipated to bear approximately three percent of the costs.
- The proposed designation is not expected to have a significant economic impact on small businesses or the energy industry.

### **Framework for the Analysis**

3. This analysis is consistent with the designation as described in the proposed rule. The final section of this Executive Summary provides a discussion of the estimated costs of the final rule.

4. The primary purpose of this analysis is to estimate the economic impact associated with the proposed designation of critical habitat for the mussels.<sup>1</sup> This information is intended to assist the Secretary in making decisions about whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.<sup>2</sup> This economic analysis considers the economic efficiency effects that may result from the proposed designation and addresses how the impacts of the designation are distributed, including an assessment of any local or regional economic impacts of the designation and the potential effects of the designation on small entities and the energy industry. This information can be used by decision-makers to assess whether the effects of the designation might unduly burden a particular group or economic sector.
5. This analysis focuses on the direct and indirect costs of the rule. However, economic impacts to land use activities exist in the absence of critical habitat. These impacts may result from, for example, local zoning laws, State and natural resource laws, and enforceable management plans and best management practices applied by other State and Federal agencies. For example, state water quality regulations provide protection to the mussels and their habitat. Economic impacts that result from these types of protections are not included in this assessment; they are considered to be part of the “baseline.”
6. This analysis describes impacts that are expected to occur above and beyond the baseline. In other words, it measures the costs of compliance with the Act that would not occur in the absence of constraints on activities engendered by section 7 of the Act. In addition, where appropriate costs associated with section 9 and 10 of the Act are considered related to the designation of critical habitat.
7. The measurement of direct compliance costs focuses on the implementation of section 7 of the Act. This section requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. The administrative costs of these consultations, along with the costs of project modifications resulting from these consultations, represent the direct compliance costs of designating critical habitat. *Importantly, this analysis does not differentiate between consultations that result from the listing of the species (i.e., the jeopardy standard) and consultations that result from the presence of critical habitat (i.e., the adverse modification standard).*

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<sup>1</sup> This analysis considers the effects of the regulatory actions as proposed in the Federal Register on June 3, 2003 (68 FR 33234) and October 6, 2003 (68 FR 57643). On October 6, 2003 the Service considered extending Unit 8 Rock Creek by four river miles based on information provided by the U.S. Forest Service. After contacting relevant Action agencies, it was found that extending Unit 8 Rock Creek does not change the initial findings of the Draft Economic Analysis of Critical Habitat Designation for Five Cumberlandian Mussels as published on October 6, 2003.

<sup>2</sup> 16 U.S.C. § 1533(b)(2).

8. The proposed designation may, under certain circumstances, affect actions that do not have a Federal nexus or are otherwise not subject to the provisions of section 7 under the Act. For the purposes of this analysis, these impacts are defined as indirect effects. For example, although technical assistance is not a direct cost of section 7 of the Act, these costs are incorporated into the cost analysis when they are explicitly propagated by consideration of species and habitat conservation. Similarly, a State agency may request technical assistance from the Service as a precaution to ensure that activities without a Federal nexus, such as the issuance of National Pollutant Discharge Elimination System (NPDES) permits, adequately provide for particular species and habitats. In this case, costs of Service review of such activities would be included as a cost of the proposed critical habitat designation.
9. The analysis examines activities taking place both within and adjacent to the proposed designation. It estimates impacts based 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 frame, beginning on the day that the current proposed rule becomes available to the public. The ten-year time frame was chosen for the analysis because, as the time horizon for an economic analysis is expanded, the assumptions on which the projected numbers of projects are based become increasingly speculative. In instances where impacts are reasonable foreseeable beyond a ten year time frame, the analysis incorporates them.
10. This report relies on a sequential methodology and focuses on distilling the salient and relevant aspects of potential economic impacts. The steps followed in this analysis consist of:
  - Describing current and projected economic activity within and around the proposed critical habitat area;
  - Identifying whether such activities are likely to involve a Federal nexus;
  - For activities with a Federal nexus, evaluating the likelihood that these activities will require consultations under section 7 of the Act and, in turn, result in any modifications to projects.
  - Estimating the direct costs of expected section 7 consultations, project modifications and other economic impacts;
  - Estimating the likelihood that current or future activities may require additional compliance with other Federal, State, and local laws as a result of new information provided by the proposed designation;

- Estimating the likelihood that projects will be delayed by the consultation process or other regulatory requirements triggered by the proposed designation;
- Estimating the likelihood that economic activity and/or property values affected will be affected by regulatory uncertainty;
- Estimating the indirect costs of the proposed designation, as reflected in the cost of compliance with State and local laws, project delays, regulatory uncertainty, including private property values;
- Assessing the extent to which the proposed critical habitat designation and other co-extensive regulations will create costs for small businesses as a result of modifications or delays to projects;
- Assessing the effects of administrative costs and project modifications on the supply, distribution, and use of energy; and
- Determining the benefits that may be associated with the proposed designation of critical habitat.

11. The Service has determined that the French Broad River, Holston River, and the Rockcastle River are essential to the conservation of the mussels. However, based on the Service's analysis under section 4(b)(2) of the Act, defined above, these areas have been proposed for exclusion from designation of critical habitat for the mussels.<sup>3</sup> This report analyzes the costs of both the lands proposed for designation and the lands proposed for exclusion because a decision to exclude an area according to section 4(b)(2) of the Act requires thorough consideration of "the economic impact, and any other relevant impact" of designating critical habitat.

### **Results of the Analysis**

12. Estimates of the economic impact, discounted to present value using a rate of seven percent, range from \$5.8 million to \$14.3 million over ten years (or \$0.8 million to \$2.0 million annually).<sup>4</sup> Most of the cost of the proposed designation (62 percent) is comprised of the administrative costs associated with consultations. Existing Federal and State

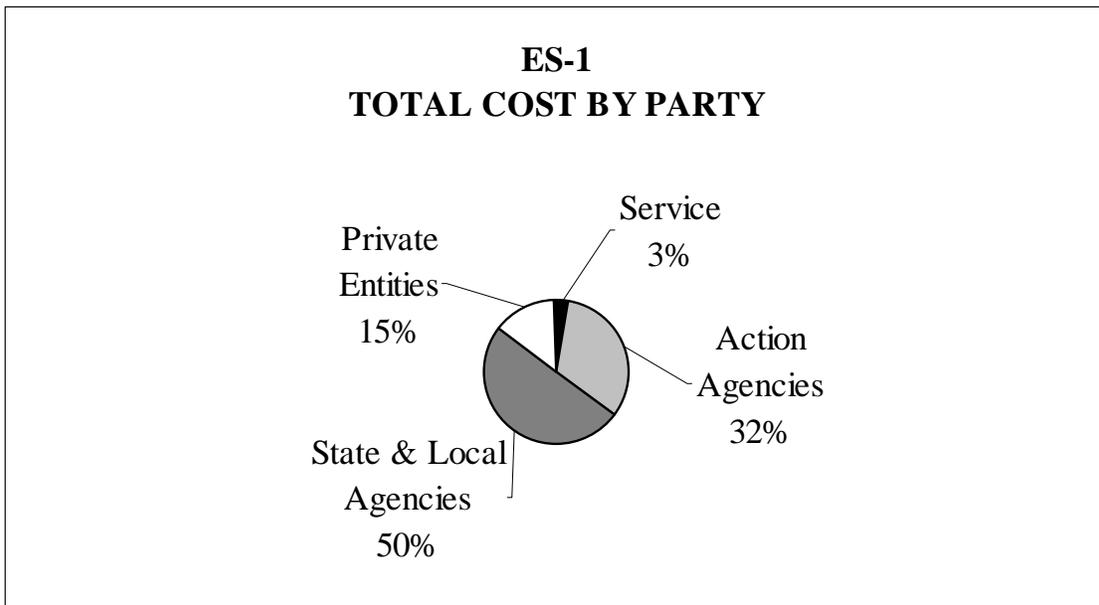
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<sup>3</sup> This analysis considers the effects of the regulatory actions as proposed in the Federal Register on June 3, 2003 (68 FR 33234) and October 6, 2003 (68 FR 57643). See the proposed rule for a complete discussion of the proposed exclusion.

<sup>4</sup> These estimates have been converted to present values using a seven percent discount rate and include impacts that are co-extensive with other aspects of section 7 of the Act (see Exhibit 4-4). Costs in the present value calculation are distributed evenly over the ten year time frame as Action agencies were unable to provide specific timing of expected consultations.

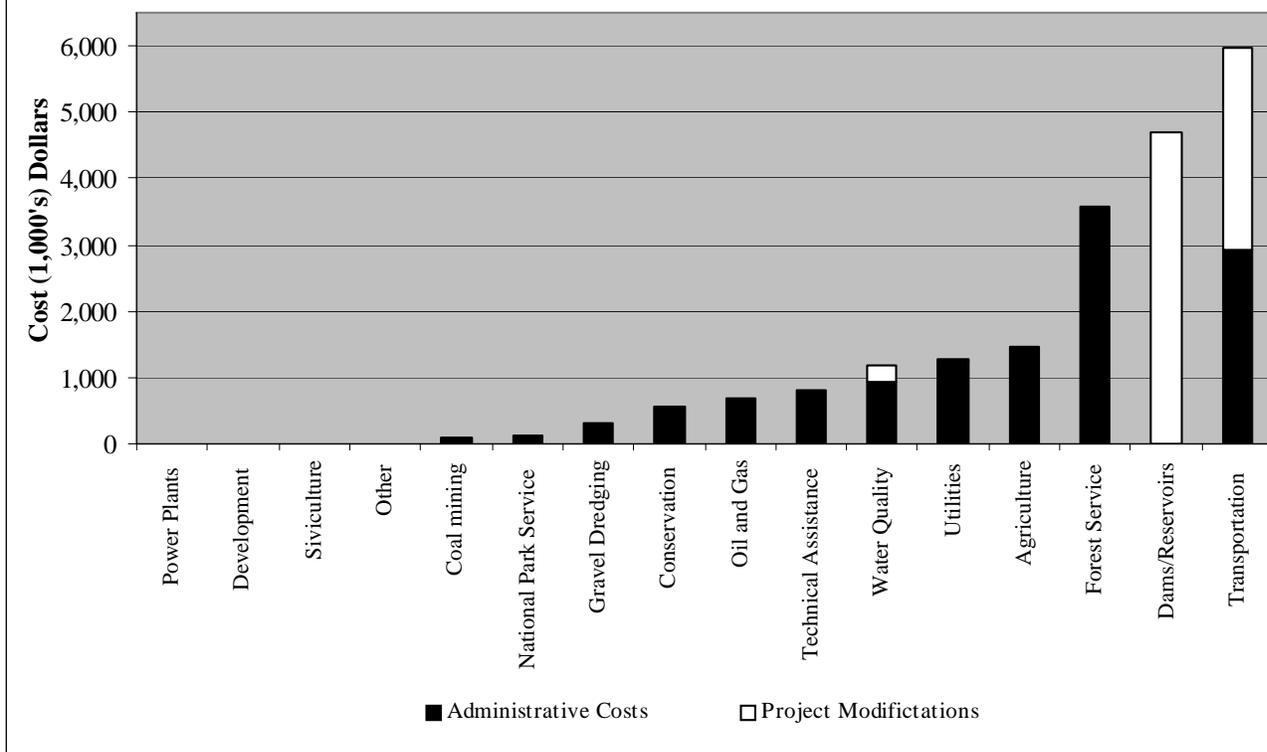
regulations provide sufficient protection of these waterways, as a result, section 7 project modifications are unlikely for most activities. While a range of activities may be affected, the activities most affected are road/bridge construction and maintenance projects and dam/reservoir activities.

13. The economic impacts will be manifested primarily as increased operating costs for Federal, State, and local agencies in Alabama, Kentucky, Mississippi, Tennessee, and Virginia. Federal, State, and local agencies are expected to bear 82 percent of the total costs. The remaining 15 percent of costs are expected to be borne by private entities. Consultations that may involve private landowners include those related to agriculture, utility projects, oil and gas, conservation and recreation, gravel dredging, national park activities, coal mining, and other activities. Because most of the costs of this rule are expected to be borne by governmental agencies rather than private businesses or landowners, secondary impacts to the region are expected to be minimal. Exhibit ES-1 represents the distribution of costs borne by party.



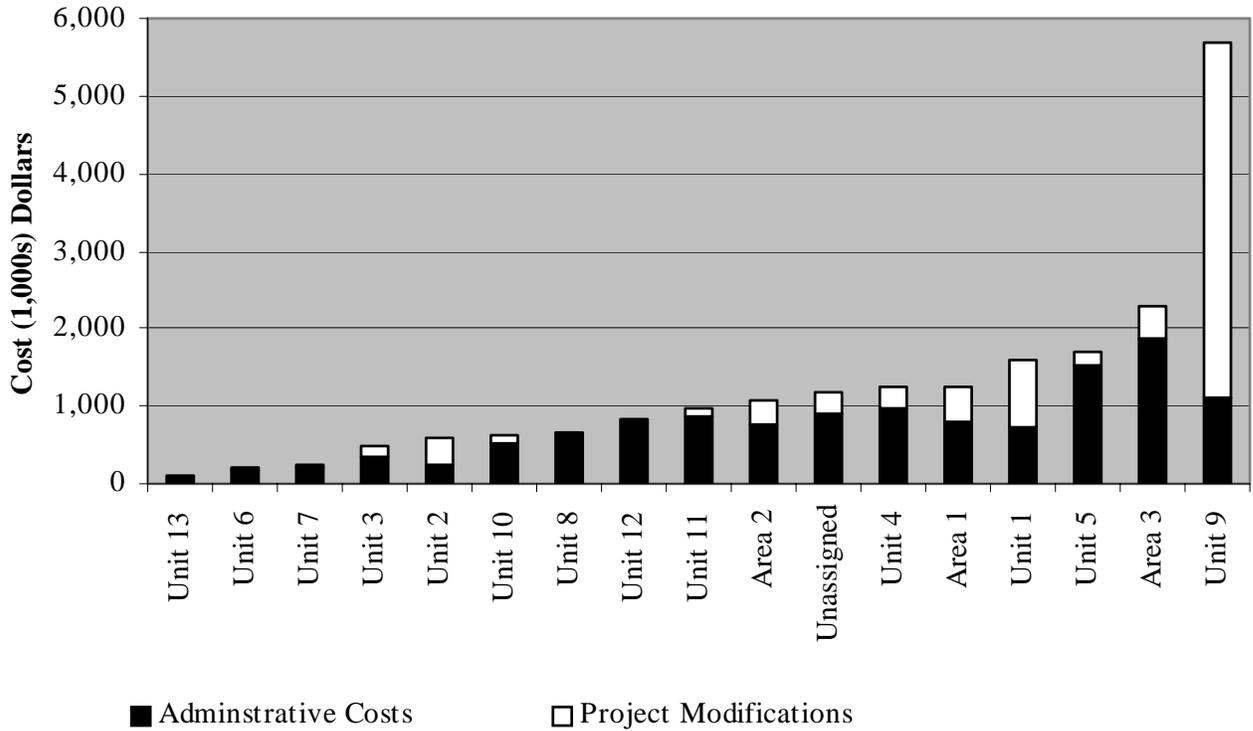
14. While a range of activities may be affected, approximately 29 percent of the total proposed designation costs are expected to stem from consultations with State and Federal agencies on road/bridge construction and maintenance projects. Of the remaining costs 21 percent stem from dam and reservoir activities, 18 percent stem from national forest activities, seven percent stem from agriculture, six percent from utilities, six percent water quality, and less than five percent for the remaining categories in descending order of magnitude, technical assistance, oil and gas drilling, conservation and recreation, gravel dredging, national park activities, and coal mining. The cost estimates presented in Exhibit ES-2 are a function of the estimated number of consultations and project modifications associated with activities affecting the proposed critical habitat for the mussels.

**EXHIBIT ES-2  
CONSULTATION COSTS BY ACTIVITY TYPE  
(TEN YEARS)**



15. The mussel critical habitat area is characterized by mostly private rural, and some suburban, lands. Agriculture is a common land use in the region, suggesting that farmers could experience costs as a result of the designation. However, based on extensive review of the consultation history and interviews with Federal and State agencies, the economic impacts to farmers are expected to be minimal, as approximately 57 percent of the section 7 costs for agricultural activities are not borne by the third party. Since agricultural consultations primarily involve Federal assistance for conservation programs (i.e., the Environmental Quality Incentives Program), any consultations associated with these activities are not likely to result in project modifications.
  
16. Most of the costs are anticipated to occur in Unit 9 Big South Fork (28 percent). The high costs in Unit 9 Big South Fork are due primarily to the potential relocation of a future water supply reservoir for Fentress County. Exhibit ES-3 is a graphical presentation of the total estimated consultation, technical assistance and project modification costs likely to be associated with the listing and proposed critical habitat designation for the mussels, by unit or area, over the next ten-years.

**EXHIBIT ES-3  
CONSULTATION COSTS BY UNIT/AREA  
(TEN YEARS)**



**Summary of Costs**

17. Exhibit ES-4 provides a overview of the present value of costs associated with the listing and proposed critical habitat designation for the mussels over the next ten years. To discount and annualize costs, guidance provided by the Office of Management and Budget (OMB) specifies the use of a real rate of seven percent.

<b>Exhibit ES-4</b>		
<b>PRESENT VALUE OF ESTIMATED TOTAL ECONOMIC COSTS (TEN YEARS)</b>		
	<b>Total Section 7 Costs</b>	
	<b>Low</b>	<b>High</b>
Total Activity Costs (Nominal Value)	\$8.3 million	\$20.3 million
<b>Present Value (3%)</b>	\$7.1 million	\$11.0 million
<b>Present Value (7%)</b>	\$5.8 million	\$14.3 million
<b>Annualized (3%)</b>	\$0.8 million	\$2.0 million
<b>Annualized (7%)</b>	\$0.8 million	\$2.0 million
Note: This table presents nominal costs as well as discounted present value of total costs based on a three and seven percent discount rate, with the assumption that total costs are distributed evenly over the ten-year period. Discounted costs are then annualized.		

18. Exhibit ES-5 provides a more detailed summary of the total estimated consultation, technical assistance and project modification costs likely to be associated with the mussels by unit over the next ten-years.

**Exhibit ES-5**

**ESTIMATED TOTAL ECONOMIC COSTS BY UNIT AND AREA  
(TEN YEARS NOMINAL DOLLARS)**

<b>Units</b>	<b>No. of Informal/Formal Consultations<sup>a</sup></b>	<b>Technical Assistance</b>	<b>Informal Consultation</b>	<b>Formal Consultation</b>	<b>Project Modification Costs</b>	<b>Total Costs<sup>b</sup></b>
1 Duck River	50/9	\$0	\$50,000 to \$530,000	\$130,000 to \$210,000	\$100,000 to \$470,000	\$290,000 to \$1,210,000
2 Bear Creek	14/2	\$10,000 to \$50,000	\$20,000 to \$140,000	\$20,000 to \$50,000	\$310,000 to \$350,000	\$360,000 to \$590,000
3 Obed River	48/2	\$0	\$120,000 to \$310,000	\$10,000 to \$40,000	\$10,000 to \$140,000	\$140,000 to \$490,000
4 Powell River	46/19	\$0 to \$10,000	\$110,000 to \$480,000	\$310,000 to \$470,000	\$230,000 to \$290,000	\$660,000 to \$1,250,000
5 Clinch River	76/14	\$180,000 to \$460,000	\$190,000 to \$720,000	\$220,000 to \$350,000	\$150,000 to \$180,000	\$750,000 to \$1,720,000
6 Nolichucky River	16/1	\$0	\$10,000 to \$140,000	\$10,000 to \$30,000	\$0 to \$30,000	\$20,000 to \$200,000
7 Beech Creek	36/0	\$0	\$100,000 to \$210,000	\$0	\$0 to \$20,000	\$100,000 to \$230,000
8 Rock Creek	35/3	\$0 to \$10,000	\$190,000 to \$570,000	\$0 to \$80,000	\$0	\$190,000 to \$660,000
9 Big South Fork	93/6	\$0	\$550,000 to \$990,000	\$70,000 to \$130,000	\$2,440,000 to \$4,570,000	\$3,060,000 to \$5,700,000
10 Buck Creek	30/15	\$0 to \$10,000	\$60,000 to \$180,000	\$110,000 to \$330,000	\$100,000	\$270,000 to \$610,000
11 Sinking Creek	52/8	\$0 to \$10,000	\$230,000 to \$670,000	\$40,000 to \$190,000	\$100,000	\$370,000 to \$970,000
12 Marsh Creek	52/7	\$0	\$230,000 to \$670,000	\$30,000 to \$170,000	\$0	\$260,000 to \$840,000
13 Laurel Fork	14/0	\$0 to \$20,000	\$50,000 to \$100,000	\$0	\$0	\$50,000 to \$120,000
Unassigned <sup>b</sup>	35/1	\$60,000 to \$150,000	\$120,000 to \$690,000	\$10,000 to \$30,000	\$110,000 to \$150,000	\$290,000 to \$1,010,000
<b>Subtotal</b>	<b>596/88</b>	<b>\$250,000 to \$720,000</b>	<b>\$2,030,000 to \$6,400,000</b>	<b>\$960,000 to \$2,080,000</b>	<b>\$3,550,000 to \$6,400,000</b>	<b>\$6,810,000 to \$15,600,000</b>
<b>Areas<sup>c</sup></b>						
1 French Broad River	87/12	\$0	\$130,000 to \$550,000	\$70,000 to \$240,000	\$50,000 to \$460,000	\$250,000 to \$1,260,000
2 Holston River	88/5	\$0	\$130,000 to \$660,000	\$50,000 to \$90,000	\$40,000 to \$310,000	\$210,000 to \$1,070,000
3 Rockcastle River	105/4	\$20,000 to \$50,000	\$470,000 to \$1,740,000	\$60,000 to \$90,000	\$400,000	\$950,000 to \$2,280,000
Unassigned <sup>b</sup>	1/1	0	\$10,000 to \$20,000	\$10,000 to \$30,000	\$70,000 to \$100,000	\$90,000 to \$150,000
<b>Subtotal</b>	<b>281/14</b>	<b>\$20,000 to \$50,000</b>	<b>\$740,000 to \$2,970,000</b>	<b>\$190,000 to \$450,000</b>	<b>\$560,000 to \$1,270,000</b>	<b>\$1,500,000 to \$4,750,000</b>
<b>TOTAL</b>	<b>876/109</b>	<b>\$280,000 to \$800,000</b>	<b>\$2,770,000 to \$9,370,000</b>	<b>\$1,150,000 to \$2,510,000</b>	<b>\$4,110,000 to \$7,660,000</b>	<b>\$8,320,000 to \$20,340,000</b>

<sup>a</sup> Maximum number of informal and formal consultations.

<sup>b</sup> Unassigned costs include Special Appropriation Projects and Technical Assistance.

<sup>c</sup> Areas are proposed for exclusion.

Note: Totals may not sum due to rounding.

**Benefits Associated with the Designation**

19. Various categories of benefit may derive from the listing of the mussels and the designation of critical habitat. For example, survival and conservation of the species may lead to enhanced existence values. In addition, protection of mussel habitat may produce benefits such as preservation of habitat suitable for recreational uses, improved water quality, and habitat improvement for other species.
20. Insufficient information exists to quantify the benefits of habitat protection. Several studies published in the economics literature, however, have attempted to estimate the public’s willingness to pay for the designation of critical habitat for endangered species. While these studies do not predict the willingness to pay individuals would have for the protections afforded to the mussels’ habitat through critical habitat designation, they support the notion that preservation of mussel habitat may generate benefits to the public.
21. Exhibit ES-6 presents the key assumptions of this economic analysis, as well as the potential direction of bias introduced by each assumption. For example, the analysis assumes that the frequency of consultations will continue at historical rates in the future. There is, however, some indication that consultation and technical assistance efforts may decline in the future, reducing the ultimate cost of the designation.

<b>Exhibit ES-6</b>	
<b>CAVEATS TO THE ECONOMIC ANALYSIS</b>	
<b>Key Assumption</b>	<b>Effect on Cost Estimate</b>
The rate of formal and informal consultations will not decrease over time.	+
The presence of other threatened and endangered species with and without critical habitat (i.e., spotfin chub, yellowfin madtom, slender chub, etc.) has no influence on consultation/project modification costs.	+
The historic occurrence and cost of project modifications are good predictors of future consultation costs.	+/-
Action agency Best Management Practices are baseline protections that are practiced consistently and as such, do not introduce additional costs to section 7 consultations.	-
All costs to development are captured by increased costs of construction of pipelines, water supply and wastewater infrastructure, and roads and bridges within the proposed critical habitat.	-
- : This assumption may result in an underestimate of real costs. + : This assumption may result in an overestimate of real costs. Multiple “+” keys refer to the magnitude of effect anticipated. +/- : This assumption has an unknown effect on estimates.	

**Estimated Cost of the Final Designation**

22. The analysis contained in this report is consistent with the designation as described in the proposed rule; however, the Service, under section 4(b)(2) of the Act, is expected to finalize the exclusions of the French Broad River, Holston River, and Rockcastle River. In the proposed rule these areas were found to be essential to the conservation of the mussels but were proposed for exclusion. The economic impact associated with the final designation, discounted to present value using a rate of seven percent, are forecast to range from \$4.8 million to \$11.0 million. Exhibit ES-7 presents an overview of the present value of the costs associated with the final rule.

<b>Exhibit ES-7</b>		
<b>PRESENT VALUE OF ESTIMATED TOTAL ECONOMIC COSTS OF THE FINAL RULE (TEN YEARS)</b>		
	<b>Total Section 7 Costs</b>	
	<b>Low</b>	<b>High</b>
Total Activity Costs (Nominal Value)	\$6.8 million	\$15.6 million
<b>Present Value (3%)</b>	\$5.8 million	\$13.7 million
<b>Present Value (7%)</b>	\$4.8 million	\$11.0 million
<b>Annualized (3%)</b>	\$0.7 million	\$1.6 million
<b>Annualized (7%)</b>	\$0.7 million	\$1.6 million
Note: This table presents nominal costs as well as discounted present value of total costs based on a three and seven percent discount rate, with the assumption that total costs are distributed evenly over the ten-year period. Discounted costs are then annualized.		

23. Approximately 59 percent of the costs of the final rule are administrative (\$6.2 million), the remaining 41 percent are associated with project modifications (\$6.4 million). State and local governments are expected to bear 53 percent of the total cost of the final rule (\$8.3 million), action agencies 28 percent (\$4.3 million), private entities 16 percent (\$2.5 million), and the Service the remaining three percent (\$0.5 million).

24. A range of activities may be affected by the final rule, approximately 28 percent of the total costs are expected to stem from dam and reservoir activities (\$4.3 million), road/bridge construction and maintenance 25 percent (\$3.9 million), and national forest activities 12 percent (\$1.9 million). Less than ten percent of costs are forecast to be associated with each of the remaining activities presented in descending order of magnitude, agriculture, water quality, utilities, technical assistance, oil and gas drilling, conservation and recreation, gravel dredging, national park activities, and coal mining.

25. Each of the remaining 13 units may be affected by the final rule. Approximately 37 percent of the total costs are expected to stem from activities within or affecting Unit 9 Big South Fork (\$5.7 million). The costs of each of the units included in the final designation can be found in Exhibit ES-5.

26. In June 2003, the U.S. Fish and Wildlife Service ( Service) proposed to designate critical habitat for the Cumberland elktoe (*Alasmidonta atropurpurea*), oyster mussel (*Epioblasma capsaeformis*), Cumberlandian combshell (*Epioblasma brevidens*), purple bean (*Villosa perpurpurea*), and rough rabbittsfoot (*Quadrula cylindrica strigillata*), hereafter mussels, on various portions of 13 rivers in Tennessee, Kentucky, Virginia, Mississippi, and Alabama. In October, amended the proposed design to contemplate additional 4 miles in one unit (Unit 8, Rock Creek). The purpose of this report is to identify and analyze potential economic impacts that may result from the proposed critical habitat designation.
27. Section 4(b)(2) of the Endangered Species Act (the 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.
28. 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 currently construed as any direct or indirect alteration that appreciably diminishes the value of critical habitat for conservation of a listed species.

## 1.1 Description of Species and Habitat<sup>5</sup>

### **Cumberland Elktoe**

29. The Cumberland elktoe is endemic to the upper Cumberland River system in southeast Kentucky and north-central Tennessee. It appears to have historically occurred only in the main stem of the Cumberland River and primarily its southern tributaries upstream from the hypothesized original location of Cumberland Falls near Burnside, Pulaski County, Kentucky. Based on recent records, populations of the Cumberland elktoe continues to persist in 12 Cumberland River tributaries: Laurel Fork, Claiborne County, Tennessee and Whitley County, Kentucky; Marsh Creek, McCreary County, Kentucky; Sinking Creek, Laurel County, Kentucky; Big South Fork, Scott County, Tennessee, and McCreary County, Kentucky; Rock Creek, McCreary County, Kentucky; North Fork White Oak Creek, Morgan and Fentress County, Tennessee; Clear Fork, Fentress, Morgan, and Scott Counties, Tennessee; North Prong Clear Fork and Crooked Creek, Fentress County, Tennessee; White Oak Creek, Scott County, Tennessee; Bone Camp Creek, Morgan County, Tennessee; and the New River, Scott County, Tennessee.

### **Oyster Mussel**

30. The oyster mussel was one of the most widely distributed Cumberlandian mussel species with historical records from six States (Alabama, Georgia, Kentucky, North Carolina, Tennessee, and Virginia). This species is now only extant in a handful of stream and river reaches in four States in the Tennessee and Cumberland River systems, including the Duck River in Maury and Marshall Counties, Tennessee; Powell River, Claiborne and Hancock Counties, Tennessee and Lee County, Virginia; Clinch River in Hancock County, Tennessee, and Scott, Russell, and Tazewell Counties, Virginia; Nolichucky River in Hamblen and Cocke Counties, Tennessee; and Big South Fork of the Cumberland River in McCreary County, Kentucky, and Scott County, Tennessee.<sup>6</sup>

### **Cumberlandian Combshell**

31. This species, like the oyster mussel, was once widely distributed, historically occurring throughout the Cumberlandian Region in five States (Alabama, Kentucky, Mississippi, Tennessee, and Virginia). It is now restricted to 5 stream and river reaches. The Cumberlandian combshell persist in Bear Creek, Colbert County, Alabama, and Tishomingo County, Mississippi; Powell River, Claiborne and Hancock Counties, Tennessee, and Lee County, Virginia; Clinch River, Hancock County, Tennessee, and Scott, Russell, and

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<sup>5</sup> Information on the mussels and their habitat is taken from the *Proposed Designation of Critical Habitat for the Five Cumberlandian Mussels*, published on June 3, 2003 (68 FR 33243).

<sup>6</sup> As the Final Rule notes, while historic records do exist for true oyster mussels in Unit 9 Big South Fork, the extant *Epioblasma* mussel in the Big South Fork River main stem is recognized as a variant of the tan riffleshell.

Tazewell Counties, Virginia; Big South Fork, Scott County, Tennessee and McCreary County, Kentucky; and Buck Creek, Pulaski County, Kentucky.

### **Purple Bean**

32. The purple bean is endemic to the upper Tennessee drainage in Tennessee and Virginia. Its historical range included the Powell River in Lee County, Virginia; the Clinch River system in Claiborne, Grainger, and Hancock Counties, Tennessee, and Russell, Scott, Tazewell, and Wise Counties, Virginia; the Emory and Obed Rivers in Morgan and Cumberland Counties, Tennessee; and the Holston River System in Hawkins and Sullivan Counties, Tennessee, and Scott and Washington Counties, Virginia. The purple bean persists in the Clinch River mainstem, Hancock County, Tennessee, and Russell, Scott, and Tazewell Counties, Virginia; Copper Creek (a Clinch River tributary) in Scott County, Virginia; and Indian Creek (a Clinch River tributary) in Tazewell County, Virginia; Obed River in Morgan and Cumberland Counties, Tennessee; and in Beech Creek, a tributary of the Holston River in Hawkins County, Tennessee.

### **Rough Rabbitsfoot**

33. Like the purple bean, this species is endemic to the upper Tennessee River system. The rough rabbitsfoot historically occupied the Powell River in Hancock and Claiborne Counties, Tennessee, and Lee County, Virginia; the Clinch River system in Claiborne and Hancock Counties, Tennessee, and Russell, Scott, and Tazewell Counties, Virginia; and the Holston River System in Hawkins and Sullivan Counties, Tennessee, and Scott and Washington Counties, Virginia. It also currently persists in portions of the Powell River, Hancock and Claiborne Counties, Tennessee, and Lee County, Virginia; Clinch River in Hancock County, Tennessee, and Russell, Scott, and Tazewell Counties, Virginia; and in Indian Creek, Tazewell County, Virginia.
34. Human-induced alterations to aquatic environments in the Cumberlandian Region, including channel modifications (e.g., dams, dredging, mining) and historic or episodic water pollution events, have eliminated these species from significant portions of the rivers and streams that they historically occupied. Current threats include continued habitat loss and fragmentation, cumulative effects of land use activities on aquatic environments, population isolation and associated deleterious effects such as inbreeding depression, competition with invasive exotic mussel species, and non-point source pollution.
35. In determining which areas to propose as critical habitat, the Service must focus on those physical and biological features that are essential to the conservation of the species and that may require special management consideration or protection. These essential features are referred to as the species' primary constituent elements (PCEs). The following are the PCEs that the Service has identified as essential to the conservation of the mussels:

- Permanent, flowing stream reaches with a flow regime (i.e, the magnitude, frequency, duration, and seasonality of discharge over time) necessary for normal behavior, growth, and survival of all life stages of the five mussels and their host fish.
- Geomorphically stable stream and river channels and banks (structurally stable stream cross section).
- Stable substrates, consisting of mud, sand, gravel, and/or cobble/boulder, with low amounts of fine sediments or attached filamentous algae.
- Water quality (including temperature, turbidity, oxygen content, and other characteristics) necessary for the normal behavior, growth, and survival of all life stages of the five mussels and their host fish.
- Fish hosts with adequate living, foraging, and spawning areas for them

## 1.2 **Proposed Critical Habitat**<sup>7</sup>

36. The proposed designation includes 13 geographic units that include rivers and streams in the Tennessee and Cumberland River Basins as critical habitat for these five mussel species. Three areas were also identified as essential to the conservation of the mussels in the Tennessee and Cumberland River Basins. These 13 geographic units and three areas (Areas) encompass a total of approximately 1,025 river kilometers (rkm) (625 river miles (rmi)). The critical habitat units described below include the stream and river channels within the ordinary high water line.<sup>8</sup> All of the proposed critical habitat units are currently occupied by at least one of the mussel species. Approximately 78 percent of stream channels proposed as critical habitat are bordered by private lands, 18 percent are bordered by Federal lands, and four percent are bordered by State lands. A more detailed description of each critical habitat unit and area is provided in Exhibit 1-1.

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<sup>7</sup> Information on the mussels and their habitat is taken from the *Proposed Designation of Critical Habitat for the Five Cumberlandian Mussels*, published on June 3, 2003 (68 FR 33243).

<sup>8</sup> The ordinary high water line on nontidal rivers is the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas.

37. The Service has determined that the French Broad River, Holston River, and the Rockcastle River are essential to the conservation of the mussels. However, these areas have been proposed for exclusion from designation of critical habitat for the mussels.<sup>9</sup> These three areas are included in this economic analysis, as described in the executive summary. A more detailed description of each area essential to the conservation of the species is also provided in Exhibit 1-1.

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<sup>9</sup>This analysis considers the effects of the regulatory action as proposed in the Federal Register on June 3, 2003 (68 FR 33234). See the proposed rule for a complete discussion of the proposed exclusion.

**Exhibit 1-1**

**DESCRIPTION OF CRITICAL HABITAT UNITS AND AREAS ESSENTIAL TO THE CONSERVATION OF THE MUSSELS**

	<b>Description</b>	<b>Species</b>	<b>State(s)</b>	<b>River Miles</b>
<b>Units</b>				
<i>Unit 1: Duck River</i>	Unit 1 consists of the mainstem of the Duck River from river kilometer (rkm) 214 (river mile (rmi) 133), (0.3 rkm (0.2 rmi) upstream of the First Street Bridge) in the City of Columbia, Maury County, Tennessee, upstream to Lillard's Mill Dam at rkm 288 (rmi 179) in Marshall County, Tennessee.	oyster mussel, Cumberlandian combshell	TN	46
<i>Unit 2: Bear Creek</i>	Unit 2 includes the mainstem of Bear Creek from the backwaters of Pickwick Lake at rkm 37 (rmi 23), Colbert County, Alabama, upstream through Tishomingo County, Mississippi, ending at the Mississippi/Alabama State line.	oyster mussel, Cumberlandian combshell	AL, MS	25
<i>Unit 3: Obed River</i>	Unit 3 begins at the confluence of the Obed with the Emory River in Morgan County, Tennessee, and continues upstream to Adams Bridge in Cumberland County, Tennessee.	purple bean	TN	25
<i>Unit 4: Powell River</i>	Unit 4 includes the Powell River from the U.S. 25E Bridge in Claiborne County, Tennessee, upstream to rmi 159 (upstream of Rock Island in the vicinity of Pughs) in Lee County, Virginia.	Cumberlandian combshell, rough rabbitsfoot, purple bean, oyster mussel	TN, VA	94
<i>Unit 5: Clinch River and tributaries</i>	Unit 5 consists of the Clinch River from rkm 255 (rmi 159) immediately below Grissom Island, Hancock County, Tennessee, upstream to its confluence with Indian Creek in Cedar Bluff, Tazewell County, Virginia; 4 rkm (2.5 rmi) of Indian Creek from its confluence with the Clinch River upstream to the fourth Norfolk Southern Railroad crossing at Van Dyke, Tazewell County, Virginia; and 21 rkm (13 rmi) of Copper Creek from its confluence with the Clinch River upstream to Virginia State Route 72, Scott County, Virginia.	Cumberlandian combshell, rough rabbitsfoot, oyster mussel, purple bean	TN, VA	171
<i>Unit 6: Nolichucky River</i>	Unit 6 consists of the mainstem of the Nolichucky River and extends from rkm 14 (rmi 9) (approximately 0.6 rkm (0.4 rmi) upstream of Enka Dam) to Susong Bridge in Hamblen and Cocke Counties, Tennessee.	oyster mussel, Cumberlandian combshell	TN	5
<i>Unit 7: Beech Creek</i>	Unit 7 extends from rkm 4 (rmi 2) of Beech Creek (in the vicinity of Slide, TN) upstream to the dismantled railroad bridge at rkm 27 (rmi 16).	purple bean	TN	14

**Exhibit 1-1**

**DESCRIPTION OF CRITICAL HABITAT UNITS AND AREAS ESSENTIAL TO THE CONSERVATION OF THE MUSSELS**

	<b>Description</b>	<b>Species</b>	<b>State(s)</b>	<b>River Miles</b>
<i>Unit 8: Rock Creek<sup>a</sup></i>	Unit 8 consists of the mainstem of Rock Creek and begins at the Rock Creek/ White Oak Creek confluence and extends upstream to Dolen Branch rkm 18 (rmi 11) in McCreary County, Kentucky.	Cumberland elktoe	KY	7
<i>Unit 9: Big South Fork and tributaries</i>	Unit 9 consists of the Big South Fork of the Cumberland River mainstem from its confluence with Laurel Crossing Branch (downstream of Big Shoals) in McCreary County, Kentucky, upstream to its confluence with the New River and Clear Fork, Scott County, Tennessee; North Fork White Oak Creek from its confluence with the Big South Fork upstream to Panther Branch, Fentress County, Tennessee; the New River from its confluence with Clear Fork upstream to U.S. Highway 27, Scott County, Tennessee; Clear Fork from its confluence with the New River upstream to its confluence with North Prong Clear Fork, Morgan and Fentress Counties, Tennessee; White Oak Creek from its confluence with Clear Fork upstream to its confluence with Bone Camp Creek in Morgan County, Tennessee; Bone Camp Creek from its confluence with White Oak Creek upstream to Massengale Branch, Morgan County, Tennessee; Crooked Creek from its confluence with Clear Fork upstream to Buttermilk Branch, Fentress County, Tennessee; and North Prong Clear Fork from its confluence with Clear Fork upstream to Shoal Creek, Fentress County, Tennessee.	Cumberland elktoe, oyster mussel, Cumberlandian combshell	KY, TN	95
<i>Unit 10: Buck Creek</i>	Unit 10 consists of Buck Creek from the State Route 192 Bridge upstream to the State Route 328 Bridge in Pulaski County, Kentucky.	oyster mussel, Cumberlandian combshell	KY	36
<i>Unit 11: Sinking Creek</i>	Unit 11 extends from the Sinking Creek/Rockcastle River confluence upstream to Sinking Creek's confluence with Laurel Branch in Laurel County, Kentucky. This unit is primarily within land owned by the Daniel Boone National Forest, but also includes private lands.	Cumberland elktoe	KY	8
<i>Unit 12: Marsh Creek</i>	Unit 12 consists of Marsh Creek from its confluence with the Cumberland River upstream to State Route 92. This unit is bounded by lands owned by the Daniel Boone National Forest and private landowners.	Cumberland elktoe	KY	15

**Exhibit 1-1**

**DESCRIPTION OF CRITICAL HABITAT UNITS AND AREAS ESSENTIAL TO THE CONSERVATION OF THE MUSSELS**

	<b>Description</b>	<b>Species</b>	<b>State(s)</b>	<b>River Miles</b>
<i>Unit 13: Laurel Fork</i>	Unit 13 consists of Laurel Fork of the Cumberland River from the Campbell County/Claiborne County line upstream through Claiborne County, Tennessee to rkm 11 (rmi 6.85) in Whitley County, Kentucky. The upstream terminus is two river miles upstream of the Kentucky/Tennessee State Line.	Cumberland elktoe	KY	5
<b>Areas</b>				
<i>Area 1: French Broad River</i>	Area 1 consists of the French Broad River from below Douglas Dam (rmi 32.5), in Sevier County, TN, downstream to its confluence with the Holston River (rmi 0) in Knox County, TN.	oyster mussel, Cumberlandian combshell <sup>b</sup>	TN	33
<i>Area 2: Holston River</i>	Area 2 consists of the free-flowing reach of the Holston River from below Cherokee Dam to (rmi 52), on the Grainger/Jefferson County line, TN, downstream to its confluence with the French Broad River in Knox County, TN.	oyster mussel, Cumberlandian combshell <sup>b</sup>	TN	52
<i>Area 3: Rockcastle River</i>	Area 3 consists of the free-flowing reach of the Rockcastle River from the backwaters of Cumberland Lake on the Laurel/Pulaski County line, KY, upstream to Kentucky Route 1956 in Rockcastle County, KY.	oyster mussel, Cumberlandian combshell <sup>b</sup>	KY	15
<p><sup>a</sup> The regulatory action as proposed in the Federal Register on October 6, 2003 (68 FR 57643) indicated that the Service is considering extending Unit 8 Rock Creek by four river miles upstream of Dolen Branch. The upstream terminus of Unit 8 would be a driveway crossing of Rock Creek at river mile 15.9 if the extension is finalized as proposed.</p> <p><sup>b</sup> Note that these Areas are currently unoccupied.</p>				

### **1.3 Framework and Methodology**

38. The primary purpose of this analysis is to estimate the economic impact associated with the designation of critical habitat for the mussels. This information is intended to assist the Secretary in making decisions about whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.<sup>10</sup> In addition, this information allows the Service to address the requirements of Executive Orders 12866 and 13211 and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).<sup>11</sup>
39. This chapter provides the framework for this analysis. First, it defines the economic effects considered in the analysis. Second, it establishes the baseline against which these effects are measured. Third, it describes the measurement of direct compliance costs, which include costs associated with, and generated as a result of, section 7 consultations. Fourth, it identifies potential indirect economic effects of the rule resulting from (1) compliance with other parts of the Act potentially triggered by critical habitat, (2) compliance with other laws, and (3) time delays and regulatory uncertainty. Fifth, it discusses the need for an economic assessment of the benefits of critical habitat designation. Finally, the section concludes by discussing the time frame for the analysis and the general steps followed in the analysis.

#### **1.3.1 Types of Economic Effects Considered**

40. This economic analysis considers both economic efficiency and distributional effects. In the case of critical habitat designation, economic efficiency effects generally reflect the “opportunity costs” associated with the commitment of resources required to comply with the Act. For example, if the activities that can take place on a parcel of private land are limited as a result of a designation, and thus the market value of the land reduced, this reduction in value represents one measure of opportunity cost or change in economic efficiency. Similarly, the costs incurred by a Federal action agency to consult with the Service under section 7 represent opportunity costs of the designation.
41. This analysis also addresses how the impacts are distributed, including an assessment of any local or regional economic impacts and the potential effects on small entities and the energy industry. This information can be used by decision-makers to assess whether the effects of the designation might unduly burden a particular group or economic sector.
42. For example, while the designation may have a relatively small impact when measured in terms of changes in economic efficiency, individuals employed in a particular

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<sup>10</sup> 16 U.S.C. § 1533(b)(2).

<sup>11</sup> Executive Order 12866, “Regulatory Planning and Review,” September 30, 1993; Executive Order 13211, “Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use,” May 18, 2001; 5 U.S.C. §§ 601 *et seq.*; and Pub Law No. 104-121; and 2 U.S.C. §§658-658g and 1501-1571.

sector of the economy in the geographic area of the designation may experience relatively greater effects. The difference between economic efficiency effects and distributional effects, as well as their application in this analysis, are discussed in greater detail below.

### **Efficiency Effects**

43. At the guidance of the Office of Management and Budget (OMB) and in compliance with Executive Order 12866 “Regulatory Planning and Review,” Federal agencies measure changes in economic efficiency in order to understand how society, as a whole, will be affected by a regulatory action.<sup>12</sup> In the context of this regulatory action, these efficiency effects represent the opportunity cost of resources used or benefits foregone by society as a result of critical habitat designation and other co-extensive regulations.<sup>13</sup> Economists generally characterize opportunity costs in terms of changes in producer and consumer surpluses in affected markets.<sup>14</sup>
44. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a landowner or manager may need to enter into a consultation with the Service to ensure that a particular activity will not adversely modify critical habitat. The effort required for the consultation represents an economic opportunity cost, because the landowner or manager’s time and effort would have been spent in an alternative activity had the parcel not been included in the designation. When compliance activity is not expected to significantly affect markets -- that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price -- the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.
45. Where a designation is expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, a designation that precludes the development of large areas of land may shift the price and quantity of housing supplied in a region. In this case, changes in economic efficiency can be measured by considering changes in producer and consumer surplus in the real estate market.
46. This analysis begins by measuring reasonably foreseeable compliance costs. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. However, if the designation is expected to significantly impact markets,

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<sup>12</sup> Executive Order 12866, “Circular A-4,” September 17, 2003.

<sup>13</sup> The term “co-extensive” is discussed in greater detail in Section 1.3.3.

<sup>14</sup> For additional information on the definition of “surplus” and an explanation of consumer and producer surplus in the context of regulatory analysis, see Gramlich, Edward M., *A Guide to Benefit-Cost Analysis (2nd Ed.)*, Prospect Heights, Illinois: Waveland Press, Inc., 1990; and U.S. Environmental Protection Agency, *Guidelines for Preparing Economic Analyses*, EPA 240-R-00-003, September 2000, available at <http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html>.

the analysis will consider potential changes in consumer and/or producer surplus in affected markets.

### **Distributional and Regional Economic Effects**

47. Measurements of changes in economic efficiency focus on the net impact of the regulation, without consideration for how certain economic sectors or groups of people are affected. Thus, a discussion of efficiency effects alone may miss important distributional considerations concerning groups that may be disproportionately affected. OMB encourages Federal agencies to consider distributional effects separately from efficiency effects.<sup>15</sup> This analysis considers several types of distributional effects, including impacts on small entities; impacts on energy supply distribution and use; and regional economic impacts. It is important to note that these are fundamentally different measures of economic impact than efficiency effects, and thus cannot be added to or compared with estimates of changes in economic efficiency.

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

48. This analysis considers how small entities, including small businesses, organizations, and governments, as defined by the RFA, might be affected by critical habitat designation and other co-extensive regulations.<sup>16</sup> In addition, in response to Executive Order 13211 “Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use,” this analysis considers the impacts of critical habitat on the energy industry and its customers.<sup>17</sup>

#### **Regional Economic Effects**

49. Regional economic impact analysis provides an assessment of the potential localized effects. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that mathematically represent the relationship between a change in one sector of the economy (e.g., hydroelectric power generation) and the effect of that change on economic output, income, or employment in other local industries (e.g., manufacturers relying on the electricity generated). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.

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<sup>15</sup> Office of Management and Budget, “Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations; Notice” 68 *Federal Register* 5492, February 3, 2003.

<sup>16</sup> 5 U.S.C. § 601 *et seq.*

<sup>17</sup> Executive Order 13211, “Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use,” May 18, 2001.

50. The use of regional input/output models can overstate the long-term impacts of a regulatory change. Most importantly, these models provide a static view of the economy of a region. That is, they measure the initial impact of a regulatory change on an economy but do not consider long-term adjustments that the economy will make in response to this change. For example, these models provide estimates of the number of jobs lost as a result of a regulatory change, but do not consider re-employment of these individuals over time. In addition, the flow of goods and services across the regional boundaries defined in the model may change as a result of the designation, compensating for a potential decrease in economic activity within the region.
51. Despite these and other limitations, in certain circumstances regional economic impact analysis may provide useful information about the scale and scope of localized impacts. It is important to remember that measures of regional economic effects generally reflect shifts in resource use rather than efficiency losses. These types of distributional effects, therefore, should be reported separately from efficiency effects (i.e., not summed). In addition, measures of regional economic impact cannot be compared with estimates of efficiency effects.

### **1.3.2 Defining the Baseline**

52. The purpose of this analysis is to measure the economic impact of compliance with the protections derived from the designation of critical habitat, including habitat protections that may be co-extensive with the listing of the species. Economic impacts to land use activities may exist in the absence of co-extensive protections. These impacts may result from, for example:
- Local zoning laws;
  - State natural resource laws; and
  - Enforceable management plans and best management practices applied by other State and Federal agencies.

Economic impacts that result from these types of protections are not included in this assessment; they are considered to be part of the “baseline.” Existing laws, regulations, and policies are described in greater detail Section 2 of this analysis.

### 1.3.3 Direct Compliance Costs Associated With Section 7 of the Act

53. The measurement of direct compliance costs focuses on the implementation of section 7 of the Act. This section requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. The administrative costs of these consultations, along with the costs of project modifications resulting from these consultations, represent the direct compliance costs.
54. This analysis does not differentiate between consultations that result from the listing of the species (i.e., the jeopardy standard) and consultations that result from the presence of critical habitat (i.e., the adverse modification standard). Consultations resulting from the listing of the species, or project modifications meant specifically to protect to the species as opposed to its habitat, may occur even in the absence of critical habitat. However, in 2001, the U.S. 10th Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of critical habitat designation, regardless of whether those impacts are attributable co-extensively to other causes.<sup>18</sup> Given the similarity in regulatory definitions between the terms “jeopardy” and “adverse modification,” in practice it can be difficult to pre-determine the standard that drives a section 7 consultation. Consequently, in an effort to ensure that this economic analysis complies with the instructions of the 10th Circuit as well as to ensure that no costs of the proposed designation are omitted, the potential effects associated with all section 7 impacts in or near proposed critical habitat are fully considered. In doing so, the analysis ensures that any critical habitat impacts that are co-extensive with the listing of the species are not overlooked.

### 1.3.4 Indirect Costs

55. A designation may, under certain circumstances, affect actions that do not have a Federal nexus or otherwise are not subject to the provisions of section 7 under the Act. The potential exists for several types of such indirect effects: three examples are discussed in this section. First, some landowners may voluntarily elect to complete a habitat conservation plan (HCP) in response to having their land designated as critical habitat. Second, some State laws may require landowners and managers to consider the effects of their actions on sensitive species and habitat. Thus, designation of critical habitat could trigger additional regulatory burden due to new information provided by the designation. Third, the consultation process may result in time delays for upcoming or ongoing projects, and the designation may foster regulatory uncertainty for prospective projects. The three most common categories of indirect effects are discussed further below.

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<sup>18</sup> *New Mexico Cattle Growers Ass'n v. U.S.F.W.S.*, 248 F.3d 1277 (10th Cir. 2001).

### Creation of Habitat Conservation Plans (HCPs)

56. No HCPs are anticipated within the boundaries of this proposed designation. Therefore, HCP-related costs are not an issue in this analysis. However, such costs may be a factor in other economic analyses of proposed critical habitat designations, so, this methodological discussion has been retained.
57. Under section 10(a)(1)(B) of the Act, a non-Federal entity (i.e., a landowner or local government) may develop an HCP for an endangered animal species in order to meet the conditions for issuance of an incidental take permit in connection with the development and management of a property.<sup>19</sup> The HCP intends to counterbalance potential harmful effects that a proposed activity may have on a species, while allowing the otherwise lawful activity to proceed. As such, the purpose of the habitat conservation planning process is to ensure that the effects of incidental take are adequately minimized and mitigated. Thus, HCPs are developed to ensure compliance with section 9 of the Act and to meet the requirements of section 10 of the Act.
58. However, a connection may exist between the creation of HCPs and the costs these plans impose and the designation of critical habitat. The Service, being a Federal entity, must formally consider whether an HCP will jeopardize a listed species or adversely modify its designated critical habitat before approving the plan. This review process may be a direct impact under section 7 of the Act. However, in certain circumstances, the effort involved in creating the HCP and associated conservation actions may also generate indirect effects associated with the designation of critical habitat. For example, in one past instance, landowners preemptively developed HCPs in an effort to avoid having their property designated as critical habitat.<sup>20</sup> In this case, the effort involved in creating the HCP and undertaking associated conservation actions were considered to be an effect of designation.
59. The following scenarios regarding HCP creation provide general guidance regarding the degree to which associated costs should be considered within the context of a critical habitat economic analysis:
- In cases in which an HCP existed prior to a proposed designation, the costs of developing the HCP and the added costs of management imposed by the HCP should not be considered in the analysis of the effects of the designation. These costs are appropriately considered to be part of the regulatory baseline, because their creation was driven by the listing of the species and the need to avoid take, which is prohibited under section 9 of the Act. However, in cases

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<sup>19</sup> U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning." From: <http://endangered.fws.gov/hcp/>, as viewed on August 6, 2002. Sections 9 and 10 of the Act do not apply to plants.

<sup>20</sup> See Industrial Economics, Incorporated, *Economic Analysis of Critical Habitat Designation for the Nine Bexar County Texas Invertebrate Species*, prepared for the U.S. Fish and Wildlife Service, March 3, 2003.

where designated critical habitat overlaps with completed HCPs, the economic analysis will need to consider the cost to the Service to re-consult on the plan's impact to critical habitat and whether or not this process may result in additional conservation actions.

- In cases in which an HCP is proposed, or reasonably foreseeable absent the designation of critical habitat, the administrative costs associated with the required internal section 7 consultation should be included in the economic analysis of total section 7 costs, because the Service will need to consider the effects of the plan on designated critical habitat. In addition, if as a result of the designation additional project modifications will be recommended by the Service and incorporated into the HCP in order to avoid adversely modifying critical habitat, the costs of these project modifications should also be included in the economic analysis of critical habitat.<sup>21</sup>
- In cases in which development of one or more HCPs can be documented as being precipitated by critical habitat designation (i.e., to avoid designation or to reduce the costs of the designation), the costs of development of the HCP and the added costs of management imposed by the HCP should be included in the critical habitat economic analysis. In such cases the analysis should be presented with appropriate caveats as to the uncertainty regarding the extent to which the HCP would have existed absent critical habitat designation.

As previously stated, no HCPs are anticipated to be located within the boundaries of this proposed designation.

### **Other State and Local Laws**

60. Under certain circumstances, the designation of critical habitat may provide new information to a community about the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under other State or local laws. In cases

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<sup>21</sup> Project modification costs associated with the jeopardy standard are not considered for the following reason. Section 10(a)(2)(B) of the Act requires that for the issuance of an incidental take permit, the HCP must assure that “the taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild.” According to the Service’s *Habitat Conservation Planning and Incidental Take Permit Processing Handbook*, “the wording of this criterion is identical to the “jeopardy” definition under the section 7 regulations (50 CFR Part 402.02)...Congress was explicit about this link, stating in the Conference Report on the 1982 ESA amendments that the Services will determine whether or not to grant a permit, “in part, by using the same standard as found in section 7(a)(2) of the ESA, as defined by the [Services’] regulations.”” (U.S. Department of the Interior and U.S. Department of Commerce, *Habitat Conservation Planning and Incidental Take Permit Processing Handbook*, November 4, 1996). As a result, during the HCP process, actions undertaken to meet the jeopardy provision of section 7 are also required under section 10 of the Act. Therefore, in circumstances where an HCP is reasonably foreseeable absent the designation of critical habitat, these actions are considered to be part of the baseline of this economic analysis.

where these costs would not have been triggered "but for" the designation of critical habitat, they are included in this economic analysis.

61. For example, in Tennessee the designation of critical habitat for the mussels may engender additional state water quality requirements under the Clean Water Act. Critical habitat is one of the considerations used by Tennessee Department of Environment and Conservation (TDEC) when determining whether a water is a high quality water, Tier II or Tier III (also known as Outstanding National Resource Waters). There are four characteristics of high quality waters:

- Waters that provide habitat for ecologically significant populations of aquatic or semi-aquatic plants or animals, including those proposed or listed for formal state or federal status.
- Waters that provide specialized recreational opportunities related to existing water quality.
- Waters that possess outstanding scenic or geologic values.
- Waters where existing conditions exceed water quality standards.

If a water is designated as critical habitat it is determined to be of high ecological value. If that water is not determined to be of low value in any of the other categories it will be designated a high quality water.

62. When a water is designated as high quality, no degradation is allowed, unless it can be demonstrated that the discharge change is a result of economic or social necessity and will not interfere with or become injurious to any existing classified uses. The determination of whether or not a discharge will degrade a water body is made on a case by case basis. Additional administrative and project modification costs may result from a change in water quality status. Although these costs are a direct result of the Clean Water Act, they may not have occurred in the absence of critical habitat. Therefore, they are considered to be an indirect effect of the designation.

### **Time Delays and Regulatory Uncertainty**

63. In addition to the indirect effects of compliance with other laws triggered by the designation, project proponents, land managers and landowners may face additional indirect impacts. These can include costs due to project delays associated with the consultation process or compliance with other regulations, or, in the case of land location within or adjacent to the designation, loss in property values due to regulatory uncertainty, and loss (or gain) in property values resulting from public perceptions regarding the effects of critical habitat. These categories of potential effects are described in greater detail below.

### Time Delays

64. Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the section 7 consultation process and/or compliance with other laws triggered by the designation. The need to conduct a section 7 consultation will not necessarily delay a project, as often the consultation may be coordinated with the existing baseline regulatory approval process. However, depending on the schedule of the consultation, a project may experience additional delays, resulting in an unanticipated extension in the time needed to fully realize returns from the planned activity. To the extent that delays result from the designation, they are considered in the analysis. Specifically, the analysis considers costs associated with any incremental time delays associated with section 7 consultation or other requirements triggered by the designation above and beyond project delays resulting from baseline regulatory processes. Time delays resulting from consultations on the mussels are possible, where appropriate these costs are included.

### Regulatory Uncertainty

65. The Service conducts each section 7 consultation on a case-by-case basis and issues a Biological Opinion on formal consultations based on species-specific and site-specific information. As a result, government agencies and affiliated private parties who need to consult with the Service under section 7 may face uncertainty concerning whether project modifications will be recommended by the Service and what the nature of these modifications will be. This uncertainty may diminish as consultations are completed and additional information becomes available on the effects of critical habitat on specific activities. However, a degree of regulatory uncertainty may persist. In some cases, this uncertainty may be incorporated by the project proponent into the costs of completing a proposed activity. For example, mining companies uncertain about potential restrictions to their activities in designated areas of critical habitat may lease mining rights at a reduced rate. They may retain outside experts or legal counsel to better understand their responsibilities with regard to critical habitat. Where appropriate, the analysis considers the potential costs associated with regulatory uncertainty.

### Stigma

66. In some cases, the public may perceive that critical habitat designation may result in incremental changes to private property values, above and beyond those associated with anticipated project modifications and regulatory uncertainty described above. That is, the public may perceive that, all else being equal, a property that is designated as critical habitat will have lower market value than an identical property that is not within the boundaries of critical habitat. Public attitudes about the limits and costs that critical habitat may impose can cause real economic effects to the owners of property, regardless of whether such limits are actually imposed.

67. Conversely, the direction of property value effects resulting from critical habitat may be positive rather than negative. For example, property owners may believe that critical habitat designation will increase property values, if they believe that such designation will slow sprawling development in a given community (i.e., protect the rural character of an area) or increase water quality of neighborhood streams and rivers. This perception alone may result in real increases in land values, even in cases where the economic analysis predicts no additional requirements on activities taking place in the area. In either case, as the public becomes aware of the true regulatory burden imposed by critical habitat, the impact of the designation on property markets should decrease. This analysis considers the implications of public perceptions related to critical habitat on private property values within the proposed designation.

### **1.3.5 Benefits**

68. The published economics literature has documented that real social welfare benefits can result from conservation and recovery of endangered and threatened species. Such benefits have also been ascribed to preservation of open space and biodiversity, both of which can be associated with species conservation, but which are not the purpose of critical habitat. Likewise, regional economies and communities can benefit from the preservation of healthy populations of endangered and threatened species, and the habitat on which these species depend.
69. In Executive Order 12866, OMB directs Federal agencies to provide an assessment of costs and benefits of a proposed regulatory actions.<sup>22</sup> However, in its guidance for implementing Executive Order 12866, OMB acknowledges that often, it may not be feasible to monetize, or even quantify, the benefits of environmental regulations.<sup>23</sup> Where benefits cannot be quantified, OMB directs agencies to describe the benefits of a proposed regulation qualitatively. This report provides insight into the potential economic benefits of critical habitat designation based on information obtained in the course of developing the economic analysis. It is not intended to provide a complete analysis of all of the benefits that could result from the designation. *Given these limitations, 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.*

### **1.3.6 Analytic Time Frame**

70. The analysis examines activities taking place both within and adjacent to the proposed designation. It estimates impacts based 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

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<sup>22</sup> Executive Order 12866, “Regulatory Planning and Review,” September 30, 1993.

<sup>23</sup> U.S. Office of Management and Budget, “Circular A-4,” September 17, 2003.

bases estimates on activities that are likely to occur within a ten year time frame, beginning on the day that the current proposed rule becomes available to the public. The ten-year time frame was chosen for the analysis because, as the time horizon for an economic analysis is expanded, the assumptions on which the projected numbers of projects are based become increasingly speculative. As a result, it is difficult to predict not only the numbers of projects, but also the cost estimates for the associated consultations, beyond a ten-year window. Consequently, attempts to extend the economic analysis beyond the ten-year time window can be speculative. Where future activities burdened by compliance with the Act are reasonable foreseeable beyond the ten-year time frame, this analysis incorporates them.

### **1.3.7 General Analytic Steps**

71. This report relies on a sequential methodology and focuses on distilling the salient and relevant aspects of potential economic impacts of the proposed designation. The steps followed in this analysis consist of:

- Describing current and projected economic activity within and around the proposed critical habitat area;
- Identifying whether such activities are likely to involve a Federal nexus;
- For activities with a Federal nexus, evaluating the likelihood that these activities will require consultations under section 7 of the Act and, in turn, result in any modifications to projects.
- Estimating the direct costs of expected section 7 consultations, project modifications and other economic impacts associated with the designation;
- Estimating the likelihood that current or future activities may require additional compliance with other Federal, State, and local laws as a result of new information provided by the proposed designation;
- Estimating the likelihood that projects will be delayed by the consultation process or other regulatory requirements triggered by the designation;
- Estimating the likelihood that economic activity will be affected by regulatory uncertainty, and/or property values affected;
- Estimating the indirect costs of the designation, as reflected in the cost of compliance with State and local laws, project delays, regulatory uncertainty, and effects on property values;
- Assessing the extent to which critical habitat designation will create costs for small businesses as a result of modifications or delays to projects;

- Assessing the effects of administrative costs and project modifications on the supply, distribution, and use of energy; and
- Determining the benefits that may be associated with the designation of critical habitat.

72. As noted above, this analysis considers both the efficiency effects and distributional effects that could result from this designation. It begins by considering direct compliance costs associated with the designation, as well as potential indirect effects, such as those effects associated with compliance with other Federal, State, and local laws, project delays, and impacts to property values. As necessary, regional economic impacts are described, as are impacts on significantly affected markets. Impacts on small entities and energy production and consumption are discussed separately, in Appendix C. Potential benefits of critical habitat are discussed qualitatively, in Section 5.

#### **1.4 Information Sources**

73. The primary sources of information for this report were communications with personnel from the Service, affected Federal agencies, State agencies and counties. Specifically, communication with personnel from the following entities:

- Alabama Department of Environmental Management (ADEM)
- Alabama Department of Transportation (ADOT)
- Army Corps of Engineers (USACE), Nashville and Norfolk Districts
- Bureau of Economic Analysis (BEA)
- U.S. Census Bureau
- U.S. Environmental Protection Agency (EPA), Regions 3 and 4
- Federal Energy Regulatory Commission (FERC)
- Federal Highway Administration (FHWA), Tennessee, Kentucky, Mississippi, Alabama, and Virginia Divisions
- U.S. Forest Service (FS), Daniel Boone National Forest
- Kentucky Department of Environmental Protection (KDEP)
- Kentucky Department for Surface Mining Reclamation and Enforcement (DSMRE)
- Kentucky Division of Forestry
- Kentucky Division of Oil and Gas (DOG)
- Kentucky Natural Resources and Environmental Protection Cabinet, Division of Water, Water Quality Branch
- Kentucky Transportation Cabinet (KTC)
- Mississippi Department of Environmental Quality (MDEQ)
- Mississippi Department of Transportation (MDOT)
- National Park Service (NPS), Big South Fork National River and Recreation Area, Obed Wild and Scenic River

- Natural Resources Conservation Service (NRCS), Tennessee, Kentucky, Virginia, Alabama, Mississippi Districts
- Department of Interior (DOI), Office of Surface Mining (OSM)
- Rural Utilities Service (RUS)
- Small Business Administration (SBA)
- Tennessee Department of Environment and Conservation (TDEC), Division of Geology (TOG), Division of Natural Heritage (DNH), Division of Water Pollution Control
- Tennessee Department of Transportation (TDOT)
- Tennessee Division of Geology (TDG)
- Tennessee Duck River Development Agency (TDRDA)
- Tennessee Forestry Division
- Tennessee Valley Authority (TVA)
- Virginia Department of Environmental Quality (VDEQ)
- Virginia Department of Mines, Minerals, and Energy (DMME), Department of Mine Land Reclamation (DMLR)
- Virginia Department of Transportation (VDOT)
- Private Consulting Firms
- Affected counties

74. This section provides information on the socioeconomic characteristics of areas proposed as critical habitat for the mussels. In addition, this section provides relevant information about regulations and requirements that exist in the baseline.

### **2.1 Socioeconomic Profile of the Critical Habitat Area**

75. This section summarizes key economic and demographic information for the 26 counties with areas either proposed for critical habitat or considered important for the conservation of the mussels in Mississippi, Alabama, Virginia, Kentucky, and Tennessee. County-level data are presented to provide context for the discussion of potential economic impacts and to illuminate trends that may influence these impacts.<sup>24</sup> Although county level data may not precisely reflect the socioeconomic characteristics of the areas immediately surrounding the proposed critical habitat and areas essential for the conservation of the mussels, as the units/areas comprise rivers and creeks that cross small portions of counties or cross county barriers, these data provide useful context for the broader analysis.

#### **2.1.1 Mississippi**

76. Critical habitat has been proposed for a portion of Tishomingo County in northeast Mississippi. This county has a total population of 19,163, or less than one percent of the total Mississippi population of 2,844,658 in 2000. The population of the county has increased by about eight percent since the 1990 census.
77. In 2000, Tishomingo County had a per capita personal income (PCPI) of \$16,949. This PCPI was 19 percent below the State average of \$20,920, and 44 percent below the national average of \$30,413.

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<sup>24</sup> Population summaries are derived primarily from: U.S. Census Bureau, State and County QuickFacts, accessed at <http://quickfacts.census.gov/qfd/index.html> and county estimates. Personal income data are derived from U.S. Bureau of Economic Analysis, Regional Accounts Data, accessed at <http://www.bea.gov/bea/regional/reis/>.

### **2.1.2 Alabama**

78. Critical habitat has been proposed for a portion of Colbert County in northwest Alabama. In 2000, Colbert had a total population of 54,984, or slightly over Alabama's total population of 4,447,100. The population of the county increased by six percent from 1990 to 2000.
79. In 2000, Colbert County had a PCPI of \$22,146, which was five percent less than the State average of \$23,964 and 27 percent below the national average of \$30,413.

### **2.1.3 Virginia**

80. Critical habitat has been proposed for portions of Lee, Scott, Russell, and Tazewell Counties in western Virginia. These counties have a total population of 121,898, or about two percent of Virginia's total population of 7,078,515 in 2000. On average, the total population of the counties decreased by less than one percent from 1990 to 2000.
81. The four counties containing proposed critical habitat area in Virginia had a median<sup>25</sup> PCPI of \$17,937 in 2000, which was 43 percent below the average PCPI of the entire State of Virginia (\$31,210) and 41 percent below the national average of \$30,413.

### **2.1.4 Kentucky**

82. Critical habitat has been proposed within portions of Laurel, McCreary, Pulaski, and Whitley Counties in southeastern Kentucky. In addition, areas within Rockcastle County are considered essential to the conservation of the mussels. These counties collectively had a total population of 178,459 in 2000, or over four percent of the total Kentucky population (4,041,769). With 56,217 residents, Pulaski County has the highest population of any county containing proposed critical habitat units or areas considered essential for the conservation of the mussels in Kentucky. Rockcastle County is the least populous county with 16,582 residents. From 1990 to 2000, the median population increase of the counties was 12 percent.
83. The five counties in Kentucky had a median PCPI of \$17,198 in 2000, which is 71 percent of the average PCPI of the entire State of Kentucky (\$24,258) and 43 percent below the national average of \$30,143. Pulaski has the highest per capita income of the four counties (\$21,081), while McCreary has the smallest (\$13,768).

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<sup>25</sup> The median value represents the middle value such that roughly half of the data is smaller and roughly half of the data is larger.

### **2.1.5 Tennessee**

84. Critical habitat has been proposed for portions of Maury, Marshall, Fentress, Scott, Morgan, Cumberland, Hancock, Claiborne, Hawkins, Cocke, and Hamblen Counties in Tennessee. In addition, areas within Grainger, Jefferson, Knox, and Sevier Counties are considered essential to the conservation of the mussels. These 15 counties collectively have a population of 900,635, or approximately 16 percent of Tennessee's population of 5,689,283. With 382,032 residents, Knox County has the highest population of any county containing proposed critical habitat units or areas considered essential to the conservation of the mussels within Tennessee. Hancock County is the least populous Tennessee county with just under 7,000 residents. The median population increase of these 15 counties since the 1990 census is 15 percent, less than that of the State, which experienced an increase of approximately 17 percent.
85. The median 2000 PCPI of the 15 counties within Tennessee was \$19,355, which is 74 percent of Tennessee's average PCPI (\$26,290) and 36 percent below the national average of \$30,413. Knox had the highest PCPI of the 15 counties (\$28,440), while Hancock had the smallest (\$13,619).

### **2.1.6 Summary**

86. Exhibit 2-1 below summarizes key socioeconomic information for the 26 counties containing proposed critical habitat or areas considered essential for the conservation of the mussels. From 1990 to 2000, Alabama, including Colbert County, and Mississippi, including Tishomingo County, grew at a slower rate than the nation (which grew at 13.1 percent). While Kentucky also grew at a slower rate than the nation, both Laurel and Pulaski Counties exceeded the national average growth rate for the decade. The population growth in Virginia also exceeded the national average, but not in the counties containing proposed critical habitat; Russell and Scott Counties grew at a slower rate, and Lee and Tazewell Counties experienced a population decline during the decade. Tennessee, which contains the remaining 15 counties, grew at a faster rate than the nation. With the exception of Hancock County, all counties containing proposed critical habitat within Tennessee also grew at faster rates than the nation.

**Exhibit 2-1  
SOCIOECONOMIC PROFILE OF COUNTIES CONTAINING CRITICAL HABITAT UNITS AND AREAS ESSENTIAL TO THE CONSERVATION OF THE  
MUSSELS (2000)**

State	County	Population	Percent of State	Percent Change 1990 to 2000	Per Capita Income	Persons per square mile	Unit/Area	Description
<b>Alabama</b>	<b>State Total</b>	<b>4,447,100</b>	<b>100%</b>	<b>10.1%</b>	<b>23,694</b>	<b>87.6</b>		
	Colbert	54,984	1.2%	6.4%	22,146	92.5	U2	Bear Creek
<b>Kentucky</b>	<b>State Total</b>	<b>4,041,769</b>	<b>100%</b>	<b>9.6%</b>	<b>24,258</b>	<b>101.7</b>		
	Laurel	52,715	1.3%	21.4%	20,063	121.0	U11, A3	Sinking Creek, Rockcastle River
	McCreary	17,080	0.4%	9.5%	13,768	39.9	U8, U9, U12	Rock Creek, Big South Fork, Marsh Creek
	Pulaski	56,217	1.4%	13.6%	21,081	85.0	U10, A3	Buck Creek, Rockcastle River
	Rockcastle	16,582	0.4%	12.0%	15,986	52.2	A3	Rockcastle River
	Whitley	35,865	0.9%	7.6%	17,198	81.5	U13	Laurel Fork
<b>Mississippi</b>	<b>State Total</b>	<b>2,844,658</b>	<b>100%</b>	<b>10.5%</b>	<b>20,900</b>	<b>60.6</b>		
	Tishomingo	19,163	0.7%	8.4%	16,949	45.2	U2	Bear Creek
<b>Tennessee</b>	<b>State Total</b>	<b>5,689,283</b>	<b>100%</b>	<b>16.7%</b>	<b>26,290</b>	<b>138.0</b>		
	Claiborne	29,862	0.5%	14.3%	19,171	68.8	U4, U13	Powell River, Laurel Fork
	Cocke	33,565	0.6%	15.2%	18,255	77.3	U6	Nolichucky River
	Cumberland	46,802	0.8%	34.7%	21,317	68.7	U3	Obed River
	Fentress	16,625	0.3%	13.3%	18,990	33.3	U9	Big South Fork
	Grainger	20,659	0.4%	20.8%	17,494	73.7	A2	Holston River
	Hamblen	58,128	1.0%	15.2%	24,060	361.0	U6	Nolichucky River
	Hancock	6,786	0.1%	7.0%	13,626	30.5	U4, U5	Powell River, Clinch River
	Hawkins	53,563	0.9%	20.2%	19,255	110.1	U7	Beech Creek
	Jefferson	44,294	0.8%	34.2%	20,331	161.8	A2	Holston River
	Knox	382,032	6.7%	13.8%	28,440	751.3	A1	French Broad River
	Marshall	26,767	0.5%	24.3%	24,218	71.3	U1	Duck River
	Maury	69,498	1.2%	26.8%	23,489	113.4	U1	Duck River
	Morgan	19,757	0.3%	14.2%	15,412	37.8	U3, U9	Obed River, Big South Fork
	Scott	21,127	0.4%	15.1%	17,207	39.7	U9	Big South Fork
Sevier	71,170	1.3%	39.4%	19,869	120.2	A1	French Broad River	

<b>Exhibit 2-1</b> <b>SOCIOECONOMIC PROFILE OF COUNTIES CONTAINING CRITICAL HABITAT UNITS AND AREAS ESSENTIAL TO THE CONSERVATION OF THE MUSSELS (2000)</b>								
State	County	Population	Percent of State	Percent Change 1990 to 2000	Per Capita Income	Persons per square mile	Unit/Area	Description
Virginia	State Total	7,078,515	100%	14.4%	31,210	178.8		
	Lee	23,589	0.3%	-3.7%	17,308	54.0	U4	Powell River
	Russell	30,308	0.4%	5.7%	18,565	63.9	U5	Clinch River
	Scott	23,403	0.3%	0.9%	17,049	43.6	U5	Clinch River
	Tazewell	44,598	0.6%	-3.0%	20,052	85.8	U5	Clinch River

Source: Population summaries are derived primarily from: U.S. Census Bureau, accessed at <http://quickfacts.census.gov/qfd/index.html> and <http://www.census.gov/epcd/cbp/view/cbpview.html> and Bureau of Economic Analysis Regional Accounts Data, accessed at <http://www.bea.gov/bea/regional/reis/>

### **2.1.7 Economic Activity**

87. Some of the most common land use activities occurring within the vicinity of the critical habitat units and areas essential to the conservation of the mussels are agriculture, recreation, and development-related activity. However, these activities do not necessarily constitute the bulk of economic activity occurring within the proposed critical habitat units. The largest industries, as defined by annual payroll by industry, are manufacturing, health care and social assistance, and retail trade. Understanding the extent of the various land-use activities and economic sectors in areas in or around critical habitat units and areas essential to the conservation of the mussels underscores the activities most likely to experience section 7 impacts. Exhibit 2-2 highlights the annual payroll for various industries in the 26 counties containing critical habitat units and areas essential to the conservation of the mussels.

## **2.2 Relevant Baseline Elements**

88. “Baseline elements” consist of regulations, guidelines, and/or policies that may afford protection for the mussels in the absence of section 7 implementation. Baseline protections for the mussels include Federal and State laws, including the prohibition against take of the species contained within section 9 of the Act, as well as voluntary environmental programs that provide protection to the mussels in the absence of the protection afforded by the listing and any anticipated additional protection afforded by the proposed critical habitat designation. This discussion focuses on several important regulatory elements that have bearing on this analysis.
89. The following regulations provide environmental protection in the proposed critical habitat areas. Most of these regulations specifically address the maintenance or improvement of water quality. Because the mussels are aquatic species, they benefit from these protections. Although section 7 consultations will take place on activities involving a Federal nexus, measures required to protect the mussels and their habitat are complemented by regulations that serve to protect water quality. Provided these regulations are properly implemented and effective, the presence of mussels’ critical habitat may not be expected to result in extensive project modifications. Appendix B provides additional discussion of State and other baseline regulatory elements potentially relevant to this analysis.

**Exhibit 2-2**

**ECONOMIC ACTIVITY WITHIN COUNTIES CONTAINING CRITICAL HABITAT/AREAS ESSENTIAL TO  
THE CONSERVATION OF THE MUSSELS:  
ANNUAL PAYROLL BY INDUSTRY (2000)**

Industry	Annual Payroll (Thousands)				
	Virginia	Tennessee	Mississippi	Kentucky	Alabama
Agriculture, Forestry, Hunting, and Fishing	\$1,680	\$2,175	--	\$1,637	--
Mining	\$73,881	\$34,723	--	\$44,673	\$3,406
Utilities	--	\$5,548	--	\$13,187	--
Construction	\$38,594	\$520,417	\$4,775	\$108,493	\$38,575
Manufacturing	\$95,749	\$2,444,416	\$58,442	\$259,740	\$147,157
Wholesale Trade	\$28,028	\$779,879	\$4,560	\$84,327	\$35,931
Retail Trade	\$91,375	\$1,041,632	\$10,766	\$166,896	\$53,009
Transportation and Warehousing	\$14,309	\$292,183	\$3,943	\$55,827	\$8,916
Information	\$12,589	\$292,297	\$447	\$52,618	\$5,089
Finance and Insurance	\$22,381	\$481,365	\$3,725	\$66,584	\$15,794
Real Estate	\$5,150	\$155,453	\$230	\$10,074	\$3,208
Professional, scientific & technical services	\$34,285	\$504,324	\$1,774	\$35,087	\$6,263
Management of companies and enterprises	\$3,395	\$298,365	--	\$6,988	--
Admin, support, waste mgt, remediation services	\$10,554	\$420,090	\$863	\$171,086	\$27,384
Educational services	\$3,908	\$40,577	\$489	\$827	\$838
Health care and social assistance	\$107,227	\$1,467,565	\$11,460	\$223,382	\$53,014
Arts, entertainment & recreation	\$4,699	\$96,999	--	\$4,338	--
Accommodation & food services	\$15,917	\$448,189	\$1,400	\$49,551	\$14,821
Other services (except public administration)	\$16,523	\$272,608	\$1,556	\$27,992	\$18,216
Auxiliaries (exc corporate, subsidiary & regional mgt)	--	\$32,598	--	--	--
Unclassified establishments	\$368	\$2,950	--	\$88	--
<b>TOTAL</b>	<b>\$580,612</b>	<b>\$9,634,353</b>	<b>\$104,430</b>	<b>\$1,383,395</b>	<b>\$431,621</b>

Source: U.S. Census Bureau, *2000 County Business Patterns*, accessed at <http://censtats.census.gov/cbpnaic/cbpnaic.shtml> on May 23, 2003.

Notes: Payroll estimates are in 2001 dollars. These values reflect the combined value of the counties containing critical habitat within these States, and are not statewide totals. "--" represents data not reported in the Census County Business Patterns.

### **2.2.1 Recovery Plan**

90. An important component of the regulatory baseline is the Agency Draft Recovery Plan for Cumberland Elktoe, Oyster Mussel, Cumberlandian Combshell, Purple Bean, and Rough Rabbitsfoot, published in 2003.<sup>26</sup> The Recovery Plan establishes recovery criteria for the mussels and proposes actions to restore viable mussel populations. The ultimate goal of the Recovery Plan is to establish criteria and objectives that when implemented should enable the species to recover to the point that it can be removed from the Federal list of endangered and threatened wildlife and plants. While the Recovery Plan imposes no binding restrictions or obligations on landowners and managers, it serves as an important information source.

### **2.2.2 Overlap With Other Listed Species**

91. Several other Federally listed endangered species may be found within the proposed critical habitat area for the mussels. Further, critical habitat exists for three fish species within the portions of the proposed critical habitat for the mussels.<sup>27</sup> Generally, if a consultation is triggered for any listed species, the consultation process will also take into account all other listed species known or thought to occupy areas on or near the project lands. As such, listing or critical habitat-related protections for other threatened or endangered species may benefit the mussels as well (i.e., provide baseline protection). However, due to the difficulty in apportioning the costs of consultations between various species as well as awareness that a consultation for the mussels would need to be conducted absent consultations for or involving other species, this analysis does not attempt to apportion the consultations and related costs reported by Action agencies between the mussels and other listed species, and assumes that all future section 7 consultations within the extant boundaries of the proposed critical habitat are fully attributable to the presence of the mussels and their habitat. While this may lead to an overestimate of costs, it is likely that adding consideration of mussel critical habitat to a consultation regarding other species or habitats will add an incremental cost to that consultation. The Service has conducted consultations on the mussels in combination with numerous species, as indicated in Appendix A.

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<sup>26</sup> U.S. Fish and Wildlife Service. 2003. Agency Draft Recovery Plan for Cumberland Elktoe, Oyster Mussel, Cumberlandian Combshell, Purple Bean, and Rough Rabbitsfoot. Atlanta, Georgia. 176 pp.

<sup>27</sup> Approximately 207 miles of the proposed critical habitat for the mussels is designated critical habitat for the yellowfin madtom, slender chub, or spotfin chub on portions of Unit 3 Obed River, Unit 5 Clinch River, and Unit 4 Powell River.

## 2.2.3 Federal Statutes and Regulations

### Federal Power Act

92. The Federal Power Act (FPA) was promulgated in 1920.<sup>28</sup> 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.<sup>29</sup> 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.
93. 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.<sup>30</sup> 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.
94. Furthermore, section 18 of the FPA provides that FERC require facility owners/operators to construct, maintain, and operate, at their own expense, fishways<sup>31</sup> if operation of the facility will impact the passage of fish species in the project area or planned for introduction in the area.<sup>32</sup>

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<sup>28</sup> Federal Power Act, 16 U.S.C. §800 (1986).

<sup>29</sup> Federal Power Act Summary, American Rivers Organization, <http://www.amrivers.org/hydropowertoolkit/hydroreformtoolkitlawsfpa.htm>

<sup>30</sup> Federal Power Act, 16 U.S.C. §803(j) (1986).

<sup>31</sup> A fishway is a structure constructed at a dam that allows for fish species to pass over the dam without harm or injury. A variety of ways exist 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). According to Section 1701(b) of the Energy Policy Act of 1992, “[T]he item which may constitute a ‘fishway’ under section 18 for the safe and timely upstream and downstream passage of fish shall be limited to physical structures, facilities, or devices necessary to maintain all life stages of such fish, and project operations and measures related to such structures, facilities, or devices which are necessary to ensure the effectiveness of such structures, facilities, or devices for such fish”.

<sup>32</sup> Federal Power Act, 16 U.S.C. §811 (1986).

## Clean Water Act (CWA)

95. 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.<sup>33</sup>
96. 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.<sup>34</sup> 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. The Service consults with the EPA on the triennial review to ensure that threatened and endangered species impacts are contemplated in the development of standards.
97. 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 issue 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.<sup>35</sup>
98. 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.”<sup>36</sup>
99. The CWA will influence activities on or near all 13 of the critical habitat units, due to the existence of road/bridge construction, residential development, and hydropower

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<sup>33</sup> Clean Water Act, 33 U.S.C. §1251 (1987).

<sup>34</sup> Clean Water Act, 33 U.S.C. §402.

<sup>35</sup> Clean Water Act, 33 U.S.C. §303, 305.

<sup>36</sup> Section 404 of the Clean Water Act: An Overview, <http://www.epa.gov/owow/wetlands/facts/fact10.html>

relicensing activities on or near all 13 units. Since water quality is important to the recovery of the mussel, 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 CWA is likely to provide substantial baseline protection to the mussels.

### **Tennessee Valley Authority (TVA) Act**

100. Section 26a of the TVA Act requires TVA approval of any construction activities that affect navigation, flood control, or public lands along the shoreline of the TVA reservoirs, the Tennessee River, or its tributaries. Before permitting an activity it must be deemed compatible with its mission of integrated river management, including water quality, flood control, navigation, land use, recreation, and power generation. Activities that require approval include boat docks, piers, boat ramps, bridges, culverts, commercial marinas, barge terminals and mooring cells, water intake and sewage outfalls, and fill or construction within the floodplain. The TVA Act will influence activities on or near nine critical habitat units for the mussels.<sup>37</sup>

### **National Wild and Scenic Rivers Act (NWSRA)**

101. The NWSRA requires that "In all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic and recreational river areas." It also requires that "the Secretary of the Interior shall make specific studies and investigations to determine which additional wild, scenic and recreational river areas.....shall be evaluated in planning reports by all Federal agencies as potential alternative uses of water and related land resources involved."<sup>38</sup> In partial fulfillment of this requirement, NPS maintains a Nationwide Rivers Inventory (NRI), a register of river segments that potentially qualify as national wild, scenic or recreational river areas.<sup>39</sup> A presidential directive requires Federal agencies to avoid or mitigate adverse effects on rivers identified in the NRI. In addition, agencies are required to consult with the NPS on actions which could affect the wild, scenic or recreational status of a river on the inventory.
102. The NWSRA will provide baseline protection to seven of the 13 critical habitat units for the mussels (Unit 3 Obed River, Unit 10 Buck Creek, Unit 5 Clinch River, Unit 12 Marsh Creek, Unit 4 Powell River, Unit 8 Rock Creek, and Unit 11 Sinking Creek). Since Federal agencies are required to avoid or mitigate adverse effects on National Wild and Scenic Rivers and those on the NRI, this statute will likely impact the extent, location, and

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<sup>37</sup> These include the Unit 1 Duck River, Unit 2 Bear Creek, Unit 3 Obed River, Unit 4 Powell River, Unit 5 Clinch River, Unit 6 Nolichucky River, Unit 7 Beech Creek, Unit 9 Big South Fork, and Unit 13 Laurel Fork.

<sup>38</sup> National Wild and Scenic Rivers Act, 16 U.S.C. §1271-1287 (1968).

<sup>39</sup> The NR I qualifies as a comprehensive plan under section 10(a)(2)(A) of the Federal Power Act.

nature of future activities on or near the seven proposed critical habitat units over the next ten years. As such, the NWSRA is likely to provide substantial baseline protection to the mussels.

### **Fish and Wildlife Coordination Act**

103. The purpose of this act is to ensure that fish and wildlife resources are equally considered with other resources during the planning of water resources development projects by: 1) authorizing the Secretaries of Agriculture and Commerce to provide assistance to Federal and State agencies in protecting game species and studying the effects of pollution on wildlife; and 2) requiring consultation with the Service for water impoundment or diversion projects with a Federal nexus.<sup>40</sup>

### **Soil and Water Resources Conservation Act of 1977**

104. This Soil and Water Resources Conservation Act provides for a continuing appraisal of the Nation's soil, water and related resources, including fish and wildlife habitats, and a soil and water conservation program to assist landowners and land users in furthering soil and water conservation. Specifically, this Act authorizes the Secretary of Agriculture to establish a cooperative conservation program with Federal, State, and local stakeholders for the management of private grazing land to conserve and enhance private grazing land resources.<sup>41</sup>

### **Watershed Protection and Flood Prevention Act**

105. This Act authorizes Federal assistance to local organizations for conservation projects in watershed areas. Specifically, the Secretary of Agriculture is authorized to enter into agreements with local organizations and landowners to provide financial and other assistance in the development of plans to conserve and develop the land's soil, water, woodland, wildlife, energy and recreation resources, and enhance water quality.<sup>42</sup>

### **Endangered Species Act Landowner Incentives Program**

106. This voluntary program, managed by the Service, provides technical and financial assistance to private landowners to address the needs of threatened and endangered species, while also incorporating the need for economic development. Private landowners are offered financial incentives to engage voluntarily in mitigation and habitat conservation planning. These incentives may be in the form of tax incentives and/or cost share payments funded

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<sup>40</sup> Fish and Wildlife Coordination Act, 16 U.S.C. 661-666.

<sup>41</sup> Soil and Resources Conservation Act, 16 U.S.C. 2001-2009.

<sup>42</sup> Watershed Protection and Flood Prevention Act, 16 U.S.C. §§ 1001-1009.

through the Wildlife Conservation Fund or the Land and Water Conservation Fund. To qualify for this program, landowners or other non-Federal partners must contribute at least ten percent of the cost of the conservation project.<sup>43</sup>

### **Surface Mining Control and Reclamation Control Act (SMCRA)**

107. One of the purposes of the SMCRA is to assure surface coal mining operations are conducted to protect the environment.<sup>44</sup> Title 5 of the SMCRA provides requirements for the control of environmental impacts. Operations are required to effectively control erosion and water pollution, to insure that all debris, acid-forming materials, toxic materials, or materials constituting a fire hazard will not contaminate ground or surface waters, control and/or prevent erosion and siltation, pollution of water, damage to fish or wildlife or their habitat, or flow alteration in association, with access roads, and revegetate the area when the operation is complete.
108. States are allowed to assume exclusive jurisdiction over the regulation of surface coal mining and reclamation operations on non-Federal lands, contingent upon the State regulation being as effective and no less stringent than the Federal. The States of Mississippi, Alabama, Kentucky, and Virginia have regulatory primacy for surface coal mining. Tennessee does not have regulatory authority (“primacy “); instead, OSM is responsible for regulating surface coal mining.

### **The National Flood Insurance Act and The Flood Disaster Protection Act**

109. Conditions of future Federal financial assistance to States and/or local communities are 1) the requirement to participate in the flood insurance program; and 2) the adoption of flood plain ordinances with enforcement provisions, consistent with Federal standards, to reduce or avoid future flood losses.<sup>45</sup> Property owners who are being assisted by Federal programs or by federally supervised, regulated, or insured agencies or institutions in the acquisition or improvement of land or facilities currently located or to be located in areas identified as special flood hazards are required to purchase flood insurance. The 100-year flood is used by the National Flood Insurance Program as the standard for floodplain management and the determination of the need for flood insurance.<sup>46</sup>

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<sup>43</sup> U.S. Fish and Wildlife Service, *Fiscal Year 2003 Budget Justifications*, Appropriation: Land Owner Incentive Program, pp. 401.

<sup>44</sup> Surface Mining Control and Reclamation Act, 30 U.S.C. §1202 (1977).

<sup>45</sup> The National Flood Insurance Act 42 U.S.C. §4001 *et seq.* (1968). The Flood Disaster Protection Act 42 U.S.C. §4001 *et seq.* (1973)

<sup>46</sup> The 100-year flood is defined as “the elevation that has a one percent chance of being equaled or exceeded each year”.

#### **2.2.4 State Statutes and Regulations and Other Voluntary Protection Measures**

110. Additional State and other baseline regulatory elements potentially relevant to this analysis are described in Appendix B. As the Appendix shows, a considerable number of State and other regulatory initiatives could provide the mussels with some measure of protection absent section 7 consultation.

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111. The previous two sections introduced the geographic areas in which the Service is proposing to designate critical habitat for the mussels, 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 mussels and their habitat. This section identifies the current land and water uses in or near proposed critical habitat that may be affected by section 7 implementation for the mussels. Importantly, these estimates include the effects of section 7 implementation for all activities associated with the proposed critical habitat area. *As such, this section does not distinguish impacts that may be attributable co-extensively to the listing of the mussels from those impacts attributable solely to the critical habitat designation.*

112. This section begins with a summary of the categories of economic impact associated with section 7 implementation for the mussels. It then provides a list of the activities likely to be affected section 7 implementation.

### **3.1 Categories of Economic Impacts Associated with Section 7 Implementation**

113. 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 mussels.

#### **3.1.1 Technical Assistance**

114. The Service may respond to requests for technical assistance from Federal or State agencies, local municipalities, and private landowners and developers with questions regarding whether specific activities may affect a listed species or its critical habitat. Technical assistance costs represent the estimated economic costs of informational conversations between stakeholders and the Service regarding such potential effects. These technical assistance activities are characteristically low effort voluntary actions between two parties, the Service and the stakeholder. The stakeholder may or may not be a Federal

agency, as opposed to section 7 consultation which by definition involves a Federal nexus with or without private third party involvement.

115. In some instances, technical assistance may involve a request for general review of a project or activity that is not subject to section 7 requirements (e.g., activity on private land without a Federal nexus) as a safeguard to ensure adequate protection for species and habitats of concern. For example, although development of water quality standards within a State requires a section 7 consultation, a State agency may request technical assistance from the Service as an additional precaution to ensure that individual NPDES permits conforming to these standards adequately provide for relevant species and habitat. Although technical assistance is not a direct cost of section 7 of the Act, these costs are incorporated into the cost analysis when they are explicitly propagated by consideration of species and habitat conservation.

### **3.1.2 Section 7 Consultations**

116. The costs of these efforts are an important component of the impacts assessment. 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 currently construed as any direct or indirect alteration that appreciably diminishes the value of critical habitat for conservation of a listed species.
117. In some cases, consultations will involve the Service and another Federal agency only, such as the USACE or the EPA. In addition, they may also include a third party, such as State agencies or private landowners involved in projects on non-Federal lands with a Federal nexus.
118. During a consultation, the Service, the Action agency, and the landowner applying for Federal funding or permitting (if applicable) communicate in an effort to minimize potential adverse effects to the species and/or to the proposed critical habitat. Communication between these parties may occur via written letters, phone calls, in-person meetings, or any combination of these. The duration and complexity of these interactions depends on a number of variables, including the type of consultation, the species, the activity of concern, the region where critical habitat has been proposed, and the involved parties.
119. Section 7 consultations with the Service may be either informal or formal. Informal consultation, which consists of discussions between the Service, the Action agency, and the applicant concerning an action that may affect a listed species or its designated critical habitat, 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 its proposed action may or will adversely affect the listed species or designated critical habitat in ways that cannot be resolved through informal consultation. The formal consultation process results in the Service's determination in its Biological Opinion of whether the action is likely to jeopardize a species or adversely modify critical habitat, and recommendations to minimize those impacts. Regardless of the type of consultation or proposed project, section 7 consultations can require substantial administrative effort on the part of all participants.

120. Estimates of the cost of formal and informal individual consultations for the Service were developed from a review and analysis of historical section 7 files from the Service's Cookeville field office. These estimates were based on a review of over 6,000 technical assistance efforts, informal, and formal consultations dating back to 1997 in Tennessee and Kentucky. Average annual staff time for each category was used to estimate time for a Service biologist to complete each action.<sup>47</sup> Staff time was then multiplied by the appropriate labor rate for staff from the Service.
121. Estimates of the cost of formal and informal individual consultations for all other entities 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.
122. 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. Section 7 consultation costs 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 or biological opinion. Biological assessments (BAs) are prepared to determine whether proposed projects, and in some cases their alternatives, are likely to adversely affect the listed species or designated critical habitat. Biological assessments include a survey of the literature, a detailed discussion of the effects of the action and listed species or critical habitat, and findings based on this information.
123. Per-unit costs associated with formal consultations, informal consultations, and technical assistance calls are presented in Exhibit 3-1. Unless stated otherwise, this table is used to develop total administrative costs for consultations associated with activities within proposed critical habitat for the mussels.

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<sup>47</sup> The estimated time for a Service biologist to complete a technical assistance request is approximately ten minutes. The estimated time for a Service biologist to complete a low complexity informal consultation is approximately 30 minutes, and a high level informal consultation is three hours. The estimated time for a Service biologist to complete a low complexity formal consultation is approximately 12 hours, and a high level formal consultation is 72 hours.

**Exhibit 3-1**

**ESTIMATED ADMINISTRATIVE COSTS OF CONSULTATION AND TECHNICAL ASSISTANCE EFFORTS FOR THE MUSSELS (PER EFFORT)<sup>a</sup>**

<b>Critical Habitat Impact</b>	<b>Scenario</b>	<b>Service<sup>b</sup></b>	<b>Action Agency</b>	<b>Third Party</b>	<b>Biological Assessment<sup>c</sup></b>
Technical Assistance	Low	\$10	N/A	\$600	\$0
	High	\$10	N/A	\$1,500	\$0
Informal Consultation <sup>d</sup>	Low	\$30	\$1,300	\$1,200	\$0
	High	\$190	\$3,900	\$2,900	\$6,600
Formal Consultation	Low	\$760	\$3,900	\$2,900	\$6,600
	High	\$4,540	\$6,500	\$4,100	\$6,600

<sup>a</sup> Low and high estimates primarily reflect variations in staff wages and time involvement by staff.  
<sup>b</sup> Service estimates are based on data from the Federal Government General Schedule Rates, Office of Personnel Management, 2002, and records from the Service's Cookeville field office.  
<sup>c</sup> A third party is assumed to bear the cost of a biological assessment. When no third party is involved, the Action Agency bears the cost, and the bearing of this cost varies from agency to agency.  
<sup>d</sup> Internal consultations are approximately the same cost as informal consultations, unless indicated otherwise. For internal consultations, the Service bears the costs normally borne by both the Service and the Action Agency.  
Sources: IEC analysis based on data from the Federal Government General Schedule Rates, Office of Personnel Management, 2002, a review of consultation records from several Service field offices across the country, and communications with Biologists in the Service.

### **3.1.3 Project Modifications**

124. The section 7 consultation process may involve some modifications to a proposed project. Projects may be modified in response to voluntary conservation measures suggested by the Service during the *informal* consultation process in order to avoid or minimize impact to a species and/or its habitat, thereby removing the need for formal consultation. Alternatively, *formal* consultations may involve modifications that are agreed upon by the Action agency and the third party and included in the project description as avoidance and minimization measures, or included in the Service's biological opinion on the proposed action as reasonable and prudent measures (RPMs) and/or discretionary conservation recommendations to assist the Action agency in meeting their obligations under section 7(a)(1) of the Act.<sup>48</sup>

125. 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 provide the Action agency with reasonable and prudent alternatives (RPAs) that will keep the action below the thresholds of jeopardy and/or

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<sup>48</sup> 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.

adverse modification. An RPA is an alternative that: (1) can be implemented in a manner consistent with the intended purpose of the action; (2) can be implemented consistent with the scope of the Action agency's legal authority and jurisdiction; and (3) is economically and technologically feasible. These RPAs are typically developed by the Service in cooperation with the Action agency and, when applicable, the third party. Alternatively, the Action agency can develop its own RPAs, or seek an exemption for the project. All of these project modifications have the potential to represent some cost to the Action agency and/or the third party. In certain instances, these modifications can lead to broader regional economic impacts.

126. Because of the difficulty generating estimates of potential modifications to specific projects on a case-by-case basis, this analysis models modifications for average or "typical" projects likely to affect the proposed critical habitat of the mussels. Actual modification costs are likely to vary according to the specific characteristics of individual projects and consultation outcomes. Estimated costs of project modifications are detailed following the descriptions of the related activities in Section 4 of this analysis.

#### **3.1.4 Regional Economic Impacts**

127. The consultation process and related project modifications could directly affect the operations of entities in some industries (e.g., agriculture producers and residential developers), with secondary impacts on the suppliers of goods and services to these industries, as well as purchasers of productions from these industries. For example, modified or decreased grazing and haying activities could affect businesses providing agricultural equipment and supplies. Thus, project modifications or other restrictions that engender cost and revenue impacts involving commercial enterprises can have a subsequent detrimental effect on other sectors of the local economy, especially when the affected industry is central to the local economy. Industries within a geographic area are interdependent in the sense that they purchase output from other industries and sectors, while also supplying inputs to other businesses. Therefore, direct economic effects on a particular enterprise can affect regional output and employment in multiple industries.

128. Many methods are available for conducting economic impact assessments, depending on the particular policy interests and goals of the economic analysis. Use of an input-output (I-O) model, such as IMPLAN, to gauge the direction and magnitude of regional economic impacts is useful in situations where the critical habitat designation may affect the commercial economy of a specific geographic area. However, I-O modeling is not appropriate for all economic impact analyses associated with critical habitat areas and can result in misinterpretations and biased conclusions if used inappropriately. I-O models are appropriate when the following factors are present: (1) economic impacts of the proposed designation are substantial and clearly defined in the analysis; (2) impacts have a clear effect on one industry or groups of industries prevalent in the geographic region; and (3) substitution possibilities for the focal economic input or activity are not widely available.

129. A regional economic analysis was not performed for this economic analysis as, due to the nature of the activities affected by this designation, section 7 consultation and associated project modifications are unlikely to measurably reduce the level of economic activity.<sup>49</sup> While increased administrative costs are projected, only minimal project modifications resulting from the designation are forecast.

### **3.2 Activities Potentially Affected by Critical Habitat Designation**

130. Numerous Action agencies carry out, permit, or fund activities and projects in or adjacent to proposed critical habitat areas. These activities may lead to section 7 consultation with the Service, and in some cases specific projects may be modified in order to protect the mussels and/or their habitat. This section provides a list of activities likely to be affected by section 7 implementation. The following land use activities are likely to be affected by implementation of section 7 of the Act:

- Road/Bridge Construction and Maintenance
- National Forest Activities
- National Park Activities
- Gravel Dredging and Excavation
- Dams/Reservoirs
- Utilities (water pipelines, stormwater projects, transmission lines)
- Agricultural Activities
- Coal Mining
- Oil and Gas Development
- Water Quality Activities
- Conservation and Recreation

The following land use activities are unlikely to incur major section 7 impacts:

- Residential and Related Development
- Power Plants
- Silviculture

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<sup>49</sup> Comment letter from the Southern Appalachian Biodiversity Project, December 9, 2003 stated that a regional economic analysis is not appropriate in this analysis. A regional economic analysis was not performed.

## ESTIMATED COSTS OF SECTION 7 ACTIVITIES FOR THE MUSSELS

## SECTION 4

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131. This section identifies and evaluates the economic impact of 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. This discussion includes a description of each activity, how these activities could be affected, the number of expected section 7 informal and formal consultations, and the associated administrative and project modification costs by activity in the proposed critical habitat units.
132. First, this section quantifies the costs of the anticipated consultations, associated project modifications, and technical assistance by activity. Importantly, these estimates include all section 7-related consultations and technical assistance efforts associated with the proposed critical habitat area. As such, this analysis does not distinguish impacts that may be attributable co-extensively to the listing of the mussels from those impacts attributable solely to the designation. This section also provides a detailed description of each anticipated consultation and technical assistance effort by activity. Exhibit 4-1 summarizes the resulting total costs. Exhibit 4-2 summarizes the resulting total costs by activity. Exhibit 4-5 summarizes the resulting total costs by unit and area. Further detailed costs of each activity according to unit and activity are provided in Appendix D. Exhibit 4-4 highlights the major assumptions made throughout this analysis, and offers information on the potential direction of cost bias generated by these assumptions.

### **4.1 Estimated Total Costs of Section 7**

133. Several Action agencies carry out, permit, or fund activities and projects in or adjacent to proposed critical habitat areas. These activities may lead to section 7 consultation with the Service, and in some cases specific projects may be modified in order to protect the mussels and their habitat. ***This analysis predicts that transportation and dam and reservoir activities will be the activities most heavily impacted by conservation measures associated with the mussels.*** Transportation costs will be greatest in Unit 4

Powell River and Unit 1 Duck River, and dam and reservoir costs will be distributed in Unit 9 Big South Fork and Unit 1 Duck River.

134. This analysis forecasts 699 to 876 informal and 77 to 109 formal section 7 consultations regarding the mussels over the next ten years. Most of the cost of this designation (62 percent) is comprised of the administrative costs. Existing Federal and State regulations provide sufficient protection of these waterways, as a result, section 7 project modifications are unlikely for most activities
135. Estimates of the economic impact range from \$8.3 million to \$20.3 million over ten years (or \$0.8 million to \$2.0 million annually).<sup>50</sup> Exhibit 4-1 presents the discounted present value of total costs by applying a seven percent discount rate, assuming that total costs are distributed evenly over the ten-year period (unless otherwise noted).

<b>Exhibit 4-1</b>		
<b>PRESENT VALUE OF ESTIMATED TOTAL ECONOMIC COSTS</b>		
<b>(TEN YEARS)</b>		
	<b>Total Section 7 Costs</b>	
	<b>Low</b>	<b>High</b>
Total Activity Costs	\$8.3 million	\$20.3 million
<b>Present Value (7%)</b>	\$5.8 million	\$14.3 million
<b>Annualized (7%)</b>	<b>\$0.8 million</b>	<b>\$2.0 million</b>
Note: This table presents nominal costs as well as discounted present value of total costs based on a seven percent discount rate, with the assumption that total costs are distributed evenly over the ten-year period unless otherwise noted. Discounted costs are then annualized.		

136. While a range of activities may be affected, approximately 29 percent of the total designation costs are expected to stem from consultations with State and Federal agencies on road/bridge construction and maintenance projects. Of the remaining costs 21 percent stem from dam and reservoir activities, 18 percent stem from national forest activities, seven percent stem from agriculture, six percent from utilities, six percent water quality, four percent technical assistance, three percent oil and gas drilling, three percent conservation and recreation, two percent gravel dredging, one percent national park activities, and less than one percent coal mining.
137. The cost estimates presented in Exhibit 4-2 are a function of the estimated number of consultations and project modifications associated with activities affected by the proposed

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<sup>50</sup> These estimates have been converted to present values using a seven percent discount rate and include impacts that are co-extensive with other aspects of section 7 of the Act (see Exhibit 4-4). Costs in the present value calculation are distributed evenly over the ten year time frame as Action agencies were unable to provide specific timing of expected consultations.

critical habitat for the mussels, along with the per effort costs outlined in Exhibit 3-1, presented by activity.

138. Based on the consultation history provided by the Service, the activities generating the most consultation activity were transportation (36 percent), utilities (13 percent), oil spill response (12 percent), recreation (six percent), and internal consultations within the Service (five percent). Most of these consultations were initiated by State departments of transportation (29 percent). Other action agencies frequently involved included the Service (24 percent), third parties, such as utility companies, counties, etc. (16 percent), USACE (nine percent), and FHWA (six percent). See Exhibit 4-3 for a direct comparison of past consultations with the expected occurrence of future consultations.
139. Transportation continues to be the activity most impacted. The forecast increase in national forest activity consultations are due to the lifting of a 1997 court order restricting timber harvest in the Daniel Boone National Forest. The forecast increase in agriculture consultations are due to NRCSs anticipation of an increase in future consultations. Utility and recreation consultations are expected to decrease in the overall contribution of consultations based on the anticipated increase in rate of consultation associated with other activities. No consultations regarding oils spills are anticipated since all historic oil spill consultations were related to one spill event. Intra-agency consultations are forecast to decrease since many of the historical consultations were regarding the recovery plan, the draft of which is now available, and is unlikely to require consultations in the future.

**Exhibit 4-2**

**ESTIMATED TOTAL ECONOMIC COSTS OF ASSOCIATED ACTIVITIES  
(TEN YEARS NOMINAL DOLLARS)**

<b>Activity</b>	<b>No. of Informal/ Formal Consultations</b>	<b>Informal Consultation</b>	<b>Formal Consultation</b>	<b>Project Modifications</b>	<b>Total Costs</b>
Transportation	110/62	\$160,000 to \$1,490,000	\$850,000 to \$1,440,000	\$1,590,000 to \$3,050,000	\$2,600,000 to \$5,980,000
Forest Service	200/10	\$1,030,000 to \$3,340,000	\$0 to \$240,000	\$0	\$1,030,000 to \$3,580,000
Agriculture	237/12	\$650,000 to \$1,190,000	\$80,000 to \$260,000	\$0	\$730,000 to \$1,450,000
Utilities	120/4	\$160,000 to \$1,150,000	\$10,000 to \$90,000	\$40,000	\$210,000 to \$1,280,000
Water Quality	38/7	\$140,000 to \$740,000	\$70,000 to \$200,000	\$180,000 to \$250,000	\$390,000 to \$1,190,000
Oil and Gas Drilling	50/0	\$480,000 to \$680,000	\$0	\$0	\$480,000 to \$680,000
Conservation and Recreation	84/1	\$110,000 to \$530,000	\$10,000 to \$20,000	\$0	\$120,000 to \$550,000
Dams/Reservoirs	0/1	\$0	\$0 to \$20,000	\$2,310,000 to \$4,320,000	\$2,330,000 to \$4,320,000
Gravel Dredging	5/11	\$10,000 to \$70,000	\$70,000 to \$240,000	\$0	\$80,000 to \$310,000
National Park Service	8/1	\$20,000 to \$100,000	\$10,000 to \$20,000	\$0	\$30,000 to \$120,000
Coal Mining	24/0	\$30,000 to \$80,000	\$0	\$0	\$30,000 to \$80,000
Development	0/0	\$0	\$0	\$0	\$0
Power Plants	0/0	\$0	\$0	\$0	\$0
Silviculture	0/0	\$0	\$0	\$0	\$0
Other	0/1	\$10,000	0	0	\$10,000
Technical Assistance					\$280,000 to \$800,000
<b>TOTAL</b>	<b>876/109</b>	<b>\$2,770,000 to \$9,370,000</b>	<b>\$1,150,000 to \$2,510,000</b>	<b>\$4,110,000 to \$7,660,000</b>	<b>\$8,320,000 to \$20,340,000</b>

Note: Numbers may not sum due to rounding. Other costs include the TVA programmatic consultation.

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

**Exhibit 4-3**

**COMPARISON OF HISTORIC AND PROJECTED CONSULTATIONS  
RANKED BY OCCURRENCE**

<b>Most Frequent Activities Consulted On</b>		<b>Action agencies Most Frequently Involved</b>	
<b>Historic</b>	<b>Projected</b>	<b>Historic</b>	<b>Projected</b>
Transportation	Transportation	State Departments of Transportation	State Departments of Transportation
Utilities	National Forest Activities	Fish and Wildlife Service	Forest Service
Oil Spill	Agriculture	Third Parties	NRCS
Recreation	Utilities	USACE	USACE/TVA
Intra-Agency	Water Quality	FHWA	EPA

Note: Based on the consultation history regarding the mussels provided by the Service's Cookeville, Abingdon, and Daphne field offices.

140. The cost estimates presented in Exhibit 4-4 are a function of the assumed number of consultations, technical assistance, and project modifications associated with activities affected by the proposed critical habitat for the mussels, along with the per effort costs outlined in Exhibit 3-1, presented by critical habitat unit.

**Exhibit 4-4**

**ESTIMATED TOTAL ECONOMIC COSTS OF SECTION 7 BY UNIT AND AREA  
(TEN YEARS NOMINAL DOLLARS)**

<b>Units</b>	<b>No. of Informal/Formal Consultations<sup>a</sup></b>	<b>Technical Assistance</b>	<b>Informal Consultation</b>	<b>Formal Consultation</b>	<b>Project Modification Costs</b>	<b>Total Costs<sup>b</sup></b>
1 Duck River	50/9	\$0	\$50,000 to \$530,000	\$130,000 to \$210,000	\$100,000 to \$470,000	\$290,000 to \$1,210,000
2 Bear Creek	14/2	\$10,000 to \$50,000	\$20,000 to \$140,000	\$20,000 to \$50,000	\$310,000 to \$350,000	\$360,000 to \$590,000
3 Obed River	48/2	\$0	\$120,000 to \$310,000	\$10,000 to \$40,000	\$10,000 to \$140,000	\$140,000 to \$490,000
4 Powell River	46/19	\$0 to \$10,000	\$110,000 to \$480,000	\$310,000 to \$470,000	\$230,000 to \$290,000	\$660,000 to \$1,250,000
5 Clinch River	76/14	\$180,000 to \$460,000	\$190,000 to \$720,000	\$220,000 to \$350,000	\$150,000 to \$180,000	\$750,000 to \$1,720,000
6 Nolichucky River	16/1	\$0	\$10,000 to \$140,000	\$10,000 to \$30,000	\$0 to \$30,000	\$20,000 to \$200,000
7 Beech Creek	36/0	\$0	\$100,000 to \$210,000	\$0	\$0 to \$20,000	\$100,000 to \$230,000
8 Rock Creek	35/3	\$0 to \$10,000	\$190,000 to \$570,000	\$0 to \$80,000	\$0	\$190,000 to \$660,000
9 Big South Fork	93/6	\$0	\$550,000 to \$990,000	\$70,000 to \$130,000	\$2,440,000 to \$4,570,000	\$3,060,000 to \$5,700,000
10 Buck Creek	30/15	\$0 to \$10,000	\$60,000 to \$180,000	\$110,000 to \$330,000	\$100,000	\$270,000 to \$610,000
11 Sinking Creek	52/8	\$0 to \$10,000	\$230,000 to \$670,000	\$40,000 to \$190,000	\$100,000	\$370,000 to \$970,000
12 Marsh Creek	52/7	\$0	\$230,000 to \$670,000	\$30,000 to \$170,000	\$0	\$260,000 to \$840,000
13 Laurel Fork	14/0	\$0 to \$20,000	\$50,000 to \$100,000	\$0	\$0	\$50,000 to \$120,000
Unassigned <sup>b</sup>	35/1	\$60,000 to \$150,000	\$120,000 to \$690,000	\$10,000 to \$30,000	\$110,000 to \$150,000	\$290,000 to \$1,010,000
<b>Subtotal</b>	<b>596/88</b>	<b>\$250,000 to \$720,000</b>	<b>\$2,030,000 to \$6,400,000</b>	<b>\$960,000 to \$2,080,000</b>	<b>\$3,550,000 to \$6,400,000</b>	<b>\$6,810,000 to \$15,600,000</b>
<b>Areas<sup>c</sup></b>						
1 French Broad River	87/12	\$0	\$130,000 to \$550,000	\$70,000 to \$240,000	\$50,000 to \$460,000	\$250,000 to \$1,260,000
2 Holston River	88/5	\$0	\$130,000 to \$660,000	\$50,000 to \$90,000	\$40,000 to \$310,000	\$210,000 to \$1,070,000
3 Rockcastle River	105/4	\$20,000 to \$50,000	\$470,000 to \$1,740,000	\$60,000 to \$90,000	\$400,000	\$950,000 to \$2,280,000
Unassigned <sup>b</sup>	1/1	0	\$10,000 to \$20,000	\$10,000 to \$30,000	\$70,000 to \$100,000	\$90,000 to \$150,000
<b>Subtotal</b>	<b>281/14</b>	<b>\$20,000 to \$50,000</b>	<b>\$740,000 to \$2,970,000</b>	<b>\$190,000 to \$450,000</b>	<b>\$560,000 to \$1,270,000</b>	<b>\$1,500,000 to \$4,750,000</b>
<b>TOTAL</b>	<b>876/109</b>	<b>\$280,000 to \$800,000</b>	<b>\$2,770,000 to \$9,370,000</b>	<b>\$1,150,000 to \$2,510,000</b>	<b>\$4,110,000 to \$7,660,000</b>	<b>\$8,320,000 to \$20,340,000</b>

<sup>a</sup> Maximum number of informal and formal consultations.

<sup>b</sup> Unassigned costs include Special Appropriation Projects and Technical Assistance.

<sup>c</sup> Areas are proposed for exclusion.

Note: Totals may not sum due to rounding.

141. Based on this analysis, the total nominal cost of consultations, technical assistance, and resultant project modifications will range from \$8.3 million to \$20.3 million over the next ten years. Most costs will occur in Unit 9 Big South Fork (28 percent). The high costs in Unit 9 Big South Fork are due primarily to the potential relocation of a future water supply reservoir. The most consultation activity (and related costs) will occur in Area 3 Rockcastle River (11 percent). The high costs in Area 3 Rockcastle River are due primarily to the presence of Daniel Boone National Forest. The Daniel Boone National Forest consultations with the Service are comprehensive as all 32 threatened and endangered species that occur in the forest in are considered in each consultation. Costs of these consultations may be reduced in the future as consultations are streamlined and consultation requirements become more clear.

142. After Unit 9 Big South Fork the highest costs occur in Area 3 Rockcastle River (11 percent), Unit 5 Clinch River (eight percent), Unit 1 Duck River (six percent), Area 1 French Broad River (six percent), and Unit 4 Powell River (six percent). No one activity is driving the unit or area costs, high costs are attributable to the size of the unit or area. Unit 5 Clinch River, Unit 9 Big South Fork, Area 2 Holston River, and Unit 4 Powell River are the largest four units and areas.

143. The cost estimates presented in Exhibit 4-5 are a function of the assumed number of consultations, technical assistance, and project modifications associated with activities affected by the proposed critical habitat, presented by party.

<b>Exhibit 4-5</b>			
<b>ESTIMATED TOTAL ECONOMIC COSTS BY PARTY</b>			
<b>(TEN YEARS)</b>			
	<b>Service</b>	<b>Action Agency</b>	<b>Third Party</b>
<b>Administrative Costs</b>			
Low	\$100,000	\$2,410,000	\$1,710,000
High	\$640,000	\$6,480,000	\$5,560,000
<b>Project Modifications</b>			
Low	\$0	\$40,000	\$4,070,000
High	\$0	\$40,000	\$7,620,000
<b>Total Costs</b>			
Low	\$100,000	\$2,440,000	\$5,780,000
High	\$640,000	\$6,520,000	\$13,190,000
Note: Totals may not sum due to rounding.			

144. Most of the costs will be borne by third parties (65 percent of total costs), followed by Action agencies (32 percent of total costs). Administrative costs account for 62 percent of total costs (\$4.2 million to \$12.7 million), and technical assistance accounts for about six

percent (\$0.3 million to \$0.8 million) of the total administrative costs. The cost burden to third parties is expected to be the greatest as these entities are likely to bear the cost of project modification in most cases. Further, the administrative costs of consultation and technical assistance is anticipated to be greater for third parties than the Service.

145. Exhibit 4-6 presents the key assumptions of this economic analysis, as well as the potential direction of bias introduced by the assumptions.

<b>Exhibit 4-6</b>	
<b>CAVEATS TO THE ECONOMIC ANALYSIS</b>	
<b>Key Assumption</b>	<b>Effect on Cost Estimate</b>
The rate of formal and informal consultations will not decrease over time.	+
The presence of other threatened and endangered species with and without critical habitat (i.e., spotfin chub, yellowfin madtom, slender chub, etc.) has no influence on consultation/project modification costs.	+
The historic occurrence and cost of project modifications are good predictors of future consultation costs.	+/-
Action agency Best Management Practices are baseline protections that are practiced consistently and as such, do not introduce additional costs to section 7 consultations.	-
All costs to development are captured by increased costs of construction of pipelines, water supply and wastewater infrastructure, and roads and bridges within the proposed critical habitat.	-
- : This assumption may result in an underestimate of real costs. + : This assumption may result in an overestimate of real costs. Multiple "+" keys refer to the magnitude of effect anticipated. +/- : This assumption has an unknown effect on estimates.	

## **4.2 Activities Potentially Affected by Section 7**

146. This section provides context to the results presented in Section 4.1. After each land use activity is introduced it is discussed with reference to: relevant baseline protections that commonly benefit the mussels; the number and specifics of each anticipated consultation effort; and the project modification types and costs that may result from each consultation.

### **4.2.1 Road/Bridge Construction and Maintenance**

147. A significant number of road/bridge construction and maintenance activities may occur within the proposed critical habitat area during the next ten years. Potential road/bridge projects that can adversely affect the mussels include: bridge construction and maintenance, expansion or improvement of the existing public road network, and construction or improvement of private roads.

## **Baseline**

148. In addition to CWA regulations and FHWA BMPs for erosion and sediment control, road and bridge projects are bound by various State regulations that may provide protection to the mussels and their habitat. FHWA BMPs are required for federally funded construction projects unless State requirements are more stringent.<sup>51</sup> BMPs of the State departments of transportation include baseline protections to the mussels. Sediment control measures, re-vegetation, restrictions on work within outstanding resource waters, national wild and scenic rivers, State wild and scenic river systems, and Federal and State wildlife management areas, time of year (flow) restrictions, and design initiatives are all examples of State BMPs.<sup>52</sup> State water quality standards also provide some protection, for example the Tennessee Water Control Board requires permit applicants to evaluate practicable alternatives and conduct avoidance, minimization, and/or mitigation for activities impacting water.<sup>53</sup>

## **Future Consultations**

149. The typical Federal nexuses for road/bridge construction and maintenance activities are funding from the FHWA for ALDOT, KTC, MSDOT, TDOT, and VDOT projects, and/or CWA §404 permitting from the USACE for projects with the potential to discharge dredged or fill material into navigable waters of the United States, and/or 26(a) permitting from the TVA for projects in the Tennessee River watershed that may impact navigation, flood control, or public lands.
150. This analysis anticipates 61 to 110 informal consultations and 54 to 62 formal consultations associated with road/bridge construction and maintenance activities during the next ten years.<sup>54</sup> The administrative costs of consultations for road/bridge construction and

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<sup>51</sup> Federal Highway Administration. 1995. Best Management Practices for Erosion and Sediment Control - Final Report October 1988- June 1995. Federal Highway Administration, Washington, D.C. Eastern Federal Lands Highway Design. FHWA/FLP-94/005.

<sup>52</sup> Kentucky Transportation Cabinet. 2000. Best Management Practices for Maintenance Activities in and Around Streams. Tennessee Department of Transportation. 1995. Standard Specifications For Road and Bridge Construction. Alabama Department of Environmental Management, *Alabama's Best Management Practice's for Forestry*; and Alabama Soil and Water Conservation Committee, *Alabama Handbook For Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Areas*, July 2002.

<sup>53</sup> Tennessee. Code Ann., §69-3-101.

<sup>54</sup> Personal communication with Michael Hardin, Kentucky Transportation Cabinet, February 4, 2003. Personal communication with Olivia Michael, Federal Highway Administration, Kentucky Division, February 10, 2003. Personal communication with Lilah Miller, Tennessee Department of Transportation, February 7, 2003. Personal communication with Charles Bush Tennessee Department of Transportation, February 27, 2003. Personal communication with Mark Doctor, Federal Highway Administration, Tennessee Division, February 13, 2003. Personal communication with Cecil Vick, Federal Highway Administration, Mississippi Division, February 13, 2003. Personal

maintenance will range from \$1,010,000 to \$2,930,000 (\$160,000 to \$1,490,000 for informal consultation and \$850,000 to \$1,440,000 for formal consultation).<sup>55</sup>

- TDOT anticipates engaging in approximately 45 to 79 informal and 15 to 23 formal consultations with the Service over the next ten years on bridge replacement, maintenance, and rehabilitation and road work projects.<sup>56</sup> These consultations are parsed by unit and area accordingly:
  - Unit 1 Duck River seven to 19 informal and five formal;
  - Unit 3 Obed River six to seven informal and one to two formal;
  - Unit 4 Powell River up to four informal;
  - Unit 5 Clinch River up to two informal;
  - Unit 6 Nolichucky River up to two informal;
  - Unit 7 Beech Creek up to one informal;
  - Unit 9 Big South Fork five to eight informal and one to two formal;
  - Area 1 French Broad River 15 to 20 informal and five to ten formal; and
  - Area 2 Holston River 12 to 16 informal and three to four formal.
- The Mississippi Division of the FHWA anticipates one informal consultation regarding the Corridor V project over the next ten years; this project will affect Unit 2 Bear Creek.<sup>57</sup> No other consultations are anticipated at the State or county level.<sup>58</sup>
- ALDOT anticipates engaging in approximately two informal consultations with the Service over the next ten years on bridge replacement, maintenance, and

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communication with Paul Rigby, Mississippi Department of Transportation Office of State Aid Road Construction, February 13, 2003. Personal communication with B.G. Cogin Jr., Tishimingo County Engineers Office, February 13, 2003. Personal communication with Jeffery Southard, Chief of Transportation Planning and the Environment, Virginia Department of Transportation, February 18, 2003. Personal communication with John Shill, Alabama Department of Transportation, February 18, 2003.

<sup>55</sup> See Exhibit 3-1. Note: VDOTs administrative costs are higher than those presented in Exhibit 3-1. VDOT anticipates a \$9,800 cost for a formal site survey and biological assessment for each formal consultation. These costs are incorporated into the cost estimate.

<sup>56</sup> Personal communication with Charles Bush, Transportation Manager, Environmental Planning and Permits, Environmental Impact Section, Tennessee Department of Transportation, February 27, 2003, May 6, 2003. Personal communication with Lilah Miller, Tennessee Department of Transportation, February 7, 2003.

<sup>57</sup> Personal communication with Cecil Vick, Federal Highway Administration, Mississippi Division, February 13, 2003.

<sup>58</sup> Personal communication with Paul Rigby, Mississippi Department of Transportation Office of State Aid Road Construction, February 13, 2003. Personal communication with B.G. Cogin Jr., Tishimingo County Engineers Office, February 13, 2003.

rehabilitation, and road construction.<sup>59</sup> These projects will affect the Unit 2 Bear Creek.

- KTC anticipates engaging in approximately nine formal consultations with the Service over the next ten years on bridge replacement, maintenance, and rehabilitation, road construction, and landslide repair.<sup>60</sup> KTC anticipates one formal consultation on Unit 10 Buck Creek, three formal consultations on Unit 9 Big South Fork, one formal consultation on Unit 11 Sinking Creek, and four formal consultations on Area 3 Rockcastle River.
- VDOT anticipates engaging in approximately 28 formal consultations with the Service over the next ten years on projects which would cross the Clinch or the Powell River, such as road construction, and bridge replacement, maintenance, and rehabilitation.<sup>61</sup> VDOT anticipates 11 formal consultations on Unit 5 Clinch River, and 17 formal consultations on Unit 4 Powell River.<sup>62</sup>
- USACE anticipates engaging in approximately 13 to 28 informal and two formal consultations with the Service over the next ten years on county and private bridge replacement, construction, maintenance, and rehabilitation, and road construction. These consultations are in addition to the State and federally funded projects discussed above.<sup>63</sup> These consultations are parsed by unit and area accordingly:

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<sup>59</sup> Personal communication with John Shill, Alabama Department of Transportation, February 18, 2003.

<sup>60</sup> Personal communication with Michael Hardin, Kentucky Transportation Cabinet, February 4, 2003. Kentucky Transportation Cabinet also indicated consultations may occur regarding guardrail installation projects. The Service does not anticipate consulting on guardrail installation projects. Personal communication with U.S. Fish and Wildlife Service staff, May 14, 2003.

<sup>61</sup> Personal communication with R. C. Woody, Virginia Department of Transportation, March 18, 31, 2003.

<sup>62</sup> Public comment submitted by Richard C. Woody II, Natural Resource Programs Manager for Virginia Department of Transportation, on behalf of the Virginia Department of Transportation indicated 425 projects in the Powell River Basin and 275 projects in the Clinch River Basin may be impacted by the designation of critical habitat for the mussels (September 5, 2003). The Tennessee River Basin in Virginia is 187,155 acres or 292 square miles. The commenter also noted that existing critical habitat for the spotfin chub, yellowfin madtom, and slender chub overlap with the proposed designation for the mussels by 36 percent and none of the past consultations for roadway projects found that the proposed action would adversely modify habitat. Since the listing of the mussels there have been two formal and one informal consultation regarding Virginia roadway projects. The 28 roadway projects that will require a formal section 7 consultation for the mussels are those which would cross critical habitat and are estimated above. According to the commenter the total project modification costs and biological assessment costs of these consultations could be \$268,400 in Unit 5 Clinch River and \$414,800 in Unit 4 Powell River, these costs are also included.

<sup>63</sup> Personal communication with William James, Permits Branch, USACE Nashville District East Office, Nashville, Tennessee, March 10 and 12, 2003, May 6, 2003. Personal communication with Alice Allen-Grimes, Regulatory Branch, USACE Norfolk District Office, Norfolk, Virginia, April 11, 2003. Personal communication with Kathy S. Perdue, Regulatory Branch, USACE Norfolk District Office, Norfolk, Virginia, April 17, 2003.

- Unit 1 Duck River two informal;
- Unit 2 Bear Creek one to two informal;
- Unit 3 Obed River one to two informal;
- Unit 4 Powell River one informal and one formal;
- Unit 5 Clinch River up to one informal and one formal;
- Unit 6 Nolichucky River one to two informal;
- Unit 7 Beech Creek one to two informal;
- Unit 8 Rock Creek one informal;
- Unit 9 Big South Fork one informal;
- Unit 10 Buck Creek one to two informal;
- Unit 11 Sinking Creek one to two informal;
- Unit 12 Marsh Creek one to two informal;
- Unit 13 Laurel Fork one to two informal;
- Area 1 French Broad River up to two informal;
- Area 2 Holston River up to three informal; and
- Area 3 Rockcastle River up to one informal.

### **Project Modifications**

151. The per project costs of project modifications for road/bridge construction and maintenance will range from \$1,800 to \$115,000, depending on project scope as described below.

- Mussel relocation efforts can range from \$1,800 to \$5,000 per crew day, and for small scale relocation projects can take one to three days (\$1,800 to \$15,000 total).<sup>64</sup> VDOT anticipates their mussel relocation efforts will cost \$2,000.<sup>65</sup>
- Increasing the span of a bridge 50 to 100 feet will cost approximately \$100,000.<sup>66</sup>
- Construction monitoring will cost approximately \$6,500.<sup>67</sup>
- Post construction monitoring will cost approximately \$5,000.<sup>68</sup>

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<sup>64</sup> Personal communication with Third Rock Consultants, February 19, 2003. Personal communication with Charles Nicholson, John Jenkinson, and Peggy Shute, Meeting with the Tennessee Valley Authority, January 30, 2003.

<sup>65</sup> Personal communication with R. C. Woody, Virginia Department of Transportation, March 31, 2003.

<sup>66</sup> Personal communication with John Shill, Alabama Department of Transportation, February 18, 2003.

<sup>67</sup> Personal communication with R. C. Woody, Virginia Department of Transportation, March 31, 2003.

<sup>68</sup> Personal communication with R. C. Woody, Virginia Department of Transportation, March 31, 2003.

152. The total costs of project modifications will range from \$1,590,000 to \$3,140,000 based on the following:

- TDOT bridge replacement, maintenance, rehabilitation, and road work may necessitate mussel relocation efforts.
- The bridge projects involving Unit 2 Bear Creek, where ALDOT and FHWA (within Mississippi) are the lead Action agencies, will result in three informal consultations. Increasing the span of the bridge and mussel relocation are likely to be recommended by the Service.
- For the eight of the nine formal consultations for bridge projects where KTC is the lead Action agency, the Service will likely recommend increasing the span of the bridge.<sup>69</sup>
- The landslide repair project involving Unit 9 Big South Fork, where KTC is the lead Action agency, will result in one formal consultation, and no project modifications are likely to be recommended by the Service.
- For all 28 formal consultations regarding stream crossing projects anticipated by VDOT, the Service is likely to recommend mussel relocation, construction monitoring, and post construction monitoring.<sup>70</sup>
- For the 13 to 28 informal and two formal consultations where USACE is the lead Action agency, no additional project modifications are likely to be recommended by the Service.

#### **4.2.2 Agricultural Activities**

153. Agriculture is a common land use in the areas surrounding the proposed critical habitat designation. Most activities on private land generally do not constitute a Federal nexus unless some type of Federal funding is involved or a Federal permit is required. However, agricultural activities can have a Federal nexus if a rancher or farmer receives a loan or grant from the Federal Farm Service Agency (FSA), or receives a grant from the NRCS to voluntarily adopt conservation practices that improve or maintain the quality of the natural resources in the area, such as through the Environmental Quality Incentives Program. The following agricultural activities may involve a Federal nexus and be subject to section 7 of the Act: agricultural operation improvements funded through the FSA or the Farm Bill, and conservation activities, such as bank stabilization projects, funded by the FSA and/or

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<sup>69</sup> Personal communication with Olivia Michael, Federal Highway Administration, Kentucky Division, February 24, 2003.

<sup>70</sup> Personal communication with R. C. Woody, Virginia Department of Transportation, March 31, 2003.

the NRCS. Potential agricultural activities which can adversely affect the mussels include: construction or improvement of private roads, bank stabilization, wildlife management, and stream crossings.

### **Baseline**

154. The NRCS field office's Conservation Practice Standard for stream bank and shoreline protection and BMPs of the State Departments of Agriculture include protection to the mussels and their habitat.<sup>71</sup> NRCS program participation is voluntary but if a contract is signed, as with any cost sharing activities, BMPs and conservation practice standards are mandatory. Both NRCS and State Departments of Agriculture BMPs require minimization of erosion and sedimentation during construction, revegetation after construction, preservation or replacement of habitat forming elements, and implementation of measures to minimize livestock in the stream area. State water quality standards also provide some protection by prescribing numeric limits for specific physical, chemical, biological, and radiological characteristics of water.<sup>72</sup>

### **Future Consultations**

155. The typical Federal nexuses for agricultural activities are either funding from the NRCS, and/or CWA §404 permitting from the USACE for projects with the potential to discharge dredged or fill material into navigable waters of the United States.
156. This analysis anticipates 182 to 237 informal consultations and six to 12 formal consultations associated with agricultural activities during the next ten years. The administrative costs of consultations for agricultural activities will range from \$730,000 to \$1,280,000 (\$650,000 to \$1,020,000 for informal consultation, and \$80,000 to \$260,000 for

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<sup>71</sup> NRCS, Kentucky Field Office, Tennessee Field Office, Alabama Field Office, Mississippi Field Office, Virginia Field Office. Field Office Technical Guide, Section IV Natural Resources Conservation Service Conservation Practice Standard, Streambank and Shoreline Protection.

NRCS, Kentucky Field Office, Mississippi Field Office. Field Office Technical Guide, Section IV Natural Resources Conservation Service Conservation Practice Standard, Stream Crossing (Interim).

NRCS, Kentucky Field Office, 2003. Field Office Technical Guide, Section IV Natural Resources Conservation Service Conservation Practice Standard, Stream Habitat Improvement and Management.

NRCS, Kentucky Field Office, Tennessee Field Office. Field Office Technical Guide, Section IV Natural Resources Conservation Service Conservation Practice Standard, Forest Stand Improvement.

NRCS, Kentucky Field Office, Tennessee Field Office, Alabama Field Office. Field Office Technical Guide, Section IV Natural Resources Conservation Service Conservation Practice Standard, Wetland Wildlife Habitat Management.

<sup>72</sup> Virginia Code Ann, §62.1-44.15(3a). Tennessee Code Ann., §69-3-101. Kentucky Revised Statutes §401.5:031. State of Mississippi Water Quality Criteria for Intrastate, Interstate, and Coastal Waters, Adopted November 16, 1995. Alabama Department of Environmental Management, Water Division, Water Quality Program, Administrative Code, §335-6-11. See Appendix B for a more in depth discussion of State water quality standards.

formal consultation).<sup>73</sup> The range of administrative costs are based on an anticipation of a high level of effort for 20 percent of informal consultations where NRCS is the lead Action agency.<sup>74</sup>

- The Kentucky field office of the NRCS anticipates stream bank stabilization, shoreline protection, and stream crossing activities may result in section 7 consultation with the Service.<sup>75</sup> Consultations regarding stream bank stabilization and shoreline protections will result in 11 to 20 informal and three to six formal consultations in the next ten years and will be parsed by unit and area accordingly:
  - Unit 10 Buck Creek five to ten informal and one to two formal;
  - Unit 12 Marsh Creek three to five informal and one to two formal; and
  - Unit 11 Sinking Creek three to five informal and one to two formal.

Consultations regarding stream crossing activities in Kentucky will result in 15 to 30 informal consultations and three to six formal consultations in the next ten years and will be parsed by unit and area accordingly:

- Unit 10 Buck Creek five to ten informal and one to two formal;
  - Unit 12 Marsh Creek five to ten informal and one to two formal; and
  - Unit 11 Sinking Creek five to ten informal and one to two formal.
- Tennessee NRCS field offices anticipate section 7 consultations on stream bank stabilization, stream crossing, grade stabilization structure, and livestock watering access ramp activities will result in 83 to 103 informal consultations in the next ten years, and consultations by unit and area will be parsed as follows:<sup>76</sup>

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<sup>73</sup> Cost for the consultations for Area 1 French Broad River, Area 2 Holston River, and Area 3 Rockcastle River are less than reported in Exhibit 3-1. TVA anticipates their cost of consultation will be reduced to \$500 because a past programmatic consultation in this watershed has streamlined the consultation process. TVA anticipates completing a new programmatic consultation for these areas within one year of designation of critical habitat reducing the total number of individual consultations as projects in years two through ten are covered by the programmatic consultation. This programmatic consultation is anticipated to cost \$5,760 to \$9,540, Service costs will range from \$760 to \$4,450 and TVA costs will be \$5,000. All other consultation costs are calculated using the costs presented in Exhibit 3-1. Personal communication with Charles P. Nicholson, and Peggy W. Shute, Tennessee Valley Authority, May 2, 2003.

<sup>74</sup> Personal communication with Mason Howell, Kentucky Field Office, NRCS, February 25, 2003 and March 3, 2003.

<sup>75</sup> Personal communication with Mason Howell, Kentucky Field Office, NRCS, February 25, 2003, March 3, 2003, May 22, 2003, May 23, 2003, and May 27, 2003.

<sup>76</sup> Personal communication with Mike Zeaman, Tennessee Field Office, NRCS, February 21, 2003. Personal communication with James Ford, State Conservationist, Tennessee Field Office, NRCS, March 3, 2003, May 28, 2003.

- Unit 3 Obed River 20 to 30 informal;
  - Unit 4 Powell River ten informal;
  - Unit 5 Clinch River 20 informal;
  - Unit 7 Beech Creek 20 to 30 informal;
  - Unit 13 Laurel Fork ten informal; and
  - Area 2 Holston River three informal.
- The Alabama and Mississippi field offices do not anticipate any projects which would require section 7 consultation with the Service on Unit 2 Bear Creek.<sup>77</sup>
  - The Virginia NRCS field office anticipates up to five projects could require informal consultation with the Service over the next ten years; none on Unit 4 Powell River and up to five on Unit 5 Clinch River.<sup>78</sup>
  - USACE and TVA anticipate 73 to 79 informal consultations on private bank stabilization projects not involving NRCS.<sup>79</sup> TVA and USACE anticipate coordinating on all projects with overlapping jurisdiction. Thus there will be 68 to 71 coordinated efforts and 5 to 8 uncoordinated efforts (USACE lead Action agency for one to two consultations, and TVA lead Action agency for four to six consultations). Appendix D provides detailed information on the breakdown of these consultations by unit and area.

### **Project Modifications**

157. Project modifications likely to be recommended by the Service for agricultural activities, in addition to what is required by BMPs or State permitting authorities, include: working outside of the stream, no equipment in the stream, and use of natural materials (for

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<sup>77</sup> Personal communication with Tommy Counts, Alabama Field Office, NRCS, March 7, 2003. Personal communication with Homer L. Wilkes, State Conservationist, Mississippi Field Office, NRCS, March 21, 2003.

<sup>78</sup> Personal communication with John Myers, Biologist, Virginia Field Office, NRCS, May 21, 2003.

<sup>79</sup> Cost for the consultations for Area 1 French Broad River, Area 2 Holston River, and Area 3 Rockcastle River are less than reported in Exhibit 3-1. TVA anticipates their cost of consultation will be reduced to \$500 because a past programmatic consultation in this watershed has streamlined the consultation process. TVA anticipates completing a new programmatic consultation for these areas within one year of designation of critical habitat reducing the total number of individual consultations as projects in years two through ten are covered by the programmatic consultation. This programmatic consultation is anticipated to cost \$5,760 to \$9,540, Service costs will range from \$760 to \$4,450 and TVA costs will be \$5,000. All other consultation costs are calculated using the costs presented in Exhibit 3-1. Personal communication with Charles P. Nicholson, and Peggy W. Shute, Tennessee Valley Authority, May 2, 2003. Personal communication with William James, Permits Branch, USACE Nashville District East Office, Nashville, Tennessee, March 10, 2003, March 12, 2003, and May 6, 2003.

example, use tree roots to deflect river momentum rather than rip rap).<sup>80</sup> While no cost estimates were provided for these project modifications, these costs are thought to be minimal.<sup>81</sup>

### **4.2.3 Activities in National Forests**

158. Portions of the proposed critical habitat designation and areas essential to the conservation of the mussels (Unit 8 Rock Creek, Unit 11 Sinking Creek, Unit 12 Marsh Creek, and Area 3 Rockcastle River) are located near or within the southern districts of the Daniel Boone National Forest in eastern Kentucky.<sup>82</sup> The forest is managed for multiple uses, including recreation and conservation. Future activities which may affect the mussels can be categorized under five main functional areas, including recreation, timber, fire, wildlife, and land.<sup>83</sup> Recreational projects that may impact the mussels include campground maintenance, issuance of special use permits, and the construction and maintenance of horse, hiking, and mountain biking trails. Projects under the timber category consist of timber harvesting, thinnings, and reforestation. Fire projects include prescribed burnings and the control of wild fires. Installation of forest openings and wetland protection constitute the wildlife projects that may affect the mussels in the future. Finally, “land” refers to projects involving minerals, oil and gas, utilities (powerline access), and land acquisition and trading. In addition to these activities, revisions to the Forest Plan may also require a section 7 consultation.

#### **Baseline**

159. Activities in National Forests are subject to State and Federal water quality regulations, including the Clean Water Act and the Kentucky Water Quality Law.

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<sup>80</sup> Personal communication with Mason Howell, Kentucky Field Office, NRCS, February 25, 2003 and March 3, 2003. Personal communication with Mike Zeaman, Tennessee Field Office, NRCS, February 21, 2003. Personal communication with James Ford, State Conservationist, Tennessee Field Office, NRCS, March 3, 2003.

<sup>81</sup> Labor costs could increase, and material costs are not likely to increase. Personal communication with James Ford, State Conservationist, Tennessee Field Office, NRCS, March 3, 2003.

<sup>82</sup> Because Unit 10 Buck Creek lies within the forest’s proclamation border, it could be acquired by the forest in the future. The possibility of this occurring over the next ten years will increase if this area is designated as critical habitat. Although portions of Unit 9 Big South Fork are located within the Daniel Boone National Forest, this area is under the jurisdiction of the Big South Fork National River and Recreation Area. Personal communication with Jim Bennett and David Taylor, US Forest Service, Daniel Boone National Forest, February 26, 2003.

<sup>83</sup> The Daniel Boone National Forest anticipates it will consult with the Service 1,000 times over the next ten years regarding all 32 threatened and endangered species that occur in the forest. About twenty percent of those consultations will be significantly attributable to the mussels. Personal communication with Jim Bennett and David Taylor, US Forest Service, Daniel Boone National Forest, February 25, 26, 2003.

Protections afforded the mussels regarding forest activities include sediment and pollution control measures.<sup>84</sup>

160. Portions of the Daniel Boone National Forest lie within the Big South Fork National River and Recreation Area. Therefore, protections are provided in these areas under the National Wild and Scenic Rivers Act, Kentucky Wild Rivers Act, and Kentucky Outstanding National Resource Waters Act.<sup>85</sup>

161. The Proposed Revised Land and Resource Management Plan for the Daniel Boone National Forest may also provide some level of protection for the mussels and their habitat.<sup>86</sup> The Daniel Boone National Forest is in the process of revising their Land and Resource Management Plan and anticipates a Record of Decision in 2004.<sup>87</sup> An assessment and strategy report for the Conservation of Aquatic Resources proposed such protections as the establishment of riparian prescription areas and streamside management zones, implementation of erosion control measures, and restrictions on the construction of stream crossings, skid trails, landings, roads, trails, firelines, and impoundments.<sup>88</sup> The Forest Service commented that specific goals of the management plan provide mussel protection.<sup>89</sup> Goal 1.1 states “Protect and/or enhance current and potential habitat for Proposed, Endangered, Threatened (PET) species, or Sensitive (S) species and Conservation species,” Goal 3 states “protect or enhance the individual values and ecological functions of flood plains, groundwater, lakes, riparian areas, springs, streams and wetlands,” and goals within the Riparian Corridor Prescription Area of the Revised Forest Plan address the primary constituent elements as identified in the proposed rule.

### **Future Consultations**

162. The typical Federal Action agency for activities within national forests is the Forest Service. This analysis forecasts 210 total consultations associated with forest service activities during the next ten years, 210 informal consultations or 200 informal consultations

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<sup>84</sup> For a more in depth description of these regulations, see Section 2.2.1 and Appendix B.

<sup>85</sup> For a more in depth description of these regulations, see Section 2.2.1 and Appendix B.

<sup>86</sup> U.S. Forest Service. Proposed Revised Land Resource Management Plan for the Daniel Boone National Forest. April 2003. Note the final resource management plan was published in April 2004. U.S. Forest Service. Land and Resource Management Plan for the Daniel Boone National Forest. April 2004.

<sup>87</sup> Comment letter received from Tom I. Thompson, Deputy Chief for National Forest System on behalf of the Forest Service regarding the Daniel Boone National Forest, August 29, 2003.

<sup>88</sup> An Assessment and Strategy for Conservation of Aquatic Resources of the Daniel Boone National Forest, Interim Report, April 2001. (Document related to Daniel Boone Plan Revision.)

<sup>89</sup> Comment letter received from Tom I. Thompson, Deputy Chief for National Forest System on behalf of the Forest Service regarding the Daniel Boone National Forest, August 29, 2003.

and ten formal consultations.<sup>90</sup> A rough breakdown of informal consultations into functional area is:

- 30 percent recreation;
- 20 percent timber;
- 20 percent fire;
- 15 percent wildlife;
- 15 percent land projects; and
- ten total (high level) regarding amendments to the Forest Plan.

The formal consultations may involve wildlife, recreation, or land projects.<sup>91</sup> The Forest Service anticipates either 110 informal consultations, or 100 informal consultations and ten formal consultations will be distributed between Unit 8 Rock Creek, Unit 11 Sinking Creek, and Unit 12 Marsh Creek. The remaining 100 informal consultations will be on Area 3 Rockcastle River. The administrative cost of consultations for national forest activities will range from \$1,030,000 to \$3,580,000 (\$1,030,000 to \$3,340,000 for informal consultation, and \$0 to \$240,000 for formal consultation).<sup>92</sup>

### **Project Modifications**

163. Uncertainty exists as to whether the Service will recommend any project modifications as a result of these consultations. In following the Forest Plan, the Forest Service strives to mitigate effects on threatened and endangered species.<sup>93</sup>

#### **4.2.4 Silviculture**

164. Private forestry is also a common land use in the areas surrounding the proposed critical habitat designation. Potential forestry activities which can adversely affect the

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<sup>90</sup> In the regulatory action as proposed in the Federal Register October 6, 2003 (68 FR 57643) the Service indicated it was considering extending Unit 8 Rock Creek four river miles based on information provided by the US Forest Service. The adjacent landownership of this four river mile segment is private lands surrounded by Forest Service property. No consultations are anticipated in addition to the 210 consultations forecasted in the Draft Economic Analysis of Critical Habitat Designation for Five Cumberlandian Mussels published October 6, 2003. No additional consultations are anticipated because the potential expansion is upstream of the previously proposed Unit 8 Rock Creek. Upstream impacts were captured in the original estimate as upstream activities have the potential to affect critical habitat downstream. Personal communication with Jim Bennett, US Forest Service, Daniel Boone National Forest, October 14, 2003.

<sup>91</sup> Personal communication with Jim Bennett and David Taylor, US Forest Service, Daniel Boone National Forest, February 26, 2003.

<sup>92</sup> See Exhibit 3-1.

<sup>93</sup> Personal communication with Jim Bennett and David Taylor, US Forest Service, Daniel Boone National Forest, February 26, 2003.

mussels include timber harvesting near streams and timber harvesting such as the construction of stream crossings, skid trails, and landings.

### **Baseline**

165. Kentucky and Tennessee State agriculture department BMPs provide protection to the mussels and their habitat, including the establishment and implementation of streamside management zones, erosion control measures, and practices for stream crossings and road and skid trail construction.<sup>94</sup> In Kentucky, the implementation of BMPs is required under the Kentucky Forest Conservation Act.<sup>95</sup> Forestry activities which impact wetlands also require a CWA Section 404 permit from the USACE. In order to obtain exemption from a Section 404 permit, mechanical site preparation activities must also be conducted in accordance with USACE's BMPs, which minimize soil disturbance from forestry activities.<sup>96</sup>
166. In addition to BMPs, NRCS Tennessee Conservation Practice Standards, specifically the Riparian Forest Buffer, Streambank and Shoreline Protection, and Wetland Wildlife Habitat Management Standards, also provide a level of protection to the mussels.<sup>97</sup> Finally, the mussels are afforded protection under Federal and State water quality standards, such as the CWA and floodplain regulations that address logging debris.<sup>98</sup>
167. Other programs in Kentucky and Tennessee that benefit the mussels are Master Logger programs, which offer logger certification and continuing education courses on timber harvesting and BMPs, and Forest Stewardship Programs, which provide management planning assistance to landowners who are interested in conserving and protecting their forested lands. Stewardship Plans are tailored to meet the primary objectives of the landowner in such areas as wildlife, aesthetics, recreation, and forestry.<sup>99</sup>

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<sup>94</sup> Cooperative Extension Service, University of Kentucky. *Field Guide to Best Management Practices for Timber Harvesting in Kentucky*. (Also includes *Kentucky Forest Practice Guidelines for Water Quality Management* and excerpts from the *Kentucky Agriculture Water Quality Authority Producer Workbook*.) Tennessee Division of Forestry. 1993. *Guide to Forestry Best Management Practices in Tennessee*.

<sup>95</sup> See Appendix B for a more detailed description of the Kentucky Forest Conservation Act

<sup>96</sup> U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. *Memorandum to the Field, Regarding Application of Best Management Practices*, November 28, 1995.

<sup>97</sup> NRCS, Kentucky Field Office, Tennessee Field Office. Field Office Technical Guide, Section IV Natural Resources Conservation Service Conservation Practice Standard, Forest Stand Improvement.

NRCS, Kentucky Field Office, Tennessee Field Office, Alabama Field Office. Field Office Technical Guide, Section IV Natural Resources Conservation Service Conservation Practice Standard, Wetland Wildlife Habitat Management.

<sup>98</sup> Debris in Floodplains, KRS 151.250 (in Field Guide to BMPs for Timber Harvesting in Kentucky).

<sup>99</sup> Personal communication with David Arnold, Tennessee Division of Forestry, February 28, 2003, and Tim Sheehan, Kentucky Division of Forestry, March 4, 2003.

## **Future Consultations**

168. The typical Federal nexus for forestry activities is CWA §404 permitting from the USACE for projects with the potential to discharge dredged or fill material into navigable waters of the United States. This analysis does not foresee the issuance of 404 permits for projects relating to forestry over the next ten years. Therefore, no informal or formal consultations associated with forestry are expected.<sup>100</sup>

### **4.2.5 National Parks, Wild and Scenic Rivers, and National River and Recreation Areas**

#### **Obed Wild and Scenic River**

169. Portions of the Obed Wild and Scenic River lie within the proposed critical habitat designation for the mussels. The park, which includes portions of the Obed River, Clear Creek, Daddys Creek and the Emory River, is located in Morgan and Cumberland Counties in Tennessee. The NPS allows public access for such recreational activities as whitewater boating, rock climbing, hiking, and fishing. Activities that occur in the park which may adversely impact the mussels are the construction of bridges, roads, and impoundments, and mineral productions. However, the NPS would only be the lead Action agency and consult with the Service for some activities, such as bridge crossing, river crossing, general park management plans, and trail maintenance. For discussions of other activities occurring within the parks where NPS would not be the lead Action agency (i.e., mineral production, and bridge crossings) please refer to each activities respective section.<sup>101</sup>

#### **Big South Fork National River and Recreation Area**

170. Portions of the Big South Fork National River and Recreation Area also lie within the proposed critical habitat designation for the mussels. Located in the Big South Fork region of the Cumberland River, the park is operated and managed by the NPS, and is open to the public. Recreational activities in the park include camping, whitewater rafting, kayaking, canoeing, hiking, horseback riding, mountain biking, hunting, and fishing. Future activities within the park that may impact the mussels include river crossing and trail maintenance projects, and the development of management and remedy plans, such as those

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<sup>100</sup> Personal communication with William James, Army Corps of Engineers, March 10, 2003.

<sup>101</sup> For a complete discussion on these types of activities, see Section 4.1.1 for Road/Bridge Construction and Section 4.1.8 for Oil and Gas Drilling.

associated with the General Management Plan, contaminated mine damage sites, and privately owned oil and gas wells.<sup>102</sup>

### **Baseline**

171. Under the Wild and Scenic Rivers Act and the Water Resources Act of 1974 (Public Law 93-251), activities within the Obed and Big South Fork parks are limited; thus, these Acts provide some level of protection for the mussels.<sup>103</sup> For example, river access and recreational use are restricted to particular points along the river.<sup>104</sup> The mussels are also afforded protection under Federal and State water quality standards.<sup>105</sup>

### **Future Consultations**

#### **Obed Wild and Scenic River**

172. The typical Federal Action agency for activities within the Obed Wild and Scenic Rivers Area is the NPS. During the next ten years, the NPS anticipates one low level informal consultation regarding a small bridge construction in Unit 3 Obed River.<sup>106</sup>

#### **Big South Fork National River and Recreation Area**

173. The NPS anticipates a total of seven informal consultations and one formal consultation regarding activities within the park over the next ten years. These consultations include one formal consultation regarding a river crossing project, two informal consultations associated with revisions to the park's General Management Plan and five informal consultations related to trail maintenance projects over the next ten years.<sup>107</sup>

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<sup>102</sup> Personal communication with Chris Stubbs and Tom Blount, National Park Service, Big South Fork River and Recreation Area, March 3, 2003.

<sup>103</sup> For a more detailed description of these protections, see Section 2.

<sup>104</sup> Personal communication with Chris Stubbs and Tom Blount, National Park Service, Big South Fork River and Recreation Area, March 3, 2003. The Big South Fork General Management Plan may also provide a baseline level of protection for the mussels.

<sup>105</sup> For a more detailed description of these standards and regulations, see Section 2 and Appendix B.

<sup>106</sup> The Tennessee District of the Federal Highway Administration is currently developing two bridge projects in Unit 3 Obed River. These consultations are captured in Section 4.2.1, TDOT's estimates for Unit 3 Obed River.

Personal communication with Kristen Stoehr, National Park Service, Obed Wild and Scenic River, March 4, 2003.

<sup>107</sup> Personal communication with Chris Stubbs and Tom Blount, National Park Service, Big South Fork River and Recreation Area, March 3, 2003.

174. This analysis anticipates eight informal consultations and one formal consultation associated with national park activities during the next ten years. The administrative costs of consultations for national park activities will range from \$34,000 to \$120,000 (\$20,000 to \$98,000 for informal consultation, and \$14,000 to \$22,000 for formal consultation).<sup>108</sup>

## **Project Modifications**

### **Obed Wild and Scenic Rivers**

175. The NPS is likely to incorporate any necessary project modifications, as the mission of NPS is to protect the park's natural resources and wildlife habitat.<sup>109</sup> Thus, no project modifications are expected to result from the bridge crossing consultation.

### **Big South Fork National River and Recreation Area**

176. The Draft Economic Analysis anticipated the river crossing project may lead to such project modifications as temporary mussel relocation in order to minimize disturbance to the mussels, or termination of the project all together.<sup>110</sup> The Tennessee Horse Council commented that the potential termination of the crossing project was inconsistent with the Draft General Management Plan (2003).<sup>111</sup> The Draft General Management Plan states that the Station Camp Ford is a designated river crossing for horses and that the riverbed at this location is habitat for endangered mussels.<sup>112</sup> "An interim method for addressing this issue, i.e., a flagged trail and educational signs, continues to provide for visitor use across, or through, the river. Additional studies are planned." The preferred alternative is to continue the interim trail crossing method and continue to investigate most appropriate long-term crossing method. The National Park Service is still exploring a range of alternatives for this crossing, including "1) construction of horse bridges over the river, 2) hardening of crossings in the river, 3) relocation of the horse crossings to a less sensitive location, 4) removal of

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<sup>108</sup> See Exhibit 3-1.

<sup>109</sup> Personal communication with Kristen Stoehr, National Park Service, Obed Wild and Scenic River, March 4, 2003. Other projects in or near the park that could impact the mussels include mining, oil drilling, and the construction of impoundments, reservoirs, and dams. However, because the NPS is not the lead agency, the NPS will not consult with the Service regarding these projects. For a complete discussion on these types of activities, see Sections 4.1.1 and 4.1.8.

<sup>110</sup> Personal communication with Chris Stubbs and Tom Blount, National Park Service, Big South Fork River and Recreation Area, March 3, 2003.

<sup>111</sup> Public comment received from Susan E. Neff, on the behalf of the Tennessee Horse Council, December 5, 2003.

<sup>112</sup> National Park Service. *Supplemental Draft General Management Plan Environmental Impact Statement Big South Fork National River and Recreation Area*. January 2003.

horse crossings from the river, and 5) relocation of mussels to a more suitable location.”<sup>113</sup> Therefore, this analysis and the General Management Plan are consistent.

177. The Tennessee Horse Council also commented that the economic analysis should go beyond direct and indirect impacts of the consultation process and address the wide ranging potential impacts on equestrian visitation to the Big South Fork.<sup>114</sup> River crossings in mussel habitat may be altered but will not be precluded in the Big South Fork.<sup>115</sup> A measurable reduction in equestrian visitation to the Big South Fork is not anticipated due to alteration of types of river crossings in mussel habitat. Therefore, this analysis does not quantify potential impacts on equestrian visitation.

#### **4.2.6 Coal Mining**

178. Coal mining is projected to occur on private and public land in Kentucky, Virginia and Tennessee.<sup>116</sup> The proposed critical habitat units and areas essential to the conservation of the mussels potentially impacted by coal operations include the Unit 3 Obed River, Unit 9 Big South Fork, Unit 13 Laurel Fork, Unit 11 Sinking Creek, Unit 8 Rock Creek, Unit 5 Clinch River, and Area 3 Rockcastle River.

179. All coal mines require a surface coal mining permit issued under authority of the Federal Surface Mining Control and Reclamation Act (SMCRA). Under SMCRA, States are given the primary (but not exclusive) responsibility for regulating surface coal mining and reclamation operations if they develop, and the OSM approves, a program which demonstrates the State’s capability to carry out the applicable provisions of SMCRA, including rules and regulations consistent with SMCRA (OSM retains oversight responsibility).<sup>117</sup> The OSM has granted the States of Kentucky (through the DSMRE) and

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<sup>113</sup> Ibid.

<sup>114</sup> Public comment received from Susan E. Neff, on the behalf of the Tennessee Horse Council, December 5, 2003.

<sup>115</sup> Personal communication with Chris Stubbs, National Park Service, Big South Fork National River and Recreation Area, December 16, 2003.

<sup>116</sup> A public comment received from Arthur W. Abbs, on behalf of the Birmingham Field Office of the Office of Surface Mining (June 25, 2003) confirmed that no impacts to coal mining in Alabama and Mississippi are anticipated due to the designation of critical habitat for the mussels.

<sup>117</sup> Memorandum dated September 24, 1996, from Assistant Director, Ecological Services, to Acting Director, Office of Surface Mining Reclamation and Enforcement, re. “Formal Section 7 Biological Opinion and Conference Report on Surface Coal Mining and Reclamation Operations Under the Surface Mining Control and Reclamation Act of 1977.”

To be delegated primacy, State surface mining laws and regulations must be as effective and no less stringent than Federal surface mining laws and regulations. Personal communication with Robert Penn, Director, Office of Surface Mining, Big Stone Gap Field Office, Big Stone Gap, Virginia, February 25, 2003. Personal communication with Joseph

Virginia (through the DMLR) the regulatory authority (“primacy”) to issue surface coal mining permits. Because Kentucky and Virginia have regulatory authority, there is no nexus and no section 7 consultation. The State of Tennessee does not have primacy, and OSM issues all surface mining permits in this State. The OSM issued permit is the nexus for a section 7 consultation with the Service.<sup>118</sup>

### **Baseline**

180. The State of Tennessee does not have regulatory primacy for surface coal mining; instead OSM is responsible for regulating surface coal mining. As a Federal agency, OSM adheres to SMCRA.<sup>119</sup> State water quality standards also provide some protection; the Tennessee Water Quality Control Board requires permit applicants to evaluate practicable alternatives and conduct avoidance, minimization, and/or mitigation for activities impacting water.<sup>120</sup> Unit 3 Obed River is also part of the Obed Wild and Scenic River, which is a National Park managed by the NPS.<sup>121</sup>
181. The Virginia Coal Surface Mining Control and Reclamation Act of 1979 provides for some protections to the mussels.<sup>122</sup> The Act requires that a protection and enhancement plan accompany each surface mining application. As part of the Plan the applicant describes how, to the extent possible using the best available technology, disturbances and adverse impacts on fish and wildlife and related environmental values will be minimized during the operation.<sup>123</sup> Protective measures may include the establishment of buffer zones, restrictions on the location and design of roads and powerlines, and surface water quality monitoring. Sediment control measures are also required.<sup>124</sup> The Virginia State Water Control Law also

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Blackburn, Program Manager, Office of Surface Mining, Lexington Field Office, Lexington, KY, February 25, 2003. Personal communication with Doug Siddell, Office of Surface Mining, Knoxville, Tennessee, February 26, 2003.

<sup>118</sup> Personal communication with Doug Siddell, Office of Surface Mining, Knoxville, Tennessee, February 26, 2003. Personal communication with Les Vincent, Customer Services Unit Manager, Department of Mines, Minerals & Energy, Division of Mined Land Reclamation, Big Stone Gap Field Office, Big Stone Gap, Virginia, February 28, 2003. Personal communication with Dr. Richard J. Wahrer, Environmental Scientist, Kentucky Department for Surface Mining Reclamation and Enforcement, Frankfort, KY, March 6, 2003. Personal communication with USFWS Field Office Biologist, Cookeville, Tennessee, March 6, 2003.

<sup>119</sup> A more complete discussion of the protections provided through SMCRA can be found in Section 2.2.2.

<sup>120</sup> Tennessee. Code Ann., §69-3-101.

<sup>121</sup> See Section 2.2.2 for a discussion of the protections provided.

<sup>122</sup> Virginia Code Ann, §45.1-226. (1979).

<sup>123</sup> Virginia Code Ann, 4§25-130-780.16.

<sup>124</sup> Virginia Code Ann, 4§25-130-816.45.

provides for some protection of the mussels by prescribing numeric limits for specific physical, chemical, biological, and radiological characteristics of water.<sup>125</sup>

182. The Kentucky Surface Mining Law<sup>126</sup> and the Permanent Program Regulations for Surface Coal Mining Reclamation Operations and Coal Exploration Operations<sup>127</sup> provide for some protection to the mussels. A Mining and Reclamation Plan (MRP) is required with each surface mining permit application. The MRPs include sections on topsoil handling, backfill and grading, surface water control and monitoring, ground water control and monitoring, and revegetation. Mining activities which require Kentucky pollution discharge elimination system permits (KPDES) are also required to implement BMPs.<sup>128</sup> A KPDES is required for discharges into waters of the Commonwealth. In addition, the Kentucky Water Quality Law provides for some protection of the mussels by prescribing numeric limits for specific physical, chemical, biological, and radiological characteristics of water.<sup>129</sup>

### **Future Consultations**

183. As stated above all mines require a surface coal mining permit issued under the authority of SMCRA. OSM has granted primacy to Kentucky and Virginia but reserves regulatory authority for Tennessee.
184. This analysis anticipates 11 to 24 informal consultations and 302 to 320 TA efforts associated with coal mining and coal mine reclamation during the next ten years. The administrative costs of consultations for coal activities will range from \$210,000 to \$560,000 (\$30,000 to \$80,000 for informal consultation, and \$180,000 to \$480,000 for TA).

### **Tennessee**

185. Although there is not much coal mining activity in Tennessee, approximately six surface coal mining permits are processed in the State annually. OSM has only consulted with the Service on surface coal mining permits three times since 1984, all three consultations were informal, and all three required that OSM prepare a BA.<sup>130</sup>

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<sup>125</sup> Virginia Code Ann, §62.1-44.15(3a).

<sup>126</sup> Kentucky Revised Statutes, 350.

<sup>127</sup> Kentucky Administrative Regulations, §405.7-24.

<sup>128</sup> Natural Resources and Environmental Protection Cabinet. 1995. Best Management Practices For Surface Coal Mining. Division of Water, Water Quality Branch, Nonpoint Source Section.

<sup>129</sup> Kentucky Revised Statutes §401.5:031.

<sup>130</sup> Personal communication with Doug Siddell, Office of Surface Mining, Knoxville, Tennessee, February 26, 2003. The Cookeville field office queried their consultation database back to October 1, 1997. Since this time, there

186. In Tennessee, coal fields drain into two of the proposed critical habitat units, Unit 3 Obed River and Unit 9 Big South Fork River.<sup>131</sup> During the next ten years, OSM anticipates it will process 60 coal permits in the State. Up to three of these permits will occur in Unit 3 Obed River Unit, and 10 to 20 will occur in Unit 9 Big South Fork Unit. The consultations with the Service on these permits will be informal, and up to two of the informal consultations will require that OSM prepare a BA.<sup>132</sup>
187. There are no active coal mines located within the boundaries of the Big South Fork National River and Recreation Area or the Obed Wild and Scenic River area. There are, however, more than 100 abandoned coal mine openings located inside the Big South Fork National Park, and the NPS has begun efforts to address the contaminated sites. Remediation plans for nine of the most acidic sites will be packaged together into a single EIS and consulted on with the Service. Remediation activities will also require a section 404 CWA permit from USACE. The NPS will coordinate and combine the two potential consultations into a single consultation. The consultation will occur in 2004, it will be informal, and it will not involve a BA or project modifications. The NPS estimates there will be no further coal mine activities during the next 10 years.<sup>133</sup>

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have been no consultations regarding the mussels in Tennessee. However, there were two mine projects that involved spotfin chub consultations. Both of these operations were located in the Obed River watershed, a watershed that contains designated habitat for the mussels. Personal communication with Biologist, U.S. Fish and Wildlife Service, Cookeville, Tennessee, May 21, 2003.

<sup>131</sup> The Obed River Unit lies within the section of the Obed River designated as a Federal Wild and Scenic River. The NPS does not consult with the Service on surface coal mining or oil and gas drilling permits, the consultation is left to the lead regulatory agency (OSM and USACE). Personal communication with Kristin A. Stoehr, Unit Manager, Obed Wild and Scenic River, Wartburg, Tennessee, March 4, 2003.

<sup>132</sup> The low range estimate reflects the current coal market and the high range estimate reflects an improved coal market. Personal communication with Doug Siddell, Office of Surface Mining, Knoxville, Tennessee, February 26, 2003.

<sup>133</sup> Personal communication with Tom Blount, Chief of Resource Management, National Park Service, Big South Fork National River & Recreation Area, Oneida, Tennessee, March 4, 2003. Personal communication with Kristin A. Stoehr, Unit Manager, Obed Wild and Scenic River, Wartburg, Tennessee, March 4, 2003.

## Virginia<sup>134</sup>

188. In Virginia, coal fields impact Unit 5 Clinch River. In the future, DMLR anticipates it will process 250 to 400 surface coal mining permits in the State annually (150 to 200 new permits or permit revisions and 100 to 200 permit renewals).<sup>135</sup> Of these annual permits, 30 will occur in Unit 5 Clinch River (4 new permits, 20 permit renewals, and 6 permit revisions). Tazewell County commented that there are 28 active DMLR permits within the county.<sup>136</sup> It is anticipated that these mines are included in the estimate of permits provided by the DMLR. Unit 4 Powell River is downstream of the coal mining areas and does not encompass any coal mine operations.<sup>137</sup> The DMLR anticipates the 300 Unit 5 Clinch River permits will require technical assistance efforts with the Service.<sup>138</sup>

## Kentucky

189. Currently in Kentucky, fewer than five surface coal mining permits address the mussels.<sup>139</sup> While some coal mining occurs within five miles of the proposed critical habitat units, any coal mining in the area occurs upstream, and the mines do not drain into the proposed critical habitat units. During the next 10 years, DSMRE estimates it will process

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<sup>134</sup> This analysis estimates impacts based 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. Black-water events could impact the mussels. For example, in 1996, a slurry impoundment owned by Lone Mountain Coal Company failed, releasing 6 million gallons of coal slurry to the Powell River. The spill impacted more than 65 miles of stream, much of which extended into the main stem of the Powell River down to the Virginia/Tennessee boarder. The number, frequency, and magnitude of black-water events are not “reasonably foreseeable,” and are not considered in this analysis.

<sup>135</sup> The consultation history provided by the Southwestern Virginia Field Office indicates there is a full-time biologist that works primarily with coal mining issues in accordance with the 1996 National Programmatic Consultation on surface coal mining and that the field office is in the process of developing species specific measures for industry regulators. The history did not include any consultations in addition to the 1996 National Programmatic Consultation on surface coal mining. Written communication from the Southwestern Virginia Field Office, February 20, 2003.

<sup>136</sup> Public comment letter submitted by Deanis Simmons, Tazewell County Attorney, on behalf of the Board of Supervisors of Tazewell County, December 5, 2003.

<sup>137</sup> Compared to the Clinch River watershed, more coalfield activities occur in the Powell River watershed. However, the activity occurs upstream from the unit. While the larger number of coal operations could have a compounding and cumulative on the mussels in the Powell River, cumulative effects are not addressed in consultations with the Service.

<sup>138</sup> Personal communication with Les Vincent, Customer Services Unit Manager, Department of Mines, Minerals & Energy, Division of Mined Land Reclamation, Big Stone Gap Field Office, Big Stone Gap, Virginia, March 4, 2003.

<sup>139</sup> The Cookeville field office queried their consultation database back to October 1, 1997. Since this time, the Service conducted consultations regarding endangered mussels for two mining projects. Personal communication with Biologist, U.S. Fish and Wildlife Service, Cookeville, Tennessee, May 21, 2003.

two to 20 new permits or permit revisions in or nearby the proposed critical habitat units. Of these permits, up to six will occur in each of the following: Unit 13 Laurel Fork, Unit 11 Sinking Creek, and Unit 8 Rock Creek, and two will occur in Area 3 Rockcastle River. These will be technical assistance efforts for the Service.<sup>140</sup>

### **Project Modifications**

190. In Tennessee, the existing Federal (section 404 CWA permit) and State (NPDES permit, Tennessee Aquatic Resource Alteration Permit (ARAP), and water quality/401 certification) permits/certifications requirement will adequately protect the mussels and their habitat.<sup>141</sup> However, 10 percent (one or two) of the informal consultations may require project modifications to address Service concerns pertaining to sediment control and water quality.<sup>142</sup> Recommended project modifications may include the installation of additional sumps along haul roads, the construction of larger sediment basins (holding and treatment ponds), more frequent clean-out of ponds and haul road sumps, and monitoring. Installation of sumps, the construction of larger sediment basins (holding and treatment ponds), and clean-out of ponds and haul road sumps are performed with a backhoe, and the cost depends on the length of haul road and the size of the holding pond. These additional costs are not expected to be expensive as the activities only involve a backhoe.<sup>143</sup> Monitoring costs are also expected to be minimal.

#### **4.2.7 Gravel Dredging and Excavation**

191. The proposed mussel critical habitat units potentially impacted by gravel dredging and excavation include Unit 1 Duck River, Unit 10 Buck Creek, and Area 1 French Broad River. Gravel dredging and excavating activities do not require a section 404 CWA permit from the USACE. The section 404 process only applies when there will be a discharge of dredge materials. Gravel dredging and excavation does, however, require State permitting (e.g., Tennessee requires an ARAP) and State water quality/401 certification. While there is no Federal nexus for State permitting and water quality certification, Unit 1 Duck River,

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<sup>140</sup> Personal communication with Dr. Richard J. Wahrer, Environmental Scientist, Kentucky Department for Surface Mining Reclamation and Enforcement, Frankfort, KY, March 4, 2003, March 6, 2003, and April 29, 2003.

<sup>141</sup> "...it is the Service's biological opinion that surface coal mining and reclamation operations conducted in accordance with properly implemented Federal and State regulatory programs under SMCRA are not likely to jeopardize the continued existence of listed or proposed species, and are not likely to result in the destruction or adverse modification of designated or proposed critical habitats." Formal Section 7 Biological Opinion and Conference Report on Surface Coal Mining and Reclamation Operations Under the Surface Mining Control and Reclamation Act of 1977.

<sup>142</sup> Personal Communication with Tom Blount, Chief of Resource Management, Big South Fork National River and Recreation Area, April 8, 2003. Personal communication with Doug Siddell, Office of Surface Mining, Knoxville, Tennessee, March 5, 2003.

<sup>143</sup> Personal communication with Doug Siddell, Office of Surface Mining, Knoxville, Tennessee, March 5, 2003.

Unit 10 Buck Creek, and Area 1 French Broad River are designated as section 10 waters, and therefore dredging and excavation activities require a section 10 permit from the USACE.<sup>144</sup> A Federal nexus does exist for this section 10 permit, and USACE will initiate section 7 consultation with the Service.

192. On February 10, 1998, the Department of Army issued a regional permit for sand and gravel excavation in Tennessee, Kentucky and Alabama. This regional permit authorizes excavation activities under section 10 of the Rivers and Harbors Act of 1899 provided work is accomplished in accordance with the terms and conditions of the permit.<sup>145</sup> This regional permit expired on February 10, 2003 and the USACE is not certain whether it will be renewed in the future. However, even if the regional permit is renewed, if a listed species is present in the gravel dredging and excavation area, the USACE would likely require an individual section 10 permit, triggering consultation with the Service. Therefore, the estimate of future consultations with the Service for gravel and dredging activities is not dependent on the renewal decision for the regional permit.<sup>146</sup>

### **Baseline**

193. Unit 1 Duck River, Unit 10 Buck Creek, and Area 1 French Broad River are designated as section 10 waters of the Rivers and Harbors Act of 1899. The required section 10 sand and gravel excavation permit requirements provide protection to the mussels. Some of the special conditions contained in the permit limit the dredging activity as follows: (1) work restricted to outside the stream flow, “in the dry,” and during low flow conditions from July 15 through October 31; (2) maintenance of a mandatory buffer zone between the excavation site and the stream flow; (3) streamside vegetation must be left undisturbed and intact; and (4) site access is limited to the existing road network, in addition to these restrictions there is a provision prohibiting the destruction of a threatened or endangered species or the critical habitat of such species.<sup>147</sup> The Tennessee ARAP provides another layer of protection for the mussels in Unit 1 Duck River because the general permit prohibits dredging in State Scenic Rivers and dredging activities that adversely affect a State or

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<sup>144</sup> Section 10 of the Rivers and Harbors Act of 1899 provides for the protection of navigable waters. This Act controls the dredging and filling of all US waterways and makes it unlawful to construct any structure in or over these waters without authorization from the USACE. Personal communication with William James, Permits Branch, USACE Nashville District East Office, Nashville, Tennessee, March 10 and 12, 2003.

<sup>145</sup> A special condition in the permit prohibits the destruction of a threatened or endangered species or the critical habitat of such species. Special conditions also restrict when, where, and how dredging and excavating activities can be done. Department of the Army Regional Permit 97-RP-2, 3, 4.

<sup>146</sup> Personal communication with William James, Permits Branch, USACE Nashville District East Office, Nashville, Tennessee, March 10 and 12, 2003.

<sup>147</sup> Department of the Army Regional Permit 97-RP-2, 3, 4

Federally listed threatened or endangered species.<sup>148</sup> State water quality permits also provide a level of protection for the mussels in Unit 1 Duck River, Unit 10 Buck Creek, and Area 1 French Broad River.

### **Future Consultations**

194. The USACE issues permits under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act for private activities that occur in water bodies or involve modifying navigable waterways for construction and maintenance of structures.<sup>149</sup> The USACE issues permits under section 404 of the Clean Water Act for all proposed units but only Unit 1 Duck River, Unit 10 Buck Creek, and Area 1 French Broad River fall under section 10 of the Rivers and Harbors Act.
195. USACE section 10 permits constitute the primary Federal nexus for consultation regarding gravel dredging. This analysis anticipates seven to 16 consultation efforts associated with gravel dredging and excavation activities during the next ten years (two to five informal consultations for Unit 1 Duck River, five to ten formal consultations for Unit 10 Buck Creek, and up to one formal consultation on Area 1 French Broad River).<sup>150</sup> The administrative cost of consultations for gravel dredging and excavation activities will range from \$80,000 to \$310,000 (\$10,000 to \$70,000 for informal consultations and \$70,000 to \$240,000 for formal consultations).

### **Project Modifications**

196. Because permit regimes provide sufficient controls the Service's recommendations on permits for gravel dredging in small streams will generally mirror the terms and conditions outlined in the Department of the Army Regional Permit, there are no anticipated project modifications.

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<sup>148</sup> Even if the gravel dredging activity could occur, the activity would have to comply with other Federal and State laws, and would be limited by terms and conditions similar to those in the Federal section 10 permit. Tennessee Department of Environmental Conservation, Aquatic Resource Alteration Permit.

<sup>149</sup> USACE issues four types of permits: (1) individual permit, a type of standard permit requiring public comment; (2) letter of permission (LOP), a type of standard permit requiring coordination with adjacent property owners; (3) nationwide permits, which authorize a category of activities and are issued for individual small projects across the United States; and (4) regional or general permits, which authorize a category of activities in a specific region.

<sup>150</sup> Because of current gravel dredging practices, consultation for gravel dredging operations in Unit 10 Buck Creek may result in formal consultation with the Service. Personal communication with William James, Permits Branch, USACE Nashville District East Office, Nashville, Tennessee, March 10 and 12, 2003.

#### 4.2.8 Oil and Gas Development

197. Most of the oil and gas activity that may impact the proposed critical habitat units is likely to occur in Fentress, Morgan, and Scott Counties in Tennessee, and McCreary County in Kentucky.<sup>151</sup> Tazewell County commented that there are currently gas wells operating in the Clinch River drainage.<sup>152</sup> Therefore, the proposed mussel critical habitat units most likely impacted by future oil and gas drilling operations include Unit 3 Obed River, Unit 9 Big South Fork, and Unit 5 Clinch River.<sup>153</sup> The five miles of proposed critical habitat on Unit 13 Laurel Fork is not likely to see oil and gas activity during the next ten years.<sup>154</sup>

#### Baseline

198. Federal and State oil and gas laws and regulations provide some protection to the mussels. While the Federal regulations do specify Operating Standards (e.g., surface operations shall not be conducted within 500 feet of a stream bank) that apply to drilling operations within a National Park, no parts of the regulations specifically mention special conditions that protect threatened or endangered species.<sup>155</sup> The NPS is also directed to not approve a plan of operations "...where operations would substantially interfere with management of the unit to ensure the preservation of its natural and ecological integrity in perpetuity, or would significantly injure the federally-owned or controlled lands or waters."<sup>156</sup>
199. State regulations also do not mention specific conditions that protect threatened or endangered species. However, the State regulations do require that oil and gas operations be conducted in a manner that prevents or mitigates adverse environmental impacts, such as soil erosion and water pollution, and prohibits discharges without a valid NPDES permit from

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<sup>151</sup> Personal Communication with Tom Blount, Chief of Resource Management, Big South Fork National River and Recreation Area, April 8, 2003. Personal communication with Michael Burton, Geologist, Tennessee Department of Environmental Conservation, Division of Geology, Nashville, Tennessee, March 5, 2003.

<sup>152</sup> Public comment letter submitted by Deanis Simmons, Tazewell County Attorney, on behalf of the Board of Supervisors of Tazewell County, December 5, 2003.

<sup>153</sup> Personal communication with U.S. Fish and Wildlife Service staff, Tennessee, Alabama, Mississippi, Kentucky, and Virginia Field Offices, January 28, 2003; Public comment letter submitted by Deanis Simmons, Tazewell County Attorney, on behalf of the Board of Supervisors of Tazewell County, December 5, 2003.

<sup>154</sup> Personal communication with Michael Burton, Geologist, Tennessee Department of Environmental Conservation, Division of Geology, Nashville, Tennessee, March 5, 2003.

<sup>155</sup> 30 CFR 9 Subpart B, Non-Federal Oil and Gas Rights, § 9.41 (a).

<sup>156</sup> 30 CFR 9 Subpart B, Non-Federal Oil and Gas Rights, § 9.37 (a)(3).

TDEC.<sup>157</sup> While the level of protection is not clear, the State oil and gas regulation may provide some level of protection to the mussels.

### **Future Consultations**

200. Oil and gas drilling is permitted by the States of Tennessee, Kentucky, and Virginia. In Tennessee, permits are issued by TDG, Oil and Gas Section, in Kentucky, permits are issued by the DOG, and in Virginia permits are issued by the Division of Gas and Oil.<sup>158</sup> Because these States have regulatory authority, there is no nexus to require section 7 consultation unless a project involves constructing or modifying a FERC licensed interstate gas line.<sup>159</sup> However, some subsurface minerals located below the Obed Wild and Scenic River area and Big South Fork National River and Recreation Area (both National Parks) are privately owned.<sup>160</sup> To access this resource (i.e., for oil and gas activity occurring on, over, or through National Park land), NPS must initiate the NEPA process and approve a plan of operations. The NPS approved plan of operations is the nexus for a section 7 consultation with the Service.<sup>161</sup>
201. In the Big South Fork National River and Recreation Area there are 326 oil and gas wells located within the legislative boundary. Approximately 150 of these wells are currently under active lease. While no plans of operation are in effect now, the NPS anticipates it will process 35 to 50 plans during the next ten years (25 to 30 for existing wells and 10 to 20 for new wells). Because oil and gas activity usually occurs on plateaus the consultations with the Service on these plans will be informal. The plans require NPS to prepare an environmental assessment, including a BA. No project modifications are anticipated.<sup>162</sup> The administrative costs of informal consultations for oil and gas activities within Unit 9 Big South Fork will range from \$480,000 to \$680,000 over the next ten years.

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<sup>157</sup> Rules of Tennessee State Oil and Gas Board Statewide Order No. 2 Terms, 1040-2-2-.02 (Drilling Permits), 1040-2-6-.04 (Environmental Protection), and 1040-3-3-.02 (2)(g) (Pollution and Safety Controls).

<sup>158</sup> Virginia's Gas and Oil Act of 1990, Virginia Code Ann., Chapter 22.1 § 45.1-361.

<sup>159</sup> Personal communication with Etta Spradlin, Biological Science Technician, National Park Service, Big South Fork National River & Recreation Area, Oneida, Tennessee, March 4, 2003; Personal communication with U.S. Fish and Wildlife Service personnel, December 17, 2003.

<sup>160</sup> In the Big South Fork National River and Recreation Area, approximately 20,000 acres (the total National Park is approximately 115,000 acres) of subsurface minerals are owned privately. Personal communication with Tom Blount, Chief of Resource Management, National Park Service, Big South Fork National River & Recreation Area, Oneida, Tennessee, March 4, 2003.

<sup>161</sup> Personal communication with Tom Blount, Chief of Resource Management, National Park Service, Big South Fork National River & Recreation Area, Oneida, Tennessee, March 4, 2003.

<sup>162</sup> Personal communication with Tom Blount, Chief of Resource Management, National Park Service, Big South Fork National River & Recreation Area, Oneida, Tennessee, March 4, 2003.

202. The NPS anticipates no oil and gas activities inside Unit 3 Obed River (which is within the park). There are six oil and gas wells located within the National Park boundaries, and none of the wells are in operation. Although there may be new oil and gas well activity near the park boundaries it is not likely to occur inside the park.<sup>163</sup>
203. While FERC maintains a short-term “On the Horizon” listing of major pipeline projects, the agency is unable to estimate the number or location of projects which may require consultation with the Service in the proposed critical habitat units over the next 10 years.<sup>164</sup> If a consultation did occur the project modifications likely to be recommended include minimizing stream crossings, spanning bridges to avoid instream work, construct catchment basins around wells, and time of year restrictions for vegetation removal if the project is near habitat occupied by protected species.<sup>165</sup>

#### **4.2.9 Dams/Reservoirs**

204. Seven TVA non-power-generating dams are currently operating adjacent to the proposed critical habitat (Normandy Reservoir on Unit 1 Duck River and Bear Creek Reservoirs on Unit 2 Bear Creek tributaries).<sup>166</sup> These dams are managed for flood control, water supply, and recreation. There are two hydroelectric dams in or affecting the areas essential to the conservation of the mussels (Douglas Dam on Area 1 French Broad River, and Cherokee Dam on Area 2 Holston River). Douglas Dam’s four hydroelectric units have a generating capacity of 145,800 kilowatts, while Cherokee Dam’s four hydroelectric units have a generating capacity of 135,200 kilowatts.<sup>167</sup> The activities with Federal nexuses for dams and reservoirs in the Tennessee Valley are TVA projects, 26(a) permitting from the TVA, and/or CWA §404 permitting from the USACE. Potential activities that can adversely affect the mussels include: replacement and maintenance activities, construction of new facilities, flow alterations, and pool level changes. Impacts associated with conservation measures for the mussels related to these TVA reservoirs are unlikely.

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<sup>163</sup> Personal communication with Etta Spradlin, Biological Science Technician, National Park Service, Big South Fork National River & Recreation Area, Oneida, Tennessee, March 4, 2003.

<sup>164</sup> Personal communication with Robert Arvedlund, Federal Energy Regulatory Commission, February 25, 2003.

<sup>165</sup> Personal communication with U.S. Fish and Wildlife Service personnel, December 17, 2003.

<sup>166</sup> Personal communication with Charles P. Nicholson, John J. Jenkinson, John T. Baxter, and Peggy W. Shute, Tennessee Valley Authority, March 20, 2003.

<sup>167</sup> Tennessee Valley Authority. TVA Reservoirs and Power Plants. [http://www.tva.gov/sites/sites\\_ie2.htm](http://www.tva.gov/sites/sites_ie2.htm), as viewed on May 23, 2003.

205. Columbia Power and Water Systems (CPWS) commented that the Old Columbia Dam, constructed in 1925, is located within Unit 1 Duck River.<sup>168</sup> CPWS owns and operates a municipally owned public water system serving Columbia and Maury County, Tennessee. The source of this water is the Old Columbia Dam. The Old Columbia Dam is also a FERC licensed hydropower facility with a generating capacity of 300 kilowatts.<sup>169</sup> Both water supply and power generation at the Old Columbia Dam may be impacted by conservation measures for the mussels; therefore, this analysis quantifies the potential impacts to these activities.
206. Fentress County commented that the designation of critical habitat “will preclude future construction of a water supply reservoir potentially located” in upper Crooked Creek and upper North Prong of Clear Fork (Unit 9 Big South Fork).<sup>170</sup> Fentress County also states that these two drainages are the only remaining potential sites available to the county since the potential sites north of White Oak Creek are eliminated by the potential effects to the Big South Fork River and Recreation Area. Water supply may be impacted by conservation for the mussels; therefore, this analysis quantifies the potential impacts to water supply activities in Fentress County.

### **Baseline**

207. TVA policy and principles on the environment provide the mussels a level of protection by requiring the minimization of effects of operations on the environment, and compliance with environmental laws and regulations.<sup>171</sup> State water quality standards also provide some protection; for example the Tennessee Water Control Board requires permit applicants to evaluate practicable alternatives and conduct avoidance, minimization, and/or mitigation for activities impacting water.<sup>172</sup>

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<sup>168</sup> Public comment letter from James O. Clark, General Manager Columbia Power and Water Systems on behalf of Columbia Power and Water Systems, August 26, 2003.

<sup>169</sup> Federal Energy Regulatory Commission, Order Approving Transfer of Licence to the Columbia Power and Water Systems, January 23, 2003.

<sup>170</sup> Public comment letter from John B. Mullinix, Fentress County Mayor, on behalf of Fentress County, December 4, 2003.

<sup>171</sup> TVA. Principles and Practices Manual. Revised 2002. <http://www.tva.com/foia/readroom/policy/prinprac/index.htm>, as viewed on February 19, 2003.

<sup>172</sup> Tennessee. Code Ann., §69-3-101.

## Future Consultations

### **Columbia Power and Water System**

208. The Draft Economic Analysis estimated no new hydroelectric dams or water supply reservoirs for any of the critical habitat units or areas essential to the conservation of the mussels.<sup>173</sup> CPWS commented that one of the TVA alternatives identified in the Final Programmatic Environmental Impact Statement (FPEIS) Future Water Supply Needs in the Upper Duck River Basin (2000) will likely be employed by 2025.<sup>174</sup> CPWS also made known a potential project, to raise the Old Columbia Dam to increase water capacity.<sup>175</sup> Based on the information provided by CPWS this analysis anticipates a water supply project will need to be undertaken to meet water supply needs in the future. This analysis identifies two alternatives to meet this water supply need, raising the level of the Old Columbia Dam or the Normandy Dam. Exhibit 4-7 provides a comparison of these two projects.
209. To evaluate the potential economic impact of critical habitat for the mussels on future water supply on the Duck River, this analysis estimates the opportunity cost of raising the level of the Normandy Dam rather than the Old Columbia Dam. That is, this analysis estimates the incremental costs associated with the next best project alternative as identified, raising the level of the Normandy Dam.
210. TVA conducted a water supply needs analysis in the Bedford, Marshall, Maury, and southern Williamson County water service areas (Unit 1 Duck River) in 1998.<sup>176</sup> That water supply needs analysis concluded that future water demand after the year 2015 would have to be met by other water supply sources, and by the year 2050 would have to supply up to 22 cfs. The Duck River Agency is in the process of updating these projections with the U.S.

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<sup>173</sup> Charles Nicholson, Tennessee Valley Authority, Environmental Policy and Planning, January 30, 2003. The Fountain Creek Reservoir, one of the four proposed alternatives evaluated by TVA in their Final Programmatic Environmental Impact Statement (FPEIS) Future Water Supply Needs in the Upper Duck River Basin (2000), if constructed could adversely affect the mussels. A revised water demand model forecasts water demands in the area will be met for the next 50 years. Current focus is on water quality issues associated with the Normandy Reservoir. Personal communication with Larry Murdock, Executive Director, Tennessee Duck River Development Agency, February 24, 2003. Personal communication with Charles P. Nicholson, John J. Jenkinson, John T. Baxter, and Peggy W. Shute, Tennessee Valley Authority, March 20, 2003.

<sup>174</sup> Public comment letter from James O. Clark, General Manager Columbia Power and Water Systems on behalf of Columbia Power and Water Systems, August 26, 2003.

<sup>175</sup> Personal communication with James O. Clark, General Manager Columbia Power and Water Systems, December 17, 2003.

<sup>176</sup> TVA. 1998. *Water Supply Needs Analysis for Bedford, Marshall, Maury, and Southern Williamson Counties Tennessee*, August 1998.

Geological Service and anticipates completion of the analysis in 2005.<sup>177</sup> The growth rates in some areas predicted by 1998 analysis has been lower than expected resulting in more water available downstream than anticipated.

<b>Exhibit 4-7 PROJECT ATTRIBUTES OF THE WATER SUPPLY STRATEGIES PROPOSED ON UNIT 1 DUCK RIVER</b>		
	Old Columbia Dam	Normandy Dam
Proposed project	Raise dam level	Raise dam level by five feet
Water supply	Increase in storage capacity of 10 to 12 million gallons	Increase minimum summer season discharge 16 cfs, 36 MGD to the Columbia area
Location	Proposed critical habitat	70 miles upstream of proposed critical habitat
Impact to mussels	Impound an area of three to seven miles, including occupied habitat, and potentially worsen water quality	Improve downstream water quality
Total project cost	\$2 million to \$10 million	\$8.5 million
Sources: Personal communication with James O. Clark, General Manager Columbia Power and Water Systems, December 17, 2003; Personal communication with U.S. Fish and Wildlife Service personnel, December 19, 2003, December 29, 2003, and January 7, 2004; Information on the mussels and their habitat is taken from the <i>Proposed Designation of Critical Habitat for the Five Cumberlandian Mussels</i> , published on June 3, 2003 (68 FR 33243).		
Note: Normandy Dam is located on river mile 248.7 on the Duck River and the terminus of the proposed critical habitat boundary at Lillard's Mill is located on river mile 179 on the Duck River.		

211. The proposal to raise the level of the Old Columbia Dam by CPWS is in the initial planning stage and has not been formally proposed. To raise the Old Columbia Dam CPWS would have to purchase flood rights, contract engineering firms, and construct the structure.<sup>178</sup> The cost of this project could be \$2 million to \$10 million (if the old structure needs to be encased). However, this project would have to be evaluated for cost and environmental impact by TVA, the Service, USACE, and TDEC before it could proceed.<sup>179</sup> The total cost of the Normandy Dam alternative could be \$8.5 million, this cost includes structural modifications and roadway and facility changes.<sup>180</sup> TVA is willing to consider the Normandy Dam project because the land to be impounded is already owned by the agency and there are few environmental issues. Raising the level of Normandy Dam is the preferred

<sup>177</sup> Personal communication with Larry Murdock, Duck River Agency, December 29, 2003.

<sup>178</sup> Personal communication with James O. Clark, General Manager Columbia Power and Water Systems, December 17, 2003.

<sup>179</sup> Personal communication with John J. Jenkinson, Tennessee Valley Authority, January 6, 2003.

<sup>180</sup> Costs were inflated from 2000 to 2003 dollars using the Construction Cost Index.

alternative of the Duck River Agency which has \$10 million set aside for the project.<sup>181</sup> If the project cost more than \$10 million all customers would contribute.

212. The total implementation costs of the Normandy Dam alternative may be up to \$6.5 million more than the Old Columbia Dam Project. However, if the high cost scenario is realized, the Old Columbia Dam needs to be encased to raise the structure, the Normandy Dam alternative could be \$1.5 million less than the Old Columbia Dam Project. The project costs would also be incurred by different parties. If the Old Columbia Dam was raised the project costs would be incurred by the CPWS and their customers. If the Normandy Dam was raised up to \$10 million would be incurred by the Duck River Agency and any additional costs would be incurred by all regional customers.<sup>182</sup> In addition, the Normandy Dam alternative as identified would provide more water than the Old Columbia Dam Project. The FPEIS did not identify the Old Columbia Project as an alternative to meet the future water supply needs in the Upper Duck River Basin.<sup>183</sup> Therefore, the likely water supply project in the Duck River Basin, even in absence of critical habitat, would be the Normandy Dam alternative.

213. The second issue associated with the Old Columbia Dam is its power generating capability. As stated above the Old Columbia Dam is a FERC licensed hydropower facility with a generating capacity of 300 kilowatts. The dam is not currently in production for two reasons, 1) a flood in March of 2002 damaged the system and repairs have yet to be made, and 2) a gravel bar has formed at the tail water area of the dam causing a four foot elevation of the water level against the downstream side of the turbine resulting in a loss of power production.<sup>184</sup> The second issue could impact the mussels as the oyster mussel currently occupies the gravel bar.<sup>185</sup> A formal consultation with the USACE and the CPWS would result if the CPWS were to apply for a 404 permit to remove the gravel bar. A potential project modification for this permit is mussel relocation of half a mile of habitat.<sup>186</sup> It is also possible that the permit may not be issued.<sup>187</sup> The total project modification cost if the

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<sup>181</sup> Personal communication with John J. Jenkinson, Tennessee Valley Authority, January 6, 2003; Personal communication with Larry Murdock, Duck River Agency, December 29, 2003.

<sup>182</sup> Personal communication with Larry Murdock, Duck River Agency, December 29, 2003.

<sup>183</sup> TVA. 2000. Final Programmatic Environmental Impact Statement (FPEIS) Future Water Supply Needs in the Upper Duck River Basin.

<sup>184</sup> Public comment letter from James O. Clark, General Manager Columbia Power and Water Systems on behalf of Columbia Power and Water Systems, August 26, 2003; Personal communication with James O. Clark, General Manager Columbia Power and Water Systems, December 17, 2003.

<sup>185</sup> Personal communication with U.S. Fish and Wildlife Service personnel, December 8, 2003.

<sup>186</sup> Personal communication with U.S. Fish and Wildlife Service personnel, December 11, 2003.

<sup>187</sup> Ibid.

permit was issued and mussel were relocated could be \$75,500 per relocation effort.<sup>188</sup> The present value, using a rate of seven percent, of the opportunity cost of lost power production if the permit was not issued and power generation did not commence could be up to \$102,500 over the next 40 years.<sup>189</sup> Therefore, the costs associated with the Old Columbia Dam hydropower project could be \$75,500 (if the permit was issued and mussels were relocated as a result of a formal consultation) to \$102,500 (opportunity cost of hydropower generation). However, it has not been determined whether the CPWS will pursue this project based on the costs required to rebuild the equipment damaged in the 2002 flood.<sup>190</sup>

<b>Exhibit 4-8</b>		
<b>PRESENT VALUE OF ESTIMATED TOTAL OPPORTUNITY COST ASSOCIATED WITH THE OLD COLUMBIA DAM HYDROPOWER PRODUCTION</b>		
Nominal Value	Low	\$768,900
	High	\$1,108,700
Present Value	Low (3%)	\$157,200
	High (3%)	\$470,400
	Low (7%)	-\$170,910
	High (7%)	\$102,545
Annualized Value	Low (3%)	\$6,800
	High (3%)	\$20,300
	Low (7%)	-\$12,800
	High (7%)	\$7,692
Note: Costs are not distributed evenly over the next 40 years. This analysis assumes that a second generator is installed in six years.		

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<sup>188</sup> This estimate includes characterization of the existing site, selection of relocation site(s), preparation and submittal to the Service study plan and relocation site, preparation of a draft report and final report, post relocation monitoring for two years, and monitoring reports. Personal communication with Ed Hartowicz, Third Rock Consulting, January 9, 2004.

<sup>189</sup> Income projection provided by the Columbia Power and Water System Federal Energy Regulatory Commission Transfer of License to the Columbia Power and Water System January 23, 2003 and adjusted to reflect cost increases provided by personal communication with James O. Clark, General Manager Columbia Power and Water Systems, January 8, 2003. This analysis assumes a time horizon of 40 years based on the life of the FERC license currently held. The opportunity cost of power production is the incremental difference between the cost to CPWS to produce a KWH of electricity and the price to purchase a KWH of electricity from TVA.

<sup>190</sup> Personal communication with James O. Clark, General Manager Columbia Power and Water Systems, December 17, 2003.

**Fentress County**

214. Fentress County plans to develop a water supply reservoir are in the discussion phase; currently there are no proposals.<sup>191</sup> With current growth rates water supply demand in the county is expected to exceed capacity by 2014. The county is currently researching alternatives. In 1994 the county began researching water supply alternatives.<sup>192</sup> At that time four alternatives were identified, these four alternatives are summarized in Exhibit 4-9.

<b>Exhibit 4-9</b>			
<b>WATER SUPPLY ALTERNATIVES IDENTIFIED FOR FENTRESS COUNTY</b>			
<b>Project</b>	<b>Description</b>	<b>Water Supply</b>	<b>20 Year Costs (2003\$)</b>
Clear Fork Impoundment	Construction of a 30 foot high dam impounding 300 MG	Adequate to meet long term supply	\$9,387,000
Crooked Creek Impoundment	Construction of 35 foot high dam impounding 300 MG	Adequate to meet long term supply	\$9,705,000
East Fork Obey River	Construction of 7 foot weir impounding 15 MG	Adequate to meet long term supply	\$11,935,000
Dale Hollow Lake	Construction of a water intake facility	Adequate to meet long term supply	\$13,923,000
Source: Draft planning documents dated January 1994, provided by John B. Mullinix, County Executive Fentress County.			

215. Cost estimates for the alternatives were provided in a 1994 draft planning document from Fentress County. This planning document was prepared as part of a proposal to construct a water supply dam on Crooked Creek in 1994 (Unit 9 Big South Fork).<sup>193</sup> This project or any impoundment has been opposed by the Service, EPA, TWRA, Tennessee Division of Water Pollution Control, and USACE. The Crooked Creek Impoundment project was opposed by the Service, because “the proposed project would have a substantial

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<sup>191</sup> Personal communication with John B. Mullinix, Fentress County Mayor, January 14, 2004.

<sup>192</sup> Draft planning documents dated January 1994, provided by John B. Mullinix, County Executive Fentress County.

<sup>193</sup> Letter from George Mullinix, County Executive, on behalf of Fentress County to the Big South Fork National River and Recreation Area in regards to the preliminary draft of the *Management Objectives Workshop* report dated July 19, 1994.

and unacceptable impact on aquatic resources of national importance.”<sup>194</sup> EPA also opposed the project, because “1) the cumulative impacts of such projects have resulting in the loss and threat to organisms that live in lotic ecosystems and 2) a regional water supply project could effectively meet the proposed project purpose with less impacts to the aquatic environment.”<sup>195</sup> TWRA opposed the project but found it significantly reduced the impacts to the project as proposed on North Prong Clear Fork Creek.<sup>196</sup> The North Prong Clear Fork Creek project was denied a 401 water quality certification by the Tennessee Division of Water Pollution Control in 1993.<sup>197</sup> In 1995 the USACE determined that the use of current water supply resources or a regional system were practicable alternatives to constructing a new impoundment.<sup>198</sup>

216. To evaluate the potential economic impact of critical habitat for the mussels on future water supply in Fentress County, this analysis estimates the opportunity cost of constructing a weir on the East Fork of the Obey River or an intake facility on the Dale Hollow Lake rather than the Clear Fork or Crooked Creek Impoundments. That is, this analysis estimates the incremental costs associated with the next best project alternatives as identified. The additional cost of constructing a weir on the East Fork of the Obey River is expected to be \$2,230,000, and additional cost of constructing an intake facility on Dale Hollow Lake is forecast to be \$4,218,000. Neither of these projects are likely to result in a consultation regarding the mussels, therefore this analysis does not anticipated any additional administrative costs.

### **Tennessee Valley Authority**

217. Other potential dam and reservoir projects in the critical habitat area include the Bear Creek Reservoir and the Douglas Dam. While the potential for enhancement projects associated with the Bear Creek Reservoirs exists, these projects are in the early discussion phase and the future likelihood of such projects is unclear. Although there was a

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<sup>194</sup> Letter from Brian P. Cole, State Supervisor, U.S. Fish and Wildlife Service, in regards to a letter from J.R. Wauford & Company requesting an explanation of why the listing of the Cumberland Elktoe would not block the proposal to construct a water supply reservoir on Crooked Creek, January 24, 1997.

<sup>195</sup> Ibid

<sup>196</sup> Letter from Dan Sherry, Fish and Wildlife Environmentalist, Tennessee Wildlife Resources Agency, to the State Planning Office in regards to the Fentress County Utility District proposed impoundment structure and municipal intake on Crooked Creek, May 23, 1994.

<sup>197</sup> Draft planning documents dated January 1994, provided by John B. Mullinix, County Executive Fentress County.

<sup>198</sup> Letter from Ronald E. Gatlin, Project Manager, Construction-Operations Division, Nashville District, Army Corps of Engineers, response to Fentress County Utility District application for a permits for the proposed impoundments structure and municipal intake at Crooked Creek, August 16, 1995.

consultation a few years ago on modernizing turbines for Douglas Dam, this is unlikely to be an issue in the future.<sup>199</sup>

#### **4.2.10 Power Plants**

218. One power plant is currently located adjacent to critical habitat and withdraws water for day to day operations.<sup>200</sup> The Carbo power plant on Unit 5 Clinch River is a coal fired power plant that withdraws water to replace loss from evaporation. At least one power plant is proposed adjacent to critical habitat, in Unit 1 Duck River.<sup>201</sup> Potential power plant activities that can adversely affect the mussels include: construction or improvement of facilities, construction or improvement of access roads, changes in water withdrawals, and accidental discharges.

#### **Baseline**

219. State water quality standards provide some protection; for example, the Virginia State Water Control Law prescribes numeric limits for specific physical, chemical, biological, and radiological characteristics of water.<sup>202</sup> A Tennessee executive order, issued by the governor, limits the development of power plants. This order also stipulates water withdrawals for new power plants are not allowed to affect existing users, harm endangered species, or impair water quality.<sup>203</sup>

#### **Future Consultations**

220. The typical Federal nexus for power plants is CWA §404 permitting from the USACE for projects with the potential to discharge dredged or fill material into navigable waters of the United States, such as construction or maintenance of water intake structures. Permits to limit the materials that enter waters, stormwater, and water withdrawal permits

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<sup>199</sup> TVA is currently consulting with the Service on all dam operations in the entire Tennessee River watershed. This analysis anticipates this consultation will be completed in the near future. Personal communication with Charles P. Nicholson and Peggy W. Shute, Tennessee Valley Authority, May 2, 2003.

<sup>200</sup> Personal communication with U.S. Fish and Wildlife Service staff, Tennessee, Alabama, Mississippi, Kentucky, and Virginia Field Offices, January 28, 2003.

<sup>201</sup> Maury Energy Projects, LLC is proposing a natural gas fueled electric generating plant in Maury County Tennessee. This project could draw five to eight million gallons of water per day from the Duck River. Maury Energy Projects, LLC. Proposed Rieves Bend Road Power Plant - A Summary. From [http://www.cme-energy.com/projects/maury/project\\_summary.asp](http://www.cme-energy.com/projects/maury/project_summary.asp) as viewed on February 19, 2003.

<sup>202</sup> Virginia Code Ann, §62.1-44.15(3a).

<sup>203</sup> Executive Order from Governor Sundquist to the Department of Environment and Conservation, August 9, 2001. Tennessee Department of Economic and Community Development. 2002. Frequently Asked Questions on Merchant Power Plants in Tennessee.

are issued by the States and would not establish a Federal nexus. Power plants, other than hydroelectric, are licensed by the State, thus no Federal nexus is established.<sup>204</sup> This analysis anticipates no consultations associated with power plants during the next ten years.<sup>205</sup>

#### **4.2.11 Utilities Construction and Maintenance**

221. Utilities infrastructure, including water, natural gas, sewer, and electrical transmission lines, have the potential to negatively impact the mussels.<sup>206</sup> In particular, activities such as construction or maintenance of shoreline or in-stream structures may result in direct disturbance of the sediment habitat for the mussels or increased siltation from upstream activity. It is likely that new shoreline and in-stream structures and pipeline crossings will be constructed over the next ten years, and consultations with the Service are expected to occur on all proposed critical habitat units and areas essential to the conservation of the mussels.<sup>207</sup>
222. The TVA operates transmission lines throughout the Tennessee Valley.<sup>208</sup> Potential transmission line activities that can adversely affect the mussels include construction or improvement of transmission lines and maintenance of transmission lines. However, it is unlikely new transmission lines will be built in or adjacent to these units in the next ten years. On the maintenance side, TVA Right-of-Way Program Administrators develop vegetation clearing plans specific to each line segment, with vegetation management activities occurring on two or five year schedules.

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<sup>204</sup> Hydroelectric facility licenses are issued by FERC.

<sup>205</sup> Personal communication with William James, Permits Branch, USACE Nashville District East Office, Nashville, Tennessee, March 10 and 12, 2003. Personal communication with Charles P. Nicholson, John J. Jenkinson, John T. Baxter, and Peggy W. Shute, Tennessee Valley Authority, March 20, 2003.

<sup>206</sup> Personal communication with U.S. Fish and Wildlife Service staff, Tennessee, Alabama, Mississippi, Kentucky, and Virginia Field Offices, January 28, 2003.

<sup>207</sup> Personal Communication with William James, USACE, March 10, 2003. Personal Communication with Bob Ramsey, Contract engineer for Marshall County, February 20, 2003. Personal Communication with Brock Hill, Cumberland County Executive, February 20, 2003. Personal Communication with James Parson, Director of Utilities, Lee County, February 25, 2003. Personal Communication with Larry Murdock, Duck River Development Agency, February 24, 2003

<sup>208</sup> Personal communication with Charles P. Nicholson, Peggy W. Shute, and John J. Jenkins. Tennessee Valley Authority, Environmental Policy and Planning, January 30, 2003, March 20, 2003, and May 2, 2003.

## **Baseline**

223. FERC consults on pipeline projects that have the potential to impact threatened and endangered species and their habitat.<sup>209</sup> For projects that may impact wetlands or cross water bodies, FERC maintains a list of construction and mitigation procedures. These mitigation procedures include the use of directional drilling, rather than open cut construction, and push for mitigation activities during the proposal stage.<sup>210</sup> Accordingly, approximately 80 percent of potential impacts are mitigated prior to section 7 consultation with the Service.
224. TVA policies provide protection to the mussels by minimizing the effects of operations on the environment, and requiring compliance with environmental laws and regulations.<sup>211</sup> TVA BMPs for transmission line construction and maintenance activities require erosion and sediment control measures, including planning considerations, site re-vegetation, equipment use limitations, slope restrictions, and herbicide use restrictions.<sup>212</sup>
225. State water quality standards also provide some protection, for example the Tennessee Water Control Board requires permit applicants to evaluate practicable alternatives.<sup>213</sup>

## **Future Consultations**

226. FERC, TVA, and the USACE are the likely lead Action agencies in section 7 utility consultations with the Service. FERC regulates the rates and transport of natural gas, oil, and electricity under the Department of Energy Organization Act.<sup>214</sup> While FERC maintains a short-term “On the Horizon” listing of major pipeline projects, the agency is unable to estimate the number or location of projects which may require consultation with the Service

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<sup>209</sup> Personal communication with Robert Arvedlund, Federal Energy Regulatory Commission, February 25, 2003

<sup>210</sup> *Wetland and Waterbody Construction and Mitigation Procedures*. Federal Energy Regulation Commission. January 17, 2003.

<sup>211</sup> TVA. *Principles and Practices Manual*. Revised 2002. <http://www.tva.com/foia/readroom/policy/prinprac/index.htm>, as viewed on February 19, 2003.

<sup>212</sup> Austin, Chris, Chris Brewster, Alicia Lewis, Kenton Smithson, Tina Broyles, and Tom Wojtalik. 1999. *A guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities*. Tennessee Valley Authority, Transmission/Power Supply Group.

<sup>213</sup> Tennessee. Code Ann., §69-3-101.

<sup>214</sup> Department of Energy Organization Act, 42 U.S.C. §7112.

in the proposed critical habitat units over the next 10 years.<sup>215</sup> These activities may also require a 404 Clean Water Act and/or Section 10 permit from the USACE. Further, the TVA also owns and operates transmission systems within a large portion of the proposed critical habitat and may also consult with the Service.<sup>216</sup>

227. Approximately 90 to 120 informal and one to four formal consultations related to utility activities are expected over the next ten years. This analysis estimates total administrative costs for utility activities, including electrical transmission lines, will range from \$220,000 to \$1,190,000 (\$170,000 to \$1,060,000 informal and \$10,000 to \$90,000 formal consultation costs).<sup>217</sup>
228. While FERC anticipates consulting on larger pipeline projects, smaller projects may result in a few section 7 consultations due to FERC's blanket certificate program. Blanket certificates allow project proponents to construct facilities with little interaction from FERC provided they avoid impacting habitat. Prior to receiving a blanket certificate, each project must receive a letter of concurrence from the Service ensuring compliance with environmental regulations.<sup>218</sup>
229. The USACE issues permits under section 404 of the Clean Water Act for all proposed units and areas. Unit 1 Duck River, Unit 10 Buck Creek, and Area 1 French Broad River are also navigable waters, and require USACE permits under section 10 of the Rivers and Harbors Act. USACE expects to be lead Action agency for 52 to 82 informal and one to four formal consultations over the next ten years.<sup>219</sup> TVA expects to coordinate with USACE on its 26(a) permit consultations for utilities (other than transmission lines). Information detailing the breakdown of these consultations by unit and area is provided in Appendix D.

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<sup>215</sup> Personal communication with Robert Arvedlund, Federal Energy Regulatory Commission, February 25, 2003.

<sup>216</sup> *TVA's Transmission System*, accessed at <http://www.tva.gov/power/xmission.htm> on February 4, 2002.

<sup>217</sup> Cost for the consultations for Area 1 French Broad River and Area 2 Holston River are less than reported in Exhibit 3-1 as TVA anticipates their cost of consultation would be \$500 because of past programmatic consultations in this area. See Section 4.2.11 for a more in depth discussion. Personal communication with Charles P. Nicholson, and Peggy W. Shute, Tennessee Valley Authority, May 2, 2003.

<sup>218</sup> Personal communication with Robert Arvedlund, Federal Energy Regulatory Commission, February 25, 2003

<sup>219</sup> The Patriot Pipeline is currently under construction. As FERC has already authorized the project this analysis anticipates any future consultations are captured by the USACE's estimates for future section 404 permits for stream crossings. Personal communication with William James, Permits Branch, USACE Nashville District East Office, Nashville, Tennessee, March 10 and 12, 2003, and May 6, 2003. Personal communication with Annette Poore, USACE Clinch Valley Field Office, Norfolk District, Abingdon, Virginia, April 4, 2003, and April 7, 2003.

230. TVA carries out and funds the construction and maintenance of electrical transmission lines in the Tennessee Valley. This analysis anticipates 38 low level informal consultations associated with transmission lines during the next ten years.<sup>220</sup> Information detailing the breakdown of these consultations by unit and area is provided in Appendix D.

### **Project Modifications**

231. The cost of project modifications for utility projects will be approximately \$38,000. The costs associated with modifications to pipeline, water intake or outflow structures, or transmission line construction or maintenance projects are discussed below.

- Potential modifications for pipeline projects include rerouting (\$600,000 to \$800,000 per mile).<sup>221</sup> Situations which could require re-routing are typically identified and mitigated during project design stage avoiding the high cost associated with such actions. As such, the number of pipeline projects that could require re-rerouting in the future cannot be estimated. Costs for implementing other project modifications are not available, however they are described by FERC as minimal relative to the total cost of pipeline construction.
- Mussel relocation may be recommended by the Service for water intake or outflow structure projects (\$1,800 to \$15,000 per project).<sup>222</sup>
- Project modifications are unlikely to be recommended by the Service for transmission line activities.<sup>223</sup> However, each project will likely incur an additional review costs of \$1,000, or a total of \$38,000.

### **4.2.12 Residential and Related Development**

232. Reductions in property value may occur through public perception that the designation will restrict land uses, inhibit private development, or cause project delays. Such loss in property value can be experienced for as long as such perception persists. Thus, any potential reduction in property value would primarily be due to the regulatory uncertainty, engendered by critical habitat designation, concerning land use within critical habitat areas.

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<sup>220</sup> Personal communication with Charles P. Nicholson, John J. Jenkinson, John T. Baxter, and Peggy W. Shute, Tennessee Valley Authority, March 20, 2003.

<sup>221</sup> Personal communication with Robert Arvedlund, Federal Energy Regulatory Commission, February 25, 2003

<sup>222</sup> Personal communication with William James, USACE, March 21, 2003

<sup>223</sup> Personal communication with Charles Nicholson, John Jenkinson, and Peggy Shute, Tennessee Valley Authority, Environmental Policy and Planning, March 20, 2003, and May 2, 2003.

No additional, significant, development-related effects are anticipated, however, for the following reasons:

- While uncertainties about the impacts of the proposed critical habitat designation and the perception that the designation will impose land use restrictions can cause reduction in property value, this effect is likely to be temporary in nature as the uncertainties and perceptions dissipate and/or become clarified over time;
- Consultation under section 7 only applies to activities that are carried out, permitted, or funded by a Federal agency. As such, the designation of critical habitat will not afford any additional protections for species with respect to strictly private activities; and
- Some or all of the units may additionally experience increases in property value due to the same perceptions of restricted development activities as preservation of open space often has a positive effect on property value.<sup>224</sup>

233. Comments received during the public comment period suggested that critical habitat could impact private property.<sup>225</sup> The consultation history for these species does not include any consultations for private activities on private lands and no such consultations are anticipated for the future. No Federal nexus exists for activities on private lands that do not require a Federal permit. Further, streams and river channels within the ordinary high water line are being proposed for designation. No private land areas are being proposed. In addition, development activities with the greatest potential to affect the mussels and habitat revolve around the increased construction of pipelines, water supply and wastewater infrastructure, and roads and bridges within the proposed critical habitat. Increased costs of these activities due to the presence of species and habitat is captured through the anticipated consultations and project modifications as quantified within this analysis. As a result, this analysis does not anticipate any direct section 7 impacts regarding private activities on private lands.

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<sup>224</sup> Comment letter from the Southern Appalachian Biodiversity Project, December 9, 2003 stated “Protecting riparian corridors and their associated environmental qualities through critical habitat will contribute to...increased property values.”

<sup>225</sup> Public comment was submitted by Robert Raines at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003; Comment letter from the Southern Appalachian Biodiversity Project, December 9, 2003.

234. Comments were also received stating that critical habitat for the mussels may impact Tazewell County.<sup>226</sup> Tazewell County commented that the designation of critical habitat will be “devastating to Tazewell County’s economic growth and development.”<sup>227</sup> Comments were also submitted stating that the designation of critical habitat will not have a negative impact on the economy of Tazewell County.<sup>228</sup> In the specific case of Tazewell County population decreased three percent from 1990 to 2000, with an overall negative growth rate of greater than 10 percent since the 1970's.<sup>229</sup> The unemployment rate was 4.4 percent in 2001 and 4.7 percent in 2002, compared to the statewide average of 3.4 percent in 2001 and 4.1 percent in 2002.<sup>230</sup> Tazewell County has been, until recently, “a coal based economy, but with the decline of the coal industry, the County is now searching for a new economic base.”<sup>231</sup> Tazewell County is in the process of developing a regional industrial park adjacent to the Clinch River in the city of Richlands.<sup>232</sup> Tazewell County has taken the lead on

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<sup>226</sup> Public comment letter submitted by Deanis Simmons, Tazewell County Attorney, on behalf of the Board of Supervisors of Tazewell County, December 5, 2003; Public comment submitted by Deanis Simmons, Tazewell County Attorney, on behalf of the Board of Supervisors of Tazewell County, at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003; Public comment submitted by Karen Moore on behalf of the Clinch Coalition for Southwest Virginia, at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003; Public comment submitted by Eli Jones, Jr. at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003; Public comment submitted by Audie Spangler at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003; Public comment submitted by Donna Lawson, at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003.

<sup>227</sup> Public comment letter submitted by Deanis Simmons, Tazewell County Attorney, on behalf of the Board of Supervisors of Tazewell County, December 5, 2003; Public comment submitted by Deanis Simmons, Tazewell County Attorney, on behalf of the Board of Supervisors of Tazewell County, at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003.

<sup>228</sup> Public comment submitted by Karen Moore on behalf of the Clinch Coalition for Southwest Virginia, at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003; Public comment submitted by Eli Jones, Jr. at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003; Public comment submitted by Audie Spangler at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003.

<sup>229</sup> Public comment letter submitted by Deanis Simmons, Tazewell County Attorney, on behalf of the Board of Supervisors of Tazewell County, December 5, 2003.

<sup>230</sup> United States Department of Agriculture, Economic Research Service, *County-Level Unemployment and Median Household Income For Virginia*, accessed at <http://www.ers.usda.gov/Data/Unemployment/RDList2.asp?ST=VA> on January 2, 2004.

<sup>231</sup> Public comment letter submitted by Deanis Simmons, Tazewell County Attorney, on behalf of the Board of Supervisors of Tazewell County, December 5, 2003.

<sup>232</sup> This project is being proposed in the flood plain of the Clinch River. Personal communication with U.S. Fish and Wildlife Service personnel, December 29, 2003; Public comment submitted by Audie Spangler at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003.

purchasing a 122 acre property that was formerly an airstrip for the industrial park.<sup>233</sup> The value associated with this site is its proximity to infrastructure, such as Route 460 a four lane highway, an on-site sewage plant, two water lines, a coal methane gas pipeline, and a spur line for the existing railway service. No alternative sites are available in the Southwest Virginia region of this size with access to the same amount of infrastructure. Tazewell County is not attempting to attract any one type of industry but provide a site attractive to all industry.

235. This regional industrial park may be affected by critical habitat if a Federal nexus is established in the construction of the project. For example, if a USACE 404 permit is required to construct a water intake or outfall structure a section 7 consultation could be initiated, impacts to such projects are captured in the utilities construction and maintenance section of this analysis above. However, this potential project could be impacted by other regulations, including but not limited to the Clean Water Act, the National Flood Insurance Act and the Flood Disaster Protection Act, and other threatened and endangered species.

236. Tazewell County is also concerned that the designation of critical habitat could stigmatize the county and preclude businesses from considering the county for future development projects.<sup>234</sup> The county reports that it already faces severe economic development hurdles, and that development is presently limited by topography and geography. Several commenters dispute Tazewell County's assertion that critical habitat will negatively impact development in the region.<sup>235</sup> With the exception of cases in which critical habitat designation excludes a portion of available land from development, and where substitutes are limited, designation is unlikely to substantially affect the course of regional economic development.<sup>236</sup> In the case that an industry requires the direct use of the natural resources of mussel habitat (e.g., large volume of water for cooling or discharge) the presence of the mussels or critical habitat may impact the decision to locate in that area. One commenter states that clean water is valuable and can attract business "because the quality of life is often one criteria companies use when relocating."<sup>237</sup> Environmental regulations

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<sup>233</sup> Personal communication with Jim Spencer, County Administrator, Tazewell County, January 6, 2003.

<sup>234</sup> Public comment letter submitted by Deanis Simmons, Tazewell County Attorney, on behalf of the Board of Supervisors of Tazewell County, December 5, 2003.

<sup>235</sup> Public comment submitted by Karen Moore on behalf of the Clinch Coalition for Southwest Virginia, at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003; Public comment submitted by Eli Jones, Jr. at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003; Public comment submitted by Audie Spangler at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003.

<sup>236</sup> Meyer, Stephen M. 1998. "The Economic Impact of the Endangered Species Act on the Housing and Real Estate Markets." *New York University Environmental Law Journal*. 6(450):1-13.

<sup>237</sup> Public comment submitted by Karen Moore on behalf of the Clinch Coalition for Southwest Virginia, at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003.

such as critical habitat designation likely constitute some fraction of the many factors involved in the decision to locate a facility. Another commenter stated that the adverse effects to development in Tazewell County are overstated, and thus far the economic impact to the region of the listing of these mussels has been a thriving ecotourism industry.<sup>238</sup> This analysis recognizes, but does not quantify, impacts to the future growth and development of the Tazewell County region as it is unclear what impact the designation may contribute to the decision-making process of potential future industries to locate facilities.

237. Under section 10(a)(1)(B) of the Act, a non-Federal entity (i.e., a landowner or local government) may develop a Habitat Conservation Plan (HCP) in order to meet the conditions for issuance of an incidental take permit from the Service in connection with the development and management of a property.<sup>239</sup> Development of HCPs within critical habitat would require an internal section 7 consultation with the Service. However, no HCPs have been developed regarding these five mussel species in the past and the Service does not anticipate that any will be developed in the future.<sup>240</sup>

#### **4.2.13 Conservation and Recreation**

238. Approximately 76 to 84 informal consultations and one formal consultation related to conservation and recreation activities are expected over the next ten years. This analysis estimates total administrative costs for conservation and recreation activities will range from \$120,000 to \$550,000 (\$110,000 to \$530,000 informal and \$10,000 to \$20,000 formal consultation costs).<sup>241</sup>

#### **Partners for Fish and Wildlife**

239. PFW is a voluntary partnership program between the Service and landowners interested in restoring streamlands, wetlands and other important fish and wildlife habitats on their own lands. The program provides various types of support ranging from technical assistance to private landowners through voluntary cooperative agreements, to funding restoration projects on private lands. Voluntary habitat restoration on private lands usually

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<sup>238</sup> Public comment submitted by Eli Jones, Jr. at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003.

<sup>239</sup> U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning." From: <http://endangered.fws.gov/hcp/>, August 6, 2002.

<sup>240</sup> Personal communication with U.S. Fish and Wildlife Service staff, Cookeville Field Office, February 12, 2003.

<sup>241</sup> Cost for the consultations for Area 1 French Broad River and Area 2 Holston River are less than reported in Exhibit 3-1 as TVA anticipates their cost of consultation would be \$500 because of past programmatic consultations in this area. See Section 4.2.11 for a more in depth discussion. Personal communication with Charles P. Nicholson, and Peggy W. Shute, Tennessee Valley Authority, May 2, 2003.

involves dollar-for-dollar cost share with private landowners and Federal, State, and local entities. Landowners sign agreements to maintain the restoration projects for the life of the agreement and otherwise retain full control of their land.<sup>242</sup> Since the projects are funded and/or carried out by the Service, internal consultation may take place for each project. Because these projects are intended to be beneficial to the mussels and their habitat, the consultations are likely to be informal, and project modifications are not expected. Approximately 26 informal consultations related to PWF partnerships are expected over the next ten years, six on Unit 1 Duck River, three on Unit 3 Obed River, four on Unit 4 Powell River, two on Unit 5 Clinch River, six on Unit 6 Nolichucky River, one on Unit 7 Beech Creek, four on Unit 10 Buck Creek.<sup>243</sup>

### **Boat Ramps**

240. Boat ramps for public recreation facilities, campgrounds, and private use are anticipated in Unit 1 Duck River, Unit 5 Clinch River, Unit 6 Nolichucky River, Unit 9 Big South Fork, Area 1 French Broad River, and Area 2 Holston River. The typical Federal nexus for boat ramp construction is CWA §404 permitting from the USACE and/or 26(a) permitting from the TVA for projects in the Tennessee River watershed that may impact navigation, flood control, or public lands.
241. The USACE anticipates consulting with the Service informally with respect to construction or maintenance of boat ramps 29 to 35 times over the next ten years (one to two in Unit 1 Duck River, one in Unit 5 Clinch River, one in Unit 9 Big South Fork, 11 in Area 1 French Broad River, and 15 to 20 in Area 2 Holtson River).<sup>244</sup> The TVA anticipates consulting informally with the Service 32 to 38 times over the next 10 years (one to two in Unit 1 Duck River, two to five in Unit 5 Clinch River, two to four in Unit 6 Nolichucky River, 15 in Area 1 French Broad River, and 12 in Area 2 Holston River), not including the one programmatic consultation regarding all activities TVA has permitting authority over on the French Broad and Holston Rivers.<sup>245</sup> TVA is expected to be the lead agency for the Unit 1 Duck River projects, Unit 5 Clinch River projects, Unit 6 Nolichucky River projects, Area 1 French Broad River projects, and Area 2 Holtson River projects. The USACE is expected to be the lead agency for the Unit 9 Big South Fork project. Thus, this analysis anticipates 33 to 39 informal consultations on boat ramp projects over the next ten years.

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<sup>242</sup> U.S. Fish and Wildlife Service, *Partners for Fish and Wildlife Program*, accessed at <http://www.fws.gov> on July 2002.

<sup>243</sup> Personal communication with Service Biologist, Fish and Wildlife Service, February 10, 2003.

<sup>244</sup> Personal communication with William James, Permits Branch, USACE Nashville District East Office, Nashville, Tennessee, March 10 and 12, 2003.

<sup>245</sup> Personal communication with Charles P. Nicholson, John J. Jenkinson, John T. Baxter, and Peggy W. Shute, Tennessee Valley Authority, March 20, 2003.

Proper construction of the ramps can avoid negative impacts to the mussels, so no project modifications are anticipated.

### **Watershed Team Activities**

242. The TVA Watershed Team program implements resource conservation strategies on TVA owned or administered property through various activities, including the installation of docks, cattle exclusion barriers, stream crossing structures, community septic systems, and stream-side agricultural buffer zones.<sup>246</sup> TVA anticipates 17 to 19 informal and one formal consultation over the next ten years for these activities, one on Unit 2 Bear Creek, six on Unit 4 Powell River, and ten to 12 on Unit 5 Clinch River. No project modifications are anticipated.

#### **4.2.14 Water Quality Activities**

243. The Environmental Protection Agency (EPA) may engage in section 7 consultations with the Service regarding water quality standards to ensure that they are appropriately protective of endangered and threatened species. EPA typically considers listed species when consulting with the Service on the following categories of water quality program activities:

- **Total maximum daily load (TMDL) approvals.** Assignment of TMDL levels falls under section 303 (d) of the CWA. Consultations on TMDLs arise when the combination of point and non-point source pollutants causes a noncompliance in a body of water. If out of compliance, a water body is added to the State's section 303 (d) list of impaired waters.<sup>247</sup> The EPA consults with the Service regarding TMDLs on 303 (d) streams listed for aquatic life criteria impairments. Impairments that effect the mussels' habitat include: sediments, siltation, organic enrichment, low dissolved oxygen, and flow alteration.<sup>248</sup> Four 303 (d) streams listed for aquatic life criteria impairments occur in the mussels proposed critical habitat area.
- **State 303 (d) lists.** State agencies must provide EPA with a proposed list of 303 (d) river segments for approval. Historically, the EPA has consulted with the Service every other year regarding review of these lists. In July of 1991, however, the EPA engaged in a programmatic consultation to streamline review of 303 (d) lists for all Region 4 States, including Alabama, Kentucky,

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<sup>246</sup> Personal communication with Kim Pilarski, Tennessee Valley Authority, March 24, 2003.

<sup>247</sup> Clean Water Act, § 131.10

<sup>248</sup> Personal communication with Duncan Powell, Environmental Protection Agency, Region 4, February 27, 2003.

Mississippi, and Tennessee. The new process contemplates potential impact to endangered species and habitat, and therefore avoids consulting as frequently as in the past. In Region 3, which includes Virginia, the Service does not consult on 303(d) listed waters.<sup>249</sup>

- **State Water Quality Standards.** The EPA reviews water quality standards within each State approximately every three years. A consultation would be initiated with the Service to ensure that such review appropriately considers, impacts to wildlife, including those to endangered species.
- **Special Appropriation Projects (SPAPs).** The EPA funds water improvement projects such as increasing the capacity of drinking water facilities, or construction or improvement of wastewater facilities.<sup>250</sup>

244. EPA's National Pollutant Discharge Elimination System (NPDES) permit program regulates point source pollution. The Service reviews each permit application to confirm that listed species are not adversely affected by water quality impacts. If the proposed permit does not appear to meet State water quality standards, the Service may object to issuance of the permit, and the State may ask the applicant to alter the permit to meet the standards. According to a 2001 Memorandum of Agreement between the EPA, National Marine Fisheries Service (NMFS), and the Service, the EPA has provided States and tribes authority over their Clean Water Act permitting when appropriate.<sup>251</sup> Accordingly, NPDES permitting may generate a technical assistance effort between the Service and the designated representative of the EPA (i.e., the respective State agencies) for review of the permit to ensure it appropriately considers the mussels and their habitat.

### **Baseline**

245. All water quality-related projects within the proposed critical habitat are subject to the provisions of the CWA and State water quality standards as outlines in Section 2.2.1 and Appendix B of this analysis. In their review of State water quality standards EPA ensures the water bodies meet their respective uses, including recreation and providing habitat to threatened and endangered species. As such, State water quality standards intend to meet

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<sup>249</sup> Personal communication with Peter Gold, Environmental Protection Agency, Region 3, March 6, 2003.

<sup>250</sup> Personal communication with Duncan Powell, Environmental Protection Agency, Region 4, February 27, 2003.

<sup>251</sup> U.S. Environmental Protection Agency, Department of the Interior, and the Department of Commerce, *Memorandum of Agreement Between the Environmental Protection Agency, Fish and Wildlife Service and National Marine Fisheries Service Regarding Enhanced Coordination Under the Clean Water Act and Endangered Species Act; Notice*, Federal Register Vol. 66, No. 36, February 22, 2001.

the needs of the mussels and consultations regarding water quality activities are primarily informal, without recommended project modifications.<sup>252</sup>

### **Future Consultations**

246. Water quality activities in the proposed critical habitat for the mussels are anticipated to result in up to 22 to 36 informal and seven formal consultations the next ten years. Administrative costs will range from \$200,000 to \$910,000 (informal costs of \$130,000 to \$710,000, and formal costs of \$70,000 to \$200,000).<sup>253</sup>
247. The EPA must approve TMDLs levels along 303 (d) designated streams. Four stream segment within critical habitat are on the State 303 (d) list due to water quality criteria impairments (Bear Creek for sediments/siltation, Duck River for organic enrichment/low dissolved oxygen and flow alteration, the Clinch River for general water quality standards/benthic, and the Nolichucky River for sediments/siltation). EPA anticipates consulting once per impairment on each of these rivers over the next ten years. Thus, five formal consultations are anticipated for TMDLs over the next ten years. Although such consultations may have been resolved informally in the past, these informal consultations were particularly lengthy, and the resulting costs more accurately represented by the effort level and associated cost of a formal consultation.<sup>254</sup>
248. EPA also consults with the Service regarding review of State 303 (d) lists and State water quality standards. In Region 4, one to four informal consultations are expected within each State in review of 303 (d) lists, and three informal consultations are anticipated within each State in review of water quality standards over the next ten years.<sup>255</sup> In Region 3, three to five informal consultations are anticipated over the next ten years for review of water quality standards.<sup>256</sup>
249. EPA funding of Special Appropriation Projects (SPAPs) regarding water quality improvements may also result in consultation if a project occurs within or adjacent to the proposed critical habitat for the mussels. It is likely that funding of drinking water or wastewater facility improvements will result in three informal and two formal consultations over the next ten years.

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<sup>252</sup> Clean Water Act, § 131.11 and § 130.7.

<sup>253</sup> See Exhibit 3-1.

<sup>254</sup> Personal communication with Duncan Powell, Environmental Protection Agency, Region 4, February 26, 2003 and March 17, 2003.

<sup>255</sup> Personal communication with Duncan Powell, Environmental Protection Agency, Region 4, February 27, 2003.

<sup>256</sup> Denise Halkowski, Environmental Protection Agency, Region 3, March 6, 2003.

## **Project Modifications**

250. Project modifications are not anticipated for approval of TMDLs, 303 (d) lists, or State water quality standards as provisions for the mussels are typically considered and recommendations of protective measures are often redundant with the CWA regulations.
251. The Service may recommend modifications to SPAP projects within mussel critical habitat, including special surveys and project redesign. Special surveys typically cost between \$10,000 to \$25,000. Project redesign may include relocation of pipelines and other infrastructure, and this may introduce a cost of about \$25,000 per project. Project modification costs for water quality activities will range from \$180,000 to \$250,000 (i.e., \$35,000 to \$50,000 per project).

### **4.3 Estimated Technical Assistance Efforts**

252. Cost estimates for technical assistance are based on recent experience at the Service's Cookeville Field Office. Costs associated with these efforts include the opportunity cost of Service personnel time, as well as third party staff costs. Per effort costs associated with technical assistance are presented in Exhibit 3-1.
253. Based on the number of technical assistance efforts specifically addressing the mussels during the past five years, this analysis assumes that the Service will receive 467 to 528 requests over the next ten years. On average, technical assistance efforts required 10 minutes of Service personnel time, and Service staff time is estimated to cost \$63 per hour. Therefore, on average, technical assistance requests cost approximately \$10 per request. Assuming technical assistance requests continue at the historic rate (100 over ten years), plus NPDES permit review (65 to 108 over ten years) and coal mining permit review (302 to 320 over ten years), the cost to the Service for technical assistance is expected to be \$4,700 to \$5,300 over the next ten years. Add to this the cost to third parties, and the total cost of technical assistance efforts over the next ten years is estimated to range from approximately \$280,000 to \$800,000. Most of these costs will be incurred by third parties such as State agencies and private landowners.

#### **4.3.1 NPDES Permit Review**

254. In all five States, the Service is notified and receives copies of draft NPDES permits from State environmental agencies. NPDES permitted activities requiring EPA oversight are for discharges exceeding one million gallons per day (1 MGD). Most NPDES activities within proposed critical habitat for the mussels do not meet this criteria and therefore do not require EPA oversight. However, not all NPDES permits in the designation are for discharges less than one MGD. If a discharge exceeds one MGD an informal consultation may arise from EPA oversight of the discharge. Consequently, all other exchanges between

State environmental agencies and the Service are classified as technical assistance efforts. These technical assistance efforts generally involve the Service notifying both State agencies and applicants about the presence of the mussels and ensuring that Federal and State water quality standards are addressed. This analysis estimates that approximately **2 informal consultations** and **65 to 108 technical assistance** efforts regarding NPDES activities will occur over the next ten years.

255. In Alabama, the Service has commented on NPDES activities permitted by the ADEM. Effluent limitations and other restrictions contained in ADEM NPDES permits are consistent with EPA regulations and applicable State water quality standards and are designed to protect indigenous species of fish and wildlife, including endangered species. ADEM also applies guidelines within the Alabama Soil and Water Conservation Committee's Alabama Handbook Best Management Practices.<sup>257</sup> This analysis estimates 12 to 22 technical assistance efforts between the Service and ADEM regarding NPDES permitted activity over the next ten years.<sup>258</sup>
256. NPDES activities within the Mississippi portion of the proposed designation typically relate to wastewater discharge. Current discharges are from the Tishomingo State Park, two publically owned waste water treatment facilities, and one industrial facility.<sup>259</sup> This analysis estimates up to ten technical assistance efforts will take place over the next ten years regarding NPDES permit review in Mississippi.
257. The Service has reviewed VPDES activities permitted by the VDEQ. Activities currently permitted include waste water treatment plants, water treatment plants, and sewage treatment facilities.<sup>260</sup> VDEQ anticipates seven to 14 technical assistance efforts with the Service within the next ten years. Tazewell County commented that the Towns of Tazewell and Richlands have large sewer plants that discharge into Unit 5 Clinch River.<sup>261</sup> Both of

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<sup>257</sup> Personal and written communication with Richard Hulcher, Alabama Department of Environmental Management, Mining and Nonpoint Section, Field Operation Division, February 24 and 26, 2003.

<sup>258</sup> Personal communication with James McIndoe, Alabama Department of Environmental Management, Water Division, March 6, 2003. Personal communication with Richard Hulcher, Alabama Department of Environmental Management, Mining and Nonpoint Section, Field Operation Division, March 7, 2003.

<sup>259</sup> Personal communication with Leslie Barkley, Mississippi Department of Environmental Quality, March 12, 2003.

<sup>260</sup> Personal communication with Jon van Soestbergen, Virginia Department of Environmental Quality, Office of Water Permits Support, March 12, 2003.

<sup>261</sup> Public comment letter submitted by Deanis Simmons, Tazewell County Attorney, on behalf of the Board of Supervisors of Tazewell County, December 5, 2003.

these plants discharge more than one MDG on average.<sup>262</sup> Therefore, this analysis anticipates two informal consultations regarding existing discharges. Neither facility has any plans to build a new facility, upgrade the existing facility, or otherwise change existing discharges.<sup>263</sup> The main concern expressed by the towns was that the designation of critical habitat would result in more stringent water quality standards. In these occupied waters the species listing did not result in stricter water quality standards. Because discharges are not likely to change and the water quality is sufficient for the mussels this analysis does not anticipate the designation of critical habitat will result in more stringent water quality standards.

258. The Service has reviewed NPDES activities permitted by TDEC. Activities currently permitted include waste water treatment plants, domestic discharges, and water intakes. TDEC anticipates ten technical assistance efforts with the Service within the next ten years.<sup>264</sup>
259. The Service has reviewed KPDES activities permitted by KDEP. Activities currently permitted include waste water treatment plants, and coal discharges (coal discharges are discussed below). KDEP anticipates 36 to 52 technical assistance efforts with the Service within the next ten years.<sup>265</sup>

#### **4.3.2 Coal Mining Permit Review**

260. Under SMCRA, Kentucky and Virginia have been given the responsibility for regulating surface coal mining and reclamation. The States of Kentucky, through the DSMRE, and Virginia, through the DMLR, have the regulatory authority to issue surface coal mining permits. Because Kentucky and Virginia have regulatory authority, there is no nexus and no section 7 consultation. The State of Tennessee does not have primacy, and OSM issues all surface mining permits in this State.
261. In Virginia, the DMLR anticipates it will process 250 to 400 surface coal mining permits in the State annually (150 to 200 new permits or permit revisions and 100 to 200 permit renewals). Of these annual permits, 30 will occur in Unit 5 Clinch River (4 new permits, 20 permit renewals, and 6 permit revisions). The Unit 4 Powell River is downstream

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<sup>262</sup> Personal communication with Bill Payne, Town of Richlands personnel, January 12, 2004; Personal communication with Jerry Wood, Town Manager of Tazewell, January 12, 2004.

<sup>263</sup> Personal communication with Bill Payne, Town of Richlands personnel, January 12, 2004; Personal communication with Jerry Wood, Town Manager of Tazewell, January 12, 2004.

<sup>264</sup> Personal communication with Saya Qualls, Tennessee Department of Environment and Conservation, Water Pollution Control, February 27, 2003, and April 29, 2003.

<sup>265</sup> Personal communication with Cliff Schneider, Kentucky Department of Environmental Protection, April 8, 2003, April 28, 2003.

of the coal mining areas and does not encompass any coal mine operations. Thus this analysis anticipates 300 technical assistance efforts with DMLR over the next ten years.<sup>266</sup>

262. In Kentucky, DSMRE estimates it will process two to 20 new permits or permit revisions in or nearby the proposed critical habitat units during the next 10 years.<sup>267</sup> Any coal mining in the area occurs upstream, and the mines do not drain into the proposed critical habitat units. Thus, this analysis anticipates up to 18 technical assistance efforts with the DSMRE during the next ten years.

### **4.3.3 State Regulation Triggered By Critical Habitat**

263. The City of Columbia, Tennessee commented that the designation of critical habitat for the mussels may engender additional state water quality requirements under the CWA involving TMDLs and antidegradation language.<sup>268</sup> The designation of critical habitat can result in greater State protection to a stream segment.<sup>269</sup> Critical habitat is one of the considerations used by TDEC when determining whether a water is a high quality water, Tier II or Tier III (also known as Outstanding National Resource Waters).<sup>270</sup> There are four characteristics of high quality waters:

- Waters that provide habitat for ecologically significant populations of aquatic or semi-aquatic plants or animals, including those proposed or listed for formal state or federal status.
- Waters that provide specialized recreational opportunities related to existing water quality.

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<sup>266</sup> Personal communication with Les Vincent, Customer Services Unit Manager, Department of Mines, Minerals & Energy, Division of Mined Land Reclamation, Big Stone Gap Field Office, Big Stone Gap, Virginia, March 4, 2003.

<sup>267</sup> Personal communication with Dr. Richard J. Wahrer, Environmental Scientist, Kentucky Department for Surface Mining Reclamation and Enforcement, Frankfort, KY, March 4 and March 6, 2003.

<sup>268</sup> Public comment letter received from Michael G. Miller, City Manager for the City of Columbia, on behalf of the City of Columbia, August 27, 2003.

<sup>269</sup> Personal communication with Paul E. Davis, Director Division of Water Pollution Control, Tennessee Department of Environment and Conservation, January 5, 2003.

<sup>270</sup> Tennessee Department of Environment and Conservation, Antidegradation Policy, Stream Evaluation Worksheet.

- Waters that possess outstanding scenic or geologic values.
- Waters where existing conditions exceed water quality standards.<sup>271</sup>

If a water is designated as critical habitat it is determined to be of high ecological value.<sup>272</sup> If that water is not determined to be of low value in any of the other categories it will be designated a high quality water.<sup>273</sup>

264. When a water is designated as high quality, no degradation is allowed, unless it can be demonstrated that the discharge change is a result of economic or social necessity and will not interfere with or become injurious to any existing classified uses.<sup>274</sup> The determination of whether or not a discharge will degrade a water body is made on a case by case basis.<sup>275</sup> An antidegradation survey is conducted by the State of Tennessee for any new or expanded permit application. Existing discharges are not considered to be degrading to a water system.<sup>276</sup> However, an expanded discharge from an existing project could be determined to be degrading to a water body.<sup>277</sup> Exhibit 4-9 provides an overview of the water quality status of proposed critical habitat units in Tennessee.

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<sup>271</sup> Tennessee. Code Ann., Chapter 1200-4-3-.06.

<sup>272</sup> Tennessee Department of Environment and Conservation, Antidegradation Policy, Stream Evaluation Worksheet.

<sup>273</sup> Personal communication with Debbie Arnwine, Tennessee Department of Environment and Conservation, Division of Water Pollution Control personnel, January 8, 2003.

<sup>274</sup> Tennessee. Code Ann., Chapter 1200-4-3-.06.

<sup>275</sup> Personal communication with Debbie Arnwine, Tennessee Department of Environment and Conservation, Division of Water Pollution Control personnel, January 8, 2003.

<sup>276</sup> Personal communication with Debbie Arnwine, Tennessee Department of Environment and Conservation, Division of Water Pollution Control personnel, January 8, 2003; Personal communication with Saya Qualls, Tennessee Department of Environment and Conservation, Division of Water Pollution Control personnel, January 8, 2003.

<sup>277</sup> Personal communication with Saya Qualls, Tennessee Department of Environment and Conservation, Division of Water Pollution Control personnel, January 8, 2003.

**Exhibit 4-9**

**WATER QUALITY STATUS OF PROPOSED CRITICAL HABITAT  
UNITS IN TENNESSEE**

<b>Unit</b>	<b>Water Quality Status</b>
Unit 3 Obed River	Outstanding Natural Resource Water
Unit 9 Big South Fork	Outstanding Natural Resource Water
Unit 4 Powell River	High Quality Waters
Unit 5 Clinch River	High Quality Waters
Unit 1 Duck River	Not determined
Unit 6 Nolichucky River	Not determined
Unit 7 Beech Creek	Not determined
Area 1 French Broad River	Not determined
Area 2 Holston River	Not determined

Note: If a stream is not listed it does not mean that it is not a Tier II water. It may not have been evaluated yet. Sources: Tennessee Department of Environment and Conservation, Working List of Tennessee's High Quality Tennessee Streams For Antidegradation Policy Implementation, revised August 8, 2003. Personal communication with Debbie Arnwine, Tennessee Department of Environment and Conservation, Division of Water Pollution Control personnel, January 8, 2003.

265. The determination of high quality water status could potentially impact future permit applications for new or expanded discharges in the five units in Tennessee which are not currently designated as high quality waters. Thus, critical habitat may potentially impact up to five existing, new, or expanded NPDES permits in Unit 1 Duck River, Unit 6 Nolichucky River, Unit 7 Beech Creek, Area 1 French Broad River, and Area 2 Holston River.<sup>278</sup> These NPDES permit applications will most likely be for waste municipal and domestic water treatment plant expansions.<sup>279</sup> These applications may be affected by critical habitat if 1) the water is not determined to be of high ecological value for any other reason and is not of low value for any of the other criteria, and 2) the discharge to be permitted is determined to degrade the water body. If these two criteria are met there four possible outcomes:

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<sup>278</sup> One NPDES permit application will occur in each unit over the next ten years. Personal communication with Saya Qualls, Tennessee Department of Environment and Conservation, Division of Water Pollution Control personnel, January 8, 2003.

<sup>279</sup> Personal communication with Saya Qualls, Tennessee Department of Environment and Conservation, Division of Water Pollution Control personnel, January 8, 2003.

- The discharge as proposed is not permitted but the project is revised so that it is determined not to be degrading.
- The discharge is not permitted and the project does not go forward.
- The discharge is not permitted, the denial is appealed, the appeal is not approved, and the project does not go forward.
- The discharge is not permitted, the denial is appealed, the appeal is approved, and the project goes forward.

That is, critical habitat could have no impact, result in additional time and resources spent completing an antidegradation survey, result in a modified project that discharges less than the preferred project, delay a project and require an appeals process, or halt new or expanded discharges on the five critical habitat units not currently designated. The appropriate measure of costs if a water high quality water determination was precipitated by critical habitat would be the costs associated with the antidegradation survey, the project delay while undergoing the appeals process, or the opportunity cost of not completing the project. No projects in Tennessee have gone through the complete process of application, non-issuance, and appeal.<sup>280</sup> However, it is possible that discharge expansions could be denied a permit in a high quality water. No project has gone through this process in the State. In addition, it is not reasonable foreseeable whether any such project will develop in the relevant units, and whether it would result in a conclusion of degradation. As such, this analysis does not estimate the likelihood of any of the above scenarios, or quantify the potential costs attributable to critical habitat.

266. In any case, if critical habitat precipitates the designation of a high quality water an antidegradation survey will be required. The antidegradation survey is conducted by the State of Tennessee.<sup>281</sup> The permit applicant is required to conduct a macroinvertebrate survey and chemical collections and analysis. This cost is dependent on the number of chemicals needed to be collected and who preforms the work. If the state has already collected data from the site or has staff available to complete the sampling and analysis there is no cost to the applicant. The time necessary to complete the survey depends on who performs the survey and whether existing data exists. The amount of time required to complete the survey typically takes two weeks if data is available, and three to six weeks if data needs to be collected. The cost of this process is unknown.<sup>282</sup>

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<sup>280</sup> Personal communication with Saya Qualls, Tennessee Department of Environment and Conservation, Division of Water Pollution Control personnel, January 8, 2003.

<sup>281</sup> Personal communication with Debbie Arnwine, Tennessee Department of Environment and Conservation, Division of Water Pollution Control personnel, January 9, 2003.

<sup>282</sup> Ibid.

#### 4.4 Potential Impacts on Small Entities

267. 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).<sup>283</sup> 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.<sup>284</sup> 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, Appendix C provides a screening level analysis of the potential effects of critical habitat designation on small entities to assist the Secretary in making this certification.

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<sup>283</sup> Small businesses are defined by the Small Business Administration, most commonly in terms of the number of employees or annual receipts. A small organization is “any not-for-profit enterprise...which is independently owned and operated and is not dominant in its field.” A small government is the government of a city, county, town, school district, or special district with a population of less than 50,000, not including tribal governments. Regulatory Flexibility Act, 5 U.S.C. 601 et. seq.

<sup>284</sup> 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).

268. The published economics literature has documented 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, both of which are associated with species conservation (see examples in Pearce and Moran (1994) and Fausold and Lillieholm (1999)). Likewise, regional economies and communities can benefit from the preservation of healthy populations of endangered and threatened species, and the habitat on which these species depend (ECONorthwest (2002)).
269. However, the purpose of the Act is to provide for the conservation of endangered and threatened species. Thus, the benefits of actions taken under the Act are primarily measured in terms of the value placed by the public on species preservation (e.g., avoidance of extinction, and/or an increase in a species' population). Such social welfare values may reflect both use and non-use (i.e., existence) values. For example, use values might include the potential for recreational use of a species (e.g., viewing opportunities) should recovery be achieved. Non-use values are not derived from direct use of the species, but instead reflect the utility the public derives from knowledge that a species continues to exist.
270. In addition, as a result of actions taken to preserve endangered and threatened species, various other benefits may accrue to the public. Such benefits may be a direct result of modifications to projects made following section 7 consultation, or may be collateral to such actions. For example, a section 7 consultation may result in the requirement for buffer strips along streams, in order to reduce sedimentation due to construction activities. A reduction in sediment load may directly benefit water quality, while the presence of buffer strips may also provide the collateral benefits of preserving habitat for terrestrial species and enhancing nearby residential property values (e.g., preservation of open space).

271. The remainder of this chapter describes the categories of benefits resulting from implementation of section 7 of the Act in the context of areas affected by the proposed designation. First, it qualitatively describes the types of benefits likely to result from section 7 protections. Then, it addresses both the benefits associated with species preservation as well as habitat protection.

272. As discussed below, it is not feasible to fully describe and accurately monetize the benefits of this designation in the context of this economic analysis particularly on a unit-by-unit basis. During the public comment period for the draft version of this analysis several comments expressed concern over the lack of quantified benefits of the designation. The discussion presented in this report provides insight into the potential benefits of the designation based on qualitative information obtained in the course of developing the economic analysis and feedback from the public comment period. It is not intended to provide a complete analysis of the benefits that could result from section 7 of the Act. *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.*

## 5.1 Categories of Benefits

273. Implementation of section 7 of the Act is expected to substantially increase the probability of recovery for the mussels. Such implementation includes both the jeopardy provisions afforded by the listing, as well as the adverse modification provisions provided by the designation. Specifically, the section 7 consultations that address the mussels will assure that actions taken by Federal agencies do not jeopardize the continued existence of the mussels or adversely modify their habitat. Note that these measures are separate and distinct from the section 9 “take” provisions of the Act, which also provide protection to this species.

274. The benefits of critical habitat designation can therefore be placed into two broad categories: (1) those associated with the primary goal of species conservation, and (2) those that derive mainly from the habitat protection required to achieve this primary goal. In the case of the mussels, habitat protection provides for a variety of environmental benefits, including:

- **Decreased sedimentation and decreased turbidity** resulting from erosion control measures, habitat protection, restoration, and enhancement projects.
- **Stable water volume, flow, and depth** resulting from erosion control and other measures.
- **Decreased habitat loss** resulting from erosion control measures, habitat protection, restoration, and enhancement projects.

- **Substitute habitat (mitigation)** resulting from habitat protection, restoration, and enhancement projects.

275. Exhibit 5-1 details those activities expected to generate section 7 consultations leading to project modifications associated with the proposed critical habitat for the mussels, organized by the category of physical/biological improvement expected to result from the project modification. Specifically, this exhibit identifies the physical/biological improvements expected to result from implementation of section 7 of the Act and existing baseline protections. As discussed, uncertainty exists in appropriately allocating the number and costs of certain project modifications between existing baseline regulations, such as the Tennessee Water Quality Control Act, the Federal Power Act, and the implementation of section 7 of the Act.

276. It is expected that 311 to 414 consultations will result in project modifications providing for stable water quality. These are expected to result from consultations regarding bank stabilization (170 to 213 consultations), road and bridge construction (115 to 172 consultations), coal mining (one to two consultations), special appropriation projects (five consultations), NPDES permit review (two consultations), and Watershed Team Activities (18 to 20) spread across all 13 proposed critical habitat units and three areas essential to the conservation of the mussels. These consultations will be conducted under both the section 7 listing provisions (i.e., jeopardy), as well as the section 7 critical habitat related provisions (i.e., adverse modification), and thus are not solely attributable to the proposed designation. Note that estimates of future consultations provided in Exhibit 5-1 are conservative (i.e., more likely to overstate than understate the true number of project modifications that could result from section 7 requirements associated with the mussels). For example, forecast modifications such as erosion and sediment control measures for road/bridge construction and maintenance projects may, in fact, have been required under the FHWA BMPs in the absence of section 7.

277. The physical/biological improvements listed in Exhibit 5-1 may in turn provide for a variety of economic benefits. For example, reduced sedimentation and turbidity may improve fish populations, resulting in improved recreational fishing opportunities. The discussion below provides qualitative descriptions of the economic benefits associated with these environmental improvements. As noted, while it is possible to estimate the number of projects that will generate consultations requiring project modifications, existing data do not allow for quantification or monetization of the ecological or economic implications of these requirements.

**Exhibit 5-1**  
**Physical/Biological Improvements Expected to**  
**Result from Implementation of Section 7 of the Act**

<b>Physical/Biological Improvement</b>	<b>Expected Project Modification</b>	<b>Activity</b>	<b>Number of Expected Consultations*</b>
Decreased sedimentation	Erosion control measures	Road & Bridge construction;	61 to 110 informal; 54 to 62 formal
Decreased turbidity	Habitat protection, restoration, and enhancement projects	Bank Stabilization	167 to 204 informal; 3 to 6 formal
Stable water volume, flow, and depth	Project redesign to avoid habitat	Coal Mining	1 to 2 informal
Decreased habitat loss	Use of natural materials	Special Appropriation Projects (EPA)	3 informal; 2 formal
Substitute habitat		NPDES Permit Review	2 informal
		Watershed Team Activities	17 to 19 informal; 1 formal

### 5.1.1 Benefits Associated with Species

278. The primary benefit of designating critical habitat is to increase the chance of conservation for the mussels. Quantifying the benefits associated with improved chance of conservation requires an assessment of the public's value for the designation of critical habitat for species such as the mussels. This may include both a use and non-use (i.e., existence value) component.

#### Use Value

279. The value that the public holds for species preservation may include a direct use component related to commercial harvesting or viewing opportunities. Commercial harvesters, however, have generally focused on more conspicuous mussel species for the purpose of buttons and pearl nuclei. Below we describe possible human use benefits associated with the recovery of the mussels.
280. Freshwater mussels have historically been used for a variety of commercial purposes. Notably, in the late 19<sup>th</sup> century mussel shells were harvested to create "pearl buttons" for shirts. This trade ended with the development of synthetic substitutes. In more recent years, freshwater mussels were harvested in the U.S. to provide nuclei for the cultivated pearl industry. Significant numbers of mussels were harvested in the South (including Alabama and Tennessee) to support this export industry; in fact, harvest in some States rose to a level that threatened mussel populations (both those species that were the target of the harvest effort as well as those simply impacted by harvest activities). Restrictions on freshwater mussel harvests to protect all mussel species are now in effect in many States, including Alabama and Tennessee.
281. While freshwater mussels provide some commercial economic benefit, the shell of the five mussels which are the subject of this analysis do not have the characteristics valued by the pearl industry, and were not commercially harvested historically.<sup>285</sup> In addition, this species' population is not expected to recover sufficiently in the foreseeable future to allow for commercial exploitation. Furthermore, critical habitat will likely result in limits on commercial harvest of other mussel species in the areas of the designation. Thus, commercial benefits are not expected to result in the foreseeable future from the recovery of the mussels.
282. Mussels also provide potential benefits to humans in their role as filter feeders.<sup>286</sup> Multiple municipalities within the designation rely on surface water sources for drinking

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<sup>285</sup> US Fish and Wildlife Service. 2003. Agency Draft Recovery Plan for the Common names Cumberland Elktoe, Oyster Mussel, Cumberlandian Combshell, Purple Bean, and Rough Rabbitsfoot. Atlanta GA, 176 pgs.

<sup>286</sup> Sedell, Sharpe, et. al., 2000. A comment letter provided by the Southern Appalachian Biodiversity Project provided this information to reinforce the positive economic value of filtered water (December 9, 2003).

water. These municipalities operate water filtration facilities in order to ensure the drinking water supply adequately meets human health standards. One commenter noted that it is possible that the economic burden imposed by these facilities may be in part alleviated if the mussels were thriving and therefore able to reduce the nutrient pollution load through filtration.<sup>287</sup>

### **Existence Value**

283. Existence value reflects the utility the public derives from knowledge that a species continues to exist. A number of published studies have demonstrated that the public holds values for endangered and threatened species separate and distinct from any expected direct use of these species (i.e., a willingness to pay to simply assure that a species will continue to exist). These studies include Boyle and Bishop (1987), Elkstrand and Loomis (1998), Kotchen and Reiling (2000), and Loomis and White (1996). While the public's willingness to pay for preservation and enhancement of a wide-range of species has been studied, no studies have addressed the non-use values associated with endangered and threatened freshwater mussel species. Thus, it is not possible to develop a monetary measure of this category of benefit. However, to the extent the mussels provide intrinsic value, this value will be enhanced by their survival and conservation.

284. This analysis attempts to assess the benefits of protections afforded the mussels as a result of designating an additional unit of critical habitat. The existing economics literature does not provide quantitative estimates of these benefits. To accurately quantify the existence value benefits for the mussels would require information regarding the public's marginal willingness to pay for an incremental unit of critical habitat, in terms of the increased probability of conservation or increase in abundance of the species.

### **5.1.2 Benefits Associated with Habitat Protection**

285. As noted above, habitat preservation provides for a range of economic benefits, as discussed below.

### **Sport Fishing**

286. Designation of critical habitat for the mussels may result in improved recreational fishing opportunities, given improved water quality and habitat. That is, recreational anglers may benefit from enhanced catch rates, a broader range of target species, and improved stream aesthetics. Associated benefits could include an increase in tourism and recreation-industry jobs and expenditures in areas of the designation. However, no data exist to quantify the extent of the improvement expected in area fisheries, and thus no monetization of this benefit category can be made.

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<sup>287</sup> Frances Lamberts on behalf of The League of Women Voters of Tennessee, September 5, 2003.

287. In a letter provided during the public comment period, the Southern Appalachian Biodiversity Project (SABDP) highlighted the important economic contribution of recreation within the States containing proposed critical habitat for the mussels.<sup>288</sup> SABDP cited one study that evaluated the economic value to visitors of camping, picnicking, swimming, travel and viewing scenery, horseback riding and water travel, fishing, hunting, nonconsumptive fish and wildlife use, and other recreation within the National Forests in Mississippi, Virginia, and Tennessee. In 1996, this value amounted to \$69 million in Mississippi, \$184 million in Virginia, and \$117 million in Tennessee.<sup>289</sup> This study underscores the economic importance of providing healthy ecosystems for recreation; however, the dollar estimates may not be considered due entirely to the preservation of mussel habitat as it is unclear to what extent these activities occur within the mussel habitat and by what margin preservation of the habitat as provided by critical habitat designation will impact expenditures on recreational activities.

### **Other Recreation Benefits**

288. In addition to the long-term potential for improvements in regional sport fisheries, protecting critical habitat for this species may result in preservation of habitat suitable for other recreational uses, such as hunting, hiking, boating (e.g., kayaking), and swimming. In particular, the Obed River and the Big South Fork are popular whitewater boating destinations. Conservation of various habitats may in turn lead to increased tourism and contribute to the expansion of a tourist economy in certain counties.<sup>290</sup> In addition, such activities are likely to generate social welfare benefits to recreators. Quantification of these benefits, however, is limited by the same information constraints as discussed above. For example, to estimate the extent to which whitewater rafting opportunities will improve requires an understanding of the extent to which this activity is limited by current flow rates and water quality (e.g., modest changes in sedimentation may not result in a change in the experience of this category of recreationalist). Data on the expected environmental change are not available.

289. The SABDP evaluated the importance of nature-based recreation, including hotels, amusement, transit, merchandise, and food, eating and drinking, auto repair, and air transport within the counties proposed for designation was valued at approximately \$72 million in the

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<sup>288</sup> Comment letter from the Southern Appalachian Biodiversity Project, December 9, 2003.

<sup>289</sup> Berrens, 2002 and USDA Forest Service, 1996 as cited in a comment letter from the Southern Appalachian Biodiversity Project, December 9, 2003.

<sup>290</sup> Of course, if designation of critical habitat somehow constrains these activities these constraints will be manifest as a cost of the designation.

year 2001.<sup>291</sup> While these data, as derived from the Bureau of Economic Analysis, Regional Economic Information System, provide context and demonstrate a positive willingness to pay for recreational use of the ecosystems surrounding the proposed designation, information is not available to isolate a portion of these recreational expenditures that may be impacted in the case that critical habitat for these mussel species was not designated. In other words, the incremental safeguarding of the use of these resources that is due to the presence of critical habitat for the mussels is indistinguishable.

290. SABDP also provided information regarding the growing economic importance of white water rafting.<sup>292</sup> Quantification of these benefits is limited as it requires an understanding of the extent to which these recreational activities are limited by current flow rates and water quality.

### **Overall Ecosystem Health**

291. Freshwater mussels are an integral part of the ecosystems in which they live. Protecting the primary constituent elements for the mussels, including preserving water quality and natural flow regimes, will benefit other organisms that cohabit these areas. Each one of these organisms may in turn provide some level of direct or indirect benefit to the public and local economies.
292. Understanding the change in aquatic ecosystem health resulting from this designation would entail significant effort to model the likely changes in water quality as well as the ecological benefits of modified flow regimes. While these benefits can be described qualitatively, existing data are not available to quantify the scale of these changes, such as required for monetization. For example, it is widely understood that reduced sedimentation in a river system can benefit various fish, shellfish, and aquatic plant communities. In addition, in some cases reductions in sedimentation may provide direct economic benefit (e.g., reducing the need for, or scale of, dredging operations). Quantifying these changes would, however, require additional information on the extent to which preservation of the mussels' habitat would improve water quality and ecosystem health in general.

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<sup>291</sup> Public comment letter from the Southern Appalachian Biodiversity Project, December 9, 2003. Information on the economic contribution of nature-based tourism supplied in this letter is derived from the Bureau of Economic Analysis, Regional Economic Information System (REIS) database.

<sup>292</sup> Public comment letter from the Southern Appalachian Biodiversity Project, December 9, 2003. This letter cites a travel cost study (Bowker et. al., 1996) in which estimated total consumer surplus value for guided whitewater rafting on the Nantahala River ranges from \$19 million to \$41 million annually. It is unclear how this value would be impacted by changes to the ecosystem due to the presence of critical habitat and to what extent the value of whitewater rafting on this river may be transferable to similar activity on rivers within the proposed designation. Further, many of the rivers within the proposed designation do not support whitewater rafting.

## **Water Quality Benefits**

293. Measures undertaken to protect the mussels habitat could lead to a variety of water quality benefits including: (1) protection of human drinking water supplies; (2) reduced cost of drinking water treatment; and (3) reduced cost of future stream restoration/maintenance activities. Again, quantification and monetization of these categories of benefits would require additional, detailed information on the scope and location of expected project modifications. For example, reductions in sediment load may reduce the cost of filtering municipal water supplies. The extent to which this category of benefits will be experienced, however, will depend on the location of the water systems, and the manner in which they operate (e.g., whether they utilize an instream water intake structure, or other system not impacted by sediment load). Although SABP commented that these benefits can be quantified and monetized and cited several studies on the offsite damage per ton of eroded sediment in North Carolina and Tennessee, this analysis does not quantify or monetize the economic benefits as the relationship between critical habitat for the mussels and sediment load reductions is unknown.<sup>293</sup>

## **Other Benefits**

294. Additional benefits of designating critical habitat for the mussels may include educational/informational benefits (increased awareness by the public of the extent of the mussels habitat), increased support for existing conservation efforts, and reduced uncertainty regarding the extent of the mussels habitat. For example, critical habitat designation will provide a firm legal definition of the extent of the mussels habitat, which may reduce regulatory uncertainty. At this time sufficient information does not exist to quantify or monetize the benefits of this designation, and thus it is not possible to present monetized benefits on a unit-by-unit basis.
295. SABP commented that many of the benefits identified by ECONorthwest in their 2003 comments on the Draft Economic Analysis of Critical Habitat Designation for the Cactus Ferruginous Pygmy-Owl can be applied to these five mussels.<sup>294</sup> Specific categories of benefits include reducing urban sprawl, lowering taxes and utility rates for existing homes, and improvements in public health. Many of the ECONorthest comments stem from a 2002 ECONorthest report issued by the Coalition for Sonoran Desert Protection entitled “Economic Benefits of Protecting Natural Resources in the Sonoran Desert” (pygmy-owl habitat). This report provides extensive qualitative discussion of the potential economic and

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<sup>293</sup> Public comment letter from the Southern Appalachian Biodiversity Project, December 9, 2003.

<sup>294</sup> Public comment letter from the Southern Appalachian Biodiversity Project, December 9, 2003; ECONorthwest, 2003. Comments on the Draft Economic Analysis of Critical Habitat Designation for the Cactus Ferruginous Pygmy-Owl (November 2002), Prepared for Defenders of Wildlife; Industrial Economics, 2002. Draft Economic Analysis of Critical Habitat Designation for the Cactus Ferruginous Pygmy-Owl, Prepared for the U.S. Fish and Wildlife Service.

social benefits of desert conservation.<sup>295</sup> While the report cites several economic studies on the monetary values the public places on protecting species and desert land, it does not quantify or monetize the economic benefits associated with the pygmy-owl designation.

## **5.2 Assigning Benefits on a Unit-by-Unit Basis and to the Designation**

296. Where possible, the benefits of critical habitat designation should be described on a unit-by-unit basis, and distinguished from the benefits that result from implementation of the jeopardy provisions of section 7 of the Act. The benefits discussed above arise primarily from the protection afforded to the mussels under the section 7 jeopardy provisions. Specifically, *future consultations - and any associated project modifications - are expected to be primarily associated with the listing of the species (i.e., the jeopardy provision of section 7), rather than the critical habitat designation (i.e., the adverse modification provision).*

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<sup>295</sup> Industrial Economics, 2002. Draft Economic Analysis of Critical Habitat Designation for the Cactus Ferruginous Pygmy-Owl, Prepared for the U.S. Fish and Wildlife Service.

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Tennessee Division of Forestry  
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United States Army Corps of Engineers, Regulatory Branch, Norfolk District, Norfolk, VA  
United States Fish and Wildlife Service, Cookeville Field Office, TN  
United States Forest Service, Daniel Boone National Forest  
United States National Park Service, Big South Fork River and Recreation Area  
United States National Park Service, Obed Wild and Scenic River

## APPENDIX A OTHER LISTED SPECIES

Generally, if a consultation is triggered for any listed species, the consultation process will also take into account all other listed species known or thought to occupy areas on or near the project lands. As such, listing or critical habitat-related protections for other threatened or endangered species may benefit the mussels as well (i.e., provide baseline protection). However, due to the difficulty in apportioning the costs of consultations between various species as well as awareness that a consultation for the mussels would need to be conducted absent consultations for or involving other species, this analysis does not attempt to apportion the consultations and related costs reported by Action agencies between the mussels and other listed species, and assumes that all future section 7 consultations within the extant boundaries of the proposed critical habitat *are fully attributable to the presence of the mussels and their habitat*. The Service has conducted consultations on the mussels in combination with numerous species, as indicated in the table below.

<b>OTHER LISTED SPECIES INCLUDED IN PAST CONSULTATIONS ON THE 5 CUMBERLANDIAN MUSSELS</b>	
<b>Species</b>	<b>Status</b>
<b><u>Fish</u></b>	
Slender Chub ( <i>Erimystax (=Hybopsis) cahni</i> )	Endangered with critical habitat
Spotfin Chub (turquoise shiner) ( <i>Cyprinella (=Hybopsis) monacha</i> )	Endangered with critical habitat
Blackside Dace ( <i>Phoxinus cumberlandensis</i> )	Threatened
Bayou Darter ( <i>Etheostoma rubrum</i> )	Threatened
Bluemask Darter ( <i>Etheostoma</i> )	Endangered
Duskytail Darter ( <i>Etheostoma percnurum</i> )	Experimental Population, Non-Essential
Pygmy Madtom ( <i>Noturus stanauli</i> )	Endangered
Yellowfin Madtom ( <i>Noturus flavipinnis</i> )	Endangered with critical habitat
Palezone Shiner ( <i>Notropis albizonatus</i> )	Endangered
<b><u>Mussels</u></b>	
Southern Acornshell ( <i>Epioblasma othcaloogensis</i> )	Endangered
Cumberland Pigtoe ( <i>Pleurobema gibberum</i> )	Endangered
Finerayed Pigtoe ( <i>Fusconaia cuneolus</i> )	Experimental Population, Non-Essential
Heavy Pigtoe ( <i>Pleurobema taitianum</i> )	Endangered
Cumberland Bean (pearlymussel) ( <i>Villosa trabalis</i> )	Experimental Population, Non-Essential
Green Blossom (pearlymussel) ( <i>Epioblasma torulosa gubernaculum</i> )	Endangered
Tubercled Blossom (pearlymussel) ( <i>Epioblasma torulosa torulosa</i> )	Experimental Population, Non-Essential
Turgid Blossom (pearlymussel) ( <i>Epioblasma turgidula</i> )	Experimental Population, Non-Essential
Yellow Blossom (pearlymussel) ( <i>Epioblasma florentina florentina</i> )	Experimental Population, Non-Essential

**OTHER LISTED SPECIES INCLUDED IN PAST CONSULTATIONS ON THE  
5 CUMBERLANDIAN MUSSELS**

<b>Species</b>	<b>Status</b>
Alabama Lampmussel ( <i>Lampsilis virescens</i> )	Endangered
Catspaw (purple cat's paw pearlymussel) ( <i>Epioblasma obliquata obliquata</i> )	Endangered
Clubshell ( <i>Pleurobema clava</i> )	Experimental Population, Non-Essential
Black Clubshell ( <i>Pleurobema curtum</i> )	Endangered
Ovate Clubshell ( <i>Pleurobema perovatum</i> )	Endangered
Southern Combshell ( <i>Epioblasma penita</i> )	Endangered
Appalachian Elktoe ( <i>Alasmidonta raveneliana</i> )	Endangered with critical habitat
Fanshell ( <i>Cyprogenia stegaria</i> )	Endangered
Alabama Heelsplitter (inflated) ( <i>Potamilus inflatus</i> )	Endangered
Pale Lilliput (pearlymussel) ( <i>Toxolasma cylindrellus</i> )	Endangered
Gulf Moccasinshell ( <i>Medionidus penicillatus</i> )	Endangered
Appalachian Monkeyface (pearlymussel) ( <i>Quadrula sparsa</i> )	Endangered
Cumberland Monkeyface (pearlymussel) ( <i>Quadrula intermedia</i> )	Endangered
Orangenacre Mucket ( <i>Lampsilis perovalis</i> )	Threatened
Pink Mucket (pearlymussel) ( <i>Lampsilis abrupta</i> )	Endangered
Birdwing Pearlymussel ( <i>Conradilla caelata</i> )	Endangered
Cracking Pearlymussel ( <i>Hemistena lata</i> )	Endangered
Curtis Pearlymussel ( <i>Epioblasma florentina curtisii</i> )	Endangered
Dromedary Pearlymussel ( <i>Dromus dromas</i> )	Experimental Population, Non-Essential
Littlewing Pearlymussel ( <i>Pegias fabula</i> )	Endangered
White Wartyback (pearlymussel) ( <i>Plethobasus cicatricosus</i> )	Endangered
Rough Pigtoe ( <i>Pleurobema plenum</i> )	Endangered
Shiny Pigtoe ( <i>Fusconaia cor (edgariana)</i> )	Endangered
Orangefoot Pimpleback (pearlymussel) ( <i>Plethobasus cooperianus</i> )	Endangered
Ring Pink ( <i>Obovaria retusa</i> )	Endangered
Finelined Pocketbook ( <i>Lampsilis altilis</i> )	Threatened
Tan Riffleshell ( <i>Epioblasma florentina walkeri</i> )	Endangered
<b>Snails</b>	
Anthony's Riversnail ( <i>Athearnia anthonyi</i> )	Endangered
<b>Crustaceans</b>	Endangered
Nashville Crayfish ( <i>Orconectes shoupi</i> )	Endangered

**OTHER LISTED SPECIES INCLUDED IN PAST CONSULTATIONS ON THE  
5 CUMBERLANDIAN MUSSELS**

<b>Species</b>	<b>Status</b>
<b><u>Plants</u></b>	
Price's potato-bean ( <i>Apios priceana</i> )	Threatened
Cumberland sandwort ( <i>Arenaria cumberlandensis</i> )	Endangered
Cumberland rosemary ( <i>Conradina verticillata</i> )	Threatened
Leafy prairie-clover ( <i>Dalea</i> (= <i>Petalostemum</i> ) <i>foliosa</i> )	Endangered
Tennessee purple coneflower ( <i>Echinacea tennesseensis</i> )	Endangered
Eggert's sunflower ( <i>Helianthus eggertii</i> )	Threatened
Small whorled pogonia ( <i>Isotria medeoloides</i> )	Threatened
Spring Creek bladderpod ( <i>Lesquerella perforata</i> )	Endangered
American chaffseed ( <i>Schwalbea americana</i> )	Endangered
Virginia spiraea ( <i>Spiraea virginiana</i> )	Threatened
Running buffalo clover ( <i>Trifolium stoloniferum</i> )	Endangered
Tennessee yellow-eyed grass ( <i>Xyris tennesseensis</i> )	Endangered
<b><u>Mammals</u></b>	
Gray Bat ( <i>Myotis grisescens</i> )	Endangered
Indiana Bat ( <i>Myotis sodalis</i> )	Endangered with critical habitat
Virginia big-eared Bat ( <i>Corynorhinus</i> ( <i>Plecotus</i> ) <i>townsendii virginianus</i> )	Endangered with critical habitat
Eastern Puma <i>Puma</i> ( <i>Felis</i> ) <i>concolor</i> cougar)	Endangered
<b><u>Birds</u></b>	
Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	Threatened
Red-cockaded Woodpecker ( <i>Picoides borealis</i> )	Endangered

<b>APPENDIX B RELEVANT BASELINE REGULATIONS</b>		
<b>Regulation</b>	<b>Description</b>	<b>Units Potentially Affected</b>
Tennessee Scenic Rivers Act 1968	Management of Tennessee Natural Resource Areas limits development to a few basic facilities (i.e., picnic areas, visitors centers, etc.) Outstanding Natural Resource Waters include the Obed River and the Big South Fork of the Cumberland River. <sup>296</sup>	Unit 1 Duck River, Unit 3 Obed River, Unit 9 Big South Fork
Tennessee Scenic Rivers Program	Established in 1968 with the passage of the Tennessee Scenic River Act, this program seeks to preserve valuable selections of rivers in their free-flow natural or scenic conditions and to protect water quality and adjacent lands. Protections afforded to the river habitat include road development control, water level control, erosion control, and vegetation and wildlife management. <sup>297</sup>	Unit 1 Duck River
Yanahli Wildlife Management Area	Managed by the Tennessee Wildlife Resources Agency (TWRA) for wildlife, recreation, and natural and cultural preservation. <sup>298</sup> The deed transfer from the Tennessee Valley Authority (TVA) to TWRA requires no land be sold or used for residential development, no industrial use will be allowed on the land, 6,800 acres are protected through development and use restrictions, 2,000 acres are protected as State Natural Areas, and 3,800 acres that include Fountain Creek are protected for water supply. <sup>299</sup>	Unit 1 Duck River

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<sup>296</sup> Tennessee Code Ann., §11-13-101 (1968).

<sup>297</sup> Rules of Tennessee Department of Conservation, Division of State Parks, §0400-2-8, *Management of Tennessee Natural Resource Areas*.

<sup>298</sup> Tennessee Department of Conservation, TDEC: Columbia Lands Deed Transfer, Accessed at <http://www.state.tn.us/environment/columbialands/> on December 19, 2003. Comment received from David Lincicome on behalf of the Tennessee Division of Natural Heritage (September 2, 2003), John W. Shipp, Jr., P.E. on behalf of the Tennessee Valley Authority (September 2, 2003), and Michael G. Miller on behalf of the City of Columbia, provided additional information on the status of the Yanahli Wildlife Management Area in Unit 1 Duck River.

<sup>299</sup> Tennessee Department of Conservation, TDEC: Columbia Lands Deed Transfer, Accessed at <http://www.state.tn.us/environment/columbialands/map.htm> on December 19, 2003.

**APPENDIX B  
RELEVANT BASELINE REGULATIONS**

Regulation	Description	Units Potentially Affected
Tennessee Water Quality Control Act of 1977	Authorizes the Tennessee Water Control Board to require permit applicants to evaluate practicable alternatives and conduct avoidance, minimization, and/or mitigation for activities impacting water. The current policy is that of “no net loss;” if mitigation is sufficient to offset the proposed loss, issuance of a permit is allowed under the Act. <sup>300</sup>	Unit 1 Duck River, Unit 3 Obed River, Unit 9 Big South Fork, Unit 6 Nolichucky River, Unit 7 Beech Creek, Unit 5 Clinch River, Unit 4 Powell River
Tennessee Water Quality Standards	Authorized by the Tennessee Water Quality Control Act of 1977, the Tennessee Division of Water Pollution Control implements and enforces State water quality standards. Water quality objectives include abating existing pollution of Tennessee waters, reclaiming polluting waters, preventing the future pollution of waters, and planning for the future use of State waters. <sup>301</sup>	Unit 1 Duck River, Unit 3 Obed River, Unit 9 Big South Fork, Unit 6 Nolichucky River, Unit 7 Beech Creek, Unit 5 Clinch River, Unit 4 Powell River
Tennessee Antidegradation Statement	The purpose of the antidegradation statement is to protect existing uses of surface waters, including high quality surface waters. <sup>302</sup>	Unit 1 Duck River, Unit 3 Obed River, Unit 9 Big South Fork, Unit 6 Nolichucky River, Unit 7 Beech Creek, Unit 5 Clinch River, Unit 4 Powell River
Tennessee Outstanding Resource Waters	New discharges, expansions of existing discharges, or mixing zones that will degrade the water body will not be permitted.	Unit 3 Obed River, Unit 9 Big South Fork
Tennessee High Quality Waters	New discharges, expansions of existing discharges, or mixing zones that will degrade the water body will not be permitted unless the water quality change can be demonstrated to be an economic or social necessity.	Unit 4 Powell River, Unit 5 Clinch River

<sup>300</sup> Tennessee Code Ann., §69-3-101.

<sup>301</sup> Tennessee Code Ann., §69-3-101.

<sup>302</sup> Tennessee. Code Ann., Chapter 1200-4-3-.06.

**APPENDIX B  
RELEVANT BASELINE REGULATIONS**

Regulation	Description	Units Potentially Affected
Virginia State Water Control Law	Protects existing high-quality State waters and provides for the restoration of all other State waters so they will support the growth of aquatic life. Also, numeric limits for specific physical, chemical, biological, and radiological characteristics of water for the propagation and growth of aquatic life are prescribed. <sup>303</sup>	Unit 5 Clinch River, Unit 4 Powell River
Virginia Scenic Rivers System	The Department of Conservation and Recreation reviews and make recommendations regarding planning and development of water and related land resources, including the construction of impoundments, diversions, roadways, crossings, channels, locks, canals, or other uses which alter the character of a waterway or destroy its scenic values, full consideration and evaluation of the river as a scenic resource will be given before plans are approved. <sup>304</sup>	Unit 5 Clinch River
Virginia Erosion and Sediment Control Program	The program's goal is to control soil erosion, sedimentation, and nonagricultural runoff from regulated "land-disturbing activities" to prevent degradation of property and natural resources. Regulations specify "Minimum Standards," which include criteria, techniques and policies, that must be followed on all regulated activities. Some exemptions exist for specific land use activities. <sup>305</sup>	Unit 5 Clinch River, Unit 4 Powell River
Kentucky Water Quality Law	Waters of the Commonwealth will be conserved for the propagation of fish and aquatic life. <sup>306</sup>	Unit 10 Buck Creek, Unit 8 Rock Creek, Unit 11 Sinking Creek, Unit 12 Marsh Creek, Unit 9 Big South Fork

<sup>303</sup> Virginia Code Ann., §62.1-44.15(3a).

<sup>304</sup> Virginia Code Ann., §10.1.402.

<sup>305</sup> Virginia Code Ann., §10.1-561.

<sup>306</sup> Kentucky Revised Statutes §401.5:002-031.

**APPENDIX B  
RELEVANT BASELINE REGULATIONS**

Regulation	Description	Units Potentially Affected
Kentucky Wild Rivers Act 1972	Surface mining, clear-cutting, dam construction, and other in-stream disturbance activities are prohibited within a wild river corridor. Existing development and agricultural land uses are allowed to continue but any developments which may impair water quality or the river's natural condition are regulated. Management plans are required for all wild rivers. <sup>307</sup>	Unit 8 Rock Creek, Unit 9 Big South Fork
Kentucky Outstanding Resource Waters	Although these waters may receive industrial and/or municipal discharges these discharges must receive a Kentucky Pollutant Discharge Elimination System (KPDES) permit. Special conditions are provided in the KPDES permit limit projects that would have a harmful effect on listed species. <sup>308</sup>	Unit 10 Buck Creek, Unit 12 Marsh Creek, Unit 11 Sinking Creek
Mississippi Water Quality Criteria for Intrastate, Interstate, and Coastal Waters	Mississippi water quality standards establish criteria necessary to protect, upgrade, and enhance water quality in Mississippi. General conditions applicable to all State waters include: State waters should be free from materials attributable to municipal, industrial, agricultural, or other discharges producing color, odor, taste, total suspended solids, or other conditions in such a degree to degrade waters and impact public health, recreation, aquatic life and wildlife. Specifically, criteria for aquatic life use includes standards for toxicity, bacteria, dissolved solids, and phenolic compounds levels. <sup>309</sup>	Unit 2 Bear Creek

<sup>307</sup> Kentucky Revised Statutes §146.200 to §146.350.

<sup>308</sup> Kentucky Administrative Record §401.5:301 §7.

<sup>309</sup> State of Mississippi Water Quality Criteria for Intrastate, Interstate, and Coastal Waters, Adopted November 16, 1995.

**APPENDIX B  
RELEVANT BASELINE REGULATIONS**

Regulation	Description	Units Potentially Affected
Mississippi State Water Management Plan	Under authority of Mississippi Legislature the Office of Land and Water Resources of the Mississippi Department of Environmental Quality (MDEQ) is responsible for development and oversight of the "State water management plan." This plan was developed in order to control the effects of development on the waters of the State through a water withdrawal permitting system and thorough study and reporting regarding: water resources of the State; methods of conserving and augmenting such waters; existing and contemplated needs and uses for protection and procreation of fish and wildlife and various other uses; and drainage, reclamation, flood-plain or flood-hazard area zoning, and selection of reservoir sites. <sup>310</sup>	Unit 2 Bear Creek
Alabama Water Pollution Control Act	This Act authorizes the Alabama Department of Environmental Management (ADEM) to establish and enforce water quality standards, regulations, and penalties in order to implement both State and federal water quality regulations. ADEM administrative code prohibits the deposition of pollutants, including sediment, organic materials, and pesticides into State waters. For non-source pollutants, provisions are limited to recommending best management practices adequate to protect water quality consistent with the ADEM's nonpoint source control program (see below). <sup>311</sup>	Unit 2 Bear Creek

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<sup>310</sup> Mississippi. Code. Ann, §51-3-1 through §51-3-5.

<sup>311</sup> Alabama Department of Environmental Management, Water Division, Water Quality Program, Administrative Code, §335-6-11.

**APPENDIX B  
RELEVANT BASELINE REGULATIONS**

Regulation	Description	Units Potentially Affected
Alabama Nonpoint Source Program: Alabama Clean Water Partnership	Established in 1987, Alabama's Nonpoint Source Program relies on best management practices, education and outreach, monitoring and assessments, and resource assistance to meet the goals of the Clean Water Act. The Alabama Clean Water Partnership, a key component of the program, consists of joint voluntary efforts of public and private stakeholders who strive to restore and protect Alabama's river basins. The Bear Creek Watershed Project began in 2000. <sup>312</sup>	Unit 2 Bear Creek
Tennessee Nongame and Endangered or Threatened Wildlife Species Conservation Act of 1974	Prohibits the taking, possession, transportation, exportation, processing, sale or offer for sale or shipment within Tennessee of endangered fish and wildlife unless such actions will assist in preservation or propagation of the species or subspecies. <sup>313</sup>	Unit 1 Duck River, Unit 3 Obed River, Unit 9 Big South Fork, Unit 6 Nolichucky River, Unit 7 Beech Creek, Unit 5 Clinch River, Unit 4 Powell River
Tennessee Endangered Species	The Environmental Review Program reviews State and Federal permit application for potential impacts to listed species and recommends ways to avoid or mitigate impacts. Each of the five mussels are listed as endangered by the Tennessee Wildlife Resources Agency. <sup>314</sup>	Unit 1 Duck River, Unit 3 Obed River, Unit 9 Big South Fork, Unit 6 Nolichucky River, Unit 7 Beech Creek, Unit 5 Clinch River, Unit 4 Powell River
Virginia's Endangered Species Act	Prohibits the taking, transportation, sale, etc. of endangered and threatened species (except as permitted) and provides for listing and recovery of these species. <sup>315</sup>	Unit 5 Clinch River, Unit 4 Powell River

<sup>312</sup> Alabama Department of Environmental Management, *Alabama's Nonpoint Source Management Program 2001 Annual Report*.

<sup>313</sup> Tennessee Code Ann., §70-8-101 through §70-8-112 (1974).

<sup>314</sup> Tennessee Department of Environment and Conservation, Division of Natural Heritage, Environmental Review Program at <http://www.state.tn.us/environment/nh/erp.htm> as viewed on March 10, 2003.

<sup>315</sup> Virginia Code Ann., §29.1-564-568.

**APPENDIX B  
RELEVANT BASELINE REGULATIONS**

Regulation	Description	Units Potentially Affected
Kentucky Endangered Species	Allows the Kentucky Department of Fish and Wildlife Resources to list threatened and endangered species. <sup>316</sup>	Unit 10 Buck Creek, Unit 8 Rock Creek, Unit 11 Sinking Creek, Unit 12 Marsh Creek, Unit 9 Big South Fork
Mississippi Nongame and Endangered Species Conservation Act	This Act prohibits the taking, possession, transportation, exportation, processing, sale, or shipment within the State of endangered species. Pursuant to this Act, the Mississippi Commission on Wildlife, Fisheries and Parks shall issue regulations establishing limitations related to taking, possession, transportation, and sale of species as necessary to protect the species. <sup>317</sup>	Unit 2 Bear Creek
Alabama Nongame Species Regulation	Prohibits the take, capture, killing, or attempt to take, capture or kill, possess, sell, trade for anything of monetary value, or offer to sell or trade for anything of monetary value for listed species. <sup>318</sup>	Unit 2 Bear Creek
Alabama Mussel Harvest Restrictions	The Alabama Division of Wildlife and Freshwater Fisheries prescribes mussel harvesting methods for commercial mussels, which include prohibitions on the harvesting of federally listed threatened and endangered mussels. <sup>319</sup>	Unit 2 Bear Creek
Tennessee Mussel Sanctuary	Prohibits the commercial harvesting of mussels or any destruction of their habitat. <sup>320</sup>	Unit 1 Duck River

<sup>316</sup> Kentucky Revised Statutes §146.600 through 146.619.

<sup>317</sup> Mississippi Code Ann., §49-5-101 through 49-5-119.

<sup>318</sup> Code of Alabama, §220-2-92.

<sup>319</sup> Alabama Wildlife & Freshwater Fisheries, *Alabama Regulations Relating to Game, Fish, and Fur-bearing Animals, 2002-2003*, pp. 76.

<sup>320</sup> Tennessee Department of Conservation, Tennessee Scenic Rivers Program: Duck River, Accessed at <http://www.state.tn.us/environment/nh/scenicrivers/duck.htm> on December 19, 2003. Comment received from David Lincicome on behalf of the Tennessee Division of Natural Heritage (September 2, 2003) provided additional information on the mussel sanctuary status of the Duck River.

**APPENDIX B  
RELEVANT BASELINE REGULATIONS**

Regulation	Description	Units Potentially Affected
Kentucky Forest Conservation Act	Provides guidelines for the harvest of timber in Kentucky. The focus of the Act is the protection of water quality. The Act requires the implementation of best management practices, and logger education. <sup>321</sup>	Unit 13 Laurel Fork, Unit 9 Big South Fork
Catoosa Wildlife Management Area	Catoosa is managed primarily for hunting. Use of off-road vehicles, horses and other saddle pack animals, camping, and fires are restricted in this 80,000 acre management area. <sup>322</sup>	Unit 3 Obed River

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<sup>321</sup> Kentucky Revised Statutes. §149.330 to 149.355.

<sup>322</sup> Tennessee Code Ann., Chapter 1660-1-14-.03 to .015.

## APPENDIX C:

### C.1 Potential Impacts on Small Entities

297. Several commenters stated their concern that this designation of critical habitat could impact small businesses.<sup>323</sup> This analysis is intended to facilitate determination of whether this critical habitat designation potentially affects a “substantial number” of small entities in counties supporting critical habitat areas. It also quantifies the probable number of small businesses and governments likely to experience a “significant effect.” In both tests, this analysis examines the total estimated section 7 costs calculated in earlier sections of this report, including those impacts that may be “attributable co-extensively” with the listing of the mussels. This results in a conservative estimate (i.e., more likely to overstate impacts than understate them), because it utilizes the upper bound impact estimate from the earlier analysis.
298. Federal courts and Congress have indicated that a Regulatory Flexibility Act/SBREFA analysis should be limited to direct and indirect impacts on entities subject to the requirements of the regulation. As such, entities indirectly impacted by the mussel listing and designation of critical habitat, and, therefore, not directly regulated by the listing or critical habitat designation, are not considered in this screening analysis.<sup>324</sup>

### **Identifying Activities That May Involve Small Entities**

299. Section 3 of this report identifies activities that are within, or will otherwise be affected by, section 7 of the Act for the mussels. Third parties are not involved in several of the activities potentially affected by section 7 implementation for the mussels (i.e. only the Action agency and the Service are involved in the consultation). Of the remaining activities potentially affected by section 7 implementation for the mussels and involving a third party, many have no directly-regulated small business or government involvement. Private entities are forecast to incur 15 percent of the costs. State and local governments are expected to incur 50 percent of the costs. Project modification costs are associated with

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<sup>323</sup> Public comment letter submitted by Deanis Simmons, Tazewell County Attorney, on behalf of the Board of Supervisors of Tazewell County, December 5, 2003; Michael G. Miller, City Manager City of Columbia, on behalf of the City of Columbia, August 27, 2003; Public comment was submitted by Robert Raines at the public hearing on the proposed designation of critical habitat for the mussels on October 29, 2003; Public comment letter submitted by James O. Clark on behalf of Columbia Power and Water Systems, August 26, 2003.

<sup>324</sup> Tazewell County provided a list of 55 businesses that may potentially be affected by critical habitat designation for the mussels and inquired as to whether any of these businesses had been contacted in the process of conducting this analysis. The Tazewell County Administrator, Jim Spencer, was contacted February 27, 2003 and interviewed regarding potential impacts of critical habitat on the county, as were representatives of each 26 counties containing critical habitat. In addition all relevant State and Federal regulatory agencies were contacted regarding potential impacts to projects the authorize or fund.

road and bridge construction and maintenance and dams/reservoirs. The costs associated with road and bridge construction and maintenance are expected to be borne directly by or passed on to the Federal government. The costs associated with dams/reservoirs are expected to be borne by municipal utilities and passed on to the consumer. Thus, small entities should not be directly impacted by section 7 implementation for these affected projects:

- **Road and bridge construction and maintenance.** DOT consultations on bridge projects could lead to project modifications that include the relocation of mussels, increasing the span of the bridge, and construction and post construction monitoring. This analysis anticipates that most costs associated with project modification compliance will either be borne directly by or passed on to the Federal government, which accordingly will ultimately bear the majority of the costs of these modifications.
- **Agricultural activities (Natural Resources Conservation Service, Army Corps of Engineers, Tennessee Valley Authority).** Both formal and informal consultations are anticipated involving agricultural activities (such as stream bank stabilization, road construction, stream crossings, and wildlife management). Project modifications may include equipment restrictions, requirements to work outside the stream bed, and the use of natural materials. Any project modification costs associated with these consultations are expected to be minimal.
- **Utilities construction and maintenance.** Utilities consultations may result in project modifications that include rerouting, and mussel relocation. TVA anticipates additional review costs associated with their transmission line activities. This analysis anticipates that most costs associated with project modification compliance will either be borne directly by or passed on to the Federal government, which accordingly will ultimately bear the majority of the costs of these modifications.
- **Activities in National Forests (Forest Service).** These may include recreation activities, timber, and land activities. These activities are anticipated to be carried out by the Forest Service.
- **National Parks, Wild and Scenic Rivers, and National River and Recreation Areas (National Park Service).** Consultations with the National Park Service will be regarding river crossing projects such as bridge construction, the park's General Management Plan, and trail maintenance. The river crossing project may result in project modifications such as mussel relocation or termination of the project. This analysis anticipates that costs associated with project modification compliance will either be borne directly by or passed on to the Federal government.

- **Coal mining (Office of Surface Mining, National Park Service).** Consultations are anticipated involving mining activities. Project modifications may include the installation of additional sumps along haul roads to handle sediment loads, the construction of larger sediment basins (holding ponds), or more frequent clean-out of ponds and haul road sumps. Any project modification costs associated with these activities are expected to be minimal.
- **Gravel dredging and excavation (Army Corps of Engineers).** Consultations are anticipated involving gravel dredging and excavation projects but these consultations are not expected to result in any project modifications.
- **Oil and gas development (National Park Service).** Informal consultations are anticipated involving oil and gas development projects but no project modifications are expected.
- **Power plants (Army Corps of Engineers).** There are no consultations expected involving power plants. The third parties that would be involved in any power plant consultations are the American Electric Power company and CME North American Merchant Energy, LLC. However, both companies report megawatt hour sales in excess of the SBA threshold of 4 million megawatt hours.<sup>325</sup>
- **Dams/Reservoirs (Tennessee Valley Authority).** The removal of a gravel bar for the production of hydroelectricity at the Old Columbia Dam in Tennessee may result in a formal consultation, and project modifications such as mussel relocation or a denial of a permit which may preclude hydropower production at the facility. Columbia Power and Water Systems is a municipally owned public water system that serves the city of Columbia and Maury County, or a population of approximately 60,000.<sup>326</sup> Maury County has a population of 69,498, and therefore does not qualify

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<sup>325</sup> “Hydroelectric power generation” is identified by NAICS code #221111. U.S. Small Business Administration, “Small Business Size Standards matched to North American Industry Classification System (NAICS),” accessed at <http://www.sba.gov/size/sizetable2002.html> on March 14, 2003. A firm is small if, including its affiliates, it is primarily engaged in the generation, transmission, and/or distribution of electric energy for sale and its total electric output for the preceding fiscal year did not exceed four million megawatt hours.

<sup>326</sup> Public comment letter submitted by James O. Clark on behalf of Columbia Power and Water Systems, August 26, 2003.

as a small government.<sup>327</sup> This analysis assumes that increased costs would be passed on to the end users.

- **Water quality activities (Environmental Protection Agency).** Environmental Protection Agency conducts activities to protect water quality under the CWA. These may include EPA review of TMDL levels with States and review of State water quality standards.
- **Conservation and recreation (Fish and Wildlife Service, Tennessee Valley Authority and Army Corps of Engineers).** As stated in Section 4 of this analysis, the Service's conservation and recreation projects are designed to benefit the mussels and habitat, and are generally carried out by the Service themselves. Therefore, small entities should not be affected by consultations on these activities. Third parties may be impacted by consultations regarding recreation projects, however, project modifications are not anticipated.

300. Consultation and project modification could lead to identifiable impacts for one potential small entity. Protection measures for the mussels may include the potential relocation of a future water supply reservoir of the Fentress County Utility District. The Fentress County Utility District serves the population of Fentress County, Tennessee, but does not serve the City of Jamestown. Fentress County has a population of approximately 16,868, therefore qualifying as a small government. Fentress County has an annual budget of about \$5 million in general revenues, and \$10 million in primary government funds excluding schools.<sup>328</sup> The annualized value of the potential project modification cost at a rate of seven percent over the next 20 years ranges from \$210,500 to \$398,100. This is up to eight percent of the general revenues budget and up to four percent of the primary government funds of Fentress County. However, the costs of this project would be passed on to the consumer, and has the potential to triple water rates.<sup>329</sup>

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<sup>327</sup> The SBA defines a "small governmental jurisdiction" as "governments of counties with a population of less than fifty thousand." U.S.C § 601.

<sup>328</sup> Tennessee Comptroller of the Treasury Division of County Audit. Comprehensive Annual Financial Reports 2001-2002. Accessed at <http://www.comptroller.state.tn.us/ca/cacafr.htm> on May 11, 2004.

<sup>329</sup> Personal communication with John Mullinix, County Executive, Fentress County, January 14, 2004.

## C.2 Potential Impacts to the Energy Industry

301. Pursuant to Executive Order No. 13211, “Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use,” issued May 18, 2001, Federal agencies must prepare and submit a “Statement of Energy Effects” for all “significant energy actions.” The purpose of this requirement is to ensure that all Federal agencies “appropriately weigh and consider the effects of the Federal Government’s regulations on the supply, distribution, and use of energy.”<sup>330</sup> The Office of Management and Budget has provided guidance for implementing this executive order that outlines nine outcomes that may constitute “a significant adverse effect” when compared without the regulatory action under consideration:

- Reductions in crude oil supply in excess of 10,000 barrels per day (bbls);
- Reductions in fuel production in excess of 4,000 bbls per day;
- Reductions in coal production in excess of 5 million tons per year;
- Reductions in natural gas production in excess of 25 million Mcf per year;
- Reductions in electricity production in excess of 1 billion kilowatts per year or in excess of 500 megawatts of installed capacity;
- Increases in energy use required by the regulatory action that exceed the thresholds above;
- Increases in the cost of energy production in excess of one percent;
- Increases in the cost of energy distribution in excess of one percent; or
- Other similarly adverse outcomes.<sup>331</sup>

302. Five of these criteria are relevant to this analysis: 1) potential reductions in crude oil supply; 2) potential reductions in coal production; 3) potential reductions in natural gas production; 4) potential increases in the cost of energy production; and 5) potential increases in the cost of energy distribution.

### **Evaluation of Whether Section 7 Implementation will Result in Reductions in Crude Oil Supply, Coal Production, and Natural Gas Production**

303. Section 7 consultations with respect to oil, gas, and coal operations are anticipated to occur within four Tennessee counties containing proposed critical habitat for the mussels; Cumberland, Fentress, Morgan, and Scott Counties.<sup>332</sup> Exhibit C-1, C-2, and C-3 provide

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<sup>330</sup> Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing E.O. 13211, M-01-27, Office of Management and Budget, July 13, 2001, accessed at <http://www.whitehouse.gov/omb/memoranda/m01-27.html>

<sup>331</sup> Ibid.

<sup>332</sup> While other counties in Virginia, Kentucky, and Tennessee have oil and gas drilling and coal mining activities they are not included in this analysis. For these counties the costs associated with technical assistance efforts and consultations with no recommended project modifications are unlikely to cause the abandonment of the projects,

an analysis of whether the energy industry, specifically, crude oil, natural gas, and coal producers are likely to experience “a significant adverse effect” as a result of section 7 implementation for the mussels.

<b>Exhibit C-1</b>						
<b>HISTORIC CRUDE OIL PRODUCTION (FENTRESS, MORGAN, AND SCOTT COUNTIES, TENNESSEE, AND MCCREARY COUNTY, KENTUCKY), bbls (barrels)</b>						
<b>Year</b>	<b>McCreary County</b>	<b>Fentress County</b>	<b>Morgan County</b>	<b>Scott County</b>	<b>Total bbls</b>	<b>Total bbls/day</b>
1997	1,457	29,193	65,585	69,198	165,433	453
1998	2,365	25,973	50,870	60,340	139,548	382
1999	3,850	26,603	55,275	63,420	149,148	409
2000	3,998	14,114	35,259	49,758	103,129	283
2001	5,702	31,920	45,147	48,683	131,452	360
Average	3,475	25,561	50,427	58,280	137,742	377

Source: Brandon Nuttall, Kentucky Geological Survey, Lexington, Kentucky. Data source: Kentucky Revenue Cabinet, Severance Tax Division.  
 Oil and Gas Activity in Tennessee During 1997, by Ronald P. Zurawski, State Geologist and Director, Tennessee Division of Geology, Nashville, Tennessee.  
 Oil and Gas Activity in Tennessee During 1998, by Ronald P. Zurawski, State Geologist and Director, Tennessee Division of Geology, Nashville, Tennessee.  
 Tennessee Statistical Energy Data, Energy Division, Tennessee Department of Economic & Community Development, Nashville, Tennessee.  
 Oil and Gas Activity in Tennessee During 2000, by Ronald P. Zurawski, State Geologist and Director, Tennessee Division of Geology, Nashville, Tennessee.  
 Oil and Gas Activity in Tennessee During 2001, by Ronald P. Zurawski, State Geologist and Director, Tennessee Division of Geology, Nashville, Tennessee.

304. As Exhibit C-1 illustrates, the Tennessee and Kentucky counties containing proposed critical habitat collectively produce less than 500 bbls of crude oil on a daily basis.<sup>333</sup> Therefore, should section 7 implementation cause the abandonment of future development of 35 to 50 oil wells within McCreary, Fentress, Morgan or Scott counties, it is unlikely that crude oil supply will drop by more than the threshold of 10,000 bbls per day. In fact, the entire States of Kentucky and Tennessee, together, produce less oil than the 10,000 bbls

and they are unlikely to lead to changes in energy production or distribution.

<sup>333</sup> In 2001, Tennessee ranked 27th in oil production out of 31 oil producing States. The State produced approximately 350,000 bbls of oil, less than two one-hundredths of total U.S. oil production in 2001 (2,117,511,000 bbls). In 2001, Kentucky ranked 20th in oil production out of 31 oil producing States. The State produced approximately 3 million bbls of oil, or less than two-tenths of the total U.S. oil production in 2001 (2,117,511,000 bbls). Energy Information Administration. Production of Crude Oil by State, 2001. Accessed at <http://www/eia.doe.gov/neic/rankings/crudebystate.htm> on June 4, 2003.

threshold (Kentucky produced 7,671 bbls per day in 2001 and Tennessee produced 1,059 bbls per day).<sup>334</sup>

305. As Exhibit C-2 illustrates, the Tennessee and Kentucky counties containing proposed critical habitat collectively produce less than 0.8 million Mcf of natural gas on an annual basis.<sup>335</sup> Therefore, should section 7 implementation cause the abandonment of future development of 35 to 50 natural gas wells within McCreary, Fentress, Morgan or Scott counties, it is unlikely that natural gas production will decrease by more than the threshold of 25 million Mcf per year.

<b>Exhibit C-2</b>						
<b>HISTORIC NATURAL GAS PRODUCTION (FENTRESS, MORGAN, AND SCOTT COUNTIES, TENNESSEE, AND MCCREARY COUNTY, KENTUCKY), Mcf (thousand cubic feet)</b>						
<b>Year</b>	<b>McCreary County</b>	<b>Fentress County</b>	<b>Morgan County</b>	<b>Scott County</b>	<b>Total Mcf</b>	<b>Total Million Mcf</b>
1997	22,340	64,401	301,328	331,072	719,141	0.7
1998	43,263	75,408	289,483	314,213	722,367	0.7
1999	139,950	62,494	298,609	335,990	837,043	0.8
2000	217,974	55,018	277,140	307,739	857,871	0.9
2001	229,874	46,422	280,191	245,831	802,318	0.8
Average	130,680	60,749	289,350	306,969	787,748	0.8

Source: Brandon Nuttall, Kentucky Geological Survey, Lexington, Kentucky. Data source: Kentucky Revenue Cabinet, Severance Tax Division.  
 Oil and Gas Activity in Tennessee During 1997, by Ronald P. Zurawski, State Geologist and Director, Tennessee Division of Geology, Nashville, Tennessee.  
 Oil and Gas Activity in Tennessee During 1998, by Ronald P. Zurawski, State Geologist and Director, Tennessee Division of Geology, Nashville, Tennessee.  
 Tennessee Statistical Energy Data, Energy Division, Tennessee Department of Economic & Community Development, Nashville, Tennessee.  
 Oil and Gas Activity in Tennessee During 2000, by Ronald P. Zurawski, State Geologist and Director, Tennessee Division of Geology, Nashville, Tennessee.  
 Oil and Gas Activity in Tennessee During 2001, by Ronald P. Zurawski, State Geologist and Director, Tennessee Division of Geology, Nashville, Tennessee.

<sup>334</sup> Oil and Gas Activity In Tennessee During 2001, by Ronald P. Zurawski, State Geologist and Director, Tennessee Division of Geology, Nashville, Tennessee; Kentucky 2001 Oil Production. Accessed at: <http://www.uky.edu/KGS/emsweb/data/2001/oilinfo2k1.html>

<sup>335</sup> In 2001, Tennessee ranked 24th in natural gas production out of 32 natural gas producing States. The State produced approximately 2 million Mcf of natural gas, about one one-hundredth of total U.S. natural gas production in 2001 (20,656,358,000 Mcf). In 2001, Kentucky ranked 18th in natural gas production out of 32 natural gas producing States. The State produced approximately 82 million Mcf of natural gas, or about four-tenths of the total U.S. natural gas production in 2001 (20,656,358,000 Mcf). Energy Information Administration, Natural Gas Annual 2001. Accessed at: [http://www.eia.doe.gov/pub/oil\\_gas/natural\\_gas/data\\_publications/natural\\_gas\\_monthly/current/pdf/table\\_07.pdf](http://www.eia.doe.gov/pub/oil_gas/natural_gas/data_publications/natural_gas_monthly/current/pdf/table_07.pdf), June 4, 2003.

306. As Exhibit C-3 illustrates, the Tennessee counties containing proposed critical habitat collectively produce approximately 0.4 million tons of coal on an annual basis. Therefore, should section 7 implementation cause the abandonment of future development of any two mines within Cumberland, Fentress, Morgan or Scott County, it is unlikely that coal production will decrease by more than the threshold of 5 million tons per year. In fact, the entire State of Tennessee produces less coal than the 5 million ton threshold (the State produced 3.3 million tons in 2001).<sup>336</sup>

<b>Exhibit C-3</b>						
<b>HISTORIC COAL PRODUCTION (CUMBERLAND, FENTRESS, MORGAN, AND SCOTT COUNTIES, TENNESSEE), thousand short tons</b>						
<b>Year</b>	<b>Cumberland County</b>	<b>Fentress County</b>	<b>Morgan County</b>	<b>Scott County</b>	<b>Total thousand short tons</b>	<b>Total tons</b>
1997	0	288	56	108	452	452,000
1998	86	211	11	47	355	355,000
1999	256	3	8	168	435	435,000
2000	265	12	31	59	367	367,000
2001	268	83	0	22	373	373,000
Average	175	119	21	81	396	396,400

Source: Coal Production and Number of Mines by State, County, and Mine Type, 2001, accessed at <http://www.eia.doe.gov/cneaf/coal/page/acr/table2.html>.  
Coal Industry Annual 1997, 1998, 1999, and 2000. Energy Information Administration, Office of Coal, Nuclear, Electric and alternative fuels, US Department of Energy, accessed at <http://tonto.eia.doe.gov/FTPROOT/coal/058497.pdf>, <http://tonto.eia.doe.gov/FTPROOT/coal/058498.pdf>, <http://tonto.eia.doe.gov/FTPROOT/coal/058498.pdf>, and <http://tonto.eia.doe.gov/FTPROOT/coal/05842000.pdf>

<sup>336</sup> Coal Production and Number of Mines by State, County, and Mine Type, 2001, found at <http://www.eia.doe.gov/cneaf/coal/page/acr/table2.html>

## **Evaluation of Whether Section 7 Implementation will Result in a Reduction in Electricity Production in Excess of 500 Megawatts of Installed Capacity**

307. Installed capacity is “the total manufacturer-rated capacity for equipment such as turbines, generators, condensers, transformers, and other system components” and represents the maximum rate of flow of energy from the plant or the maximum output of the plant.<sup>337</sup> The Old Columbia dam has 0.3 megawatts (MW) of installed capacity and in five years may have 0.6 MW of installed capacity. The average annual generation of the Dam is 1,994,400 Kwhr and may increase to 3,555,000 in the next five years.
308. The total installed capacity of the Old Columbia Dam is 0.6 MW (600 KW) of hydroelectricity. The average annual generation at these facilities could be up to 3.6 million KWhr. The impact threshold for installed capacity is 500 MW (500,000 KW) and the threshold for annual generation is one billion KWhr. The impact to hydropower production is therefore not expected to surpass the threshold of 500 MW.

## **Evaluation of Whether Section 7 Implementation will Result in an Increase in the Cost of Energy Production in Excess of One Percent**

- 1) In order to determine whether implementation of section 7 of the Act will result in an increase in the cost of energy production, this analysis considers the maximum possible increase in energy production costs. Under the high cost scenario, all decreased hydropower generation is substituted with the more expensive, but most common, coal production. Coal production has production costs of \$0.02 per kilowatt-hour, \$0.01 greater than the cost of hydropower production. Under this scenario, \$36,000 in additional production costs will be incurred, an increase in production costs of approximately 0.002 percent. This analysis therefore does not anticipate an increase in the cost of energy production in excess of one percent. Exhibit C-4 summarizes the cost of energy production in Tennessee according to two scenarios, Scenario I in which there is no change due to critical habitat, and Scenario II in which the lost power generation due to the designation of critical habitat is substituted with coal production.

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<sup>337</sup> California Power Plants, In-State Installed Capacity and Dependable Capacity, California Energy Commission, <http://www.energy.ca.gov/electricity/capacity.html>.

<b>Exhibit C-4</b>				
<b>AVERAGE PRODUCTION AND ASSOCIATED COSTS FOR ENERGY PRODUCERS IN TENNESSEE</b>				
<b>Fuel Type</b>	<b>Net Generation (1000 KWhrs)</b>	<b>Weighted Average of Total Production</b>	<b>Production Costs (\$/KWhr)</b>	<b>Total Costs (1,000 dollars)*</b>
<b>SCENARIO I</b>				
Hydro	5,665,000	5.91%	\$0.01	\$56,650
Gas	648,000	0.68%	\$0.04	\$25,920
Coal	62,349,000	65.00%	\$0.02	\$1,246,980
Petroleum	549,000	0.57%	\$0.02	\$10,980
Nuclear	25,825,000	26.92%	\$0.02	\$516,500
<b>Total*</b>	<b>95,918,000</b>	<b>99.08%</b>		<b>\$1,857,030</b>
<b>SCENARIO II</b>				
Hydro	5,661,445	5.90%	\$0.01	\$56,614
Gas	648,000	0.68%	\$0.04	\$25,920
Coal	62,352,555	65.01%	\$0.02	\$1,247,051
Petroleum	549,000	0.57%	\$0.02	\$10,980
Nuclear	25,825,000	26.92%	\$0.02	\$516,500
<b>Total*</b>	<b>95,918,000</b>	<b>99.08%</b>		<b>\$1,857,066</b>
<p>Note: The net generation and weighted average of total production does not sum to 95,918,000 or 100 percent as 882 million kilowatts of net generation are produced by "other" sources.</p> <p>*Totals may not sum due to rounding.</p> <p>Sources: Federal Energy Regulatory Commission, "Hydroelectric Power Resources of the United States: Developed and Undeveloped," January 1, 1992. Electric Power Annual 2000: Volume I, Energy Information Administration, U.S. Department of Energy, August 2001, accessed at <a href="http://www.eia.doe.gov/cneaf/electricity/epav2/html_tables/epav2t13p.html">http://www.eia.doe.gov/cneaf/electricity/epav2/html_tables/epav2t13p.html</a>; State Electricity Profiles, Alabama and Georgia, Energy Information Administration, U.S. Department of Energy, May 2003; Average Operating Expenses for Major U.S. Investor-Owned Electric Utilities, 1996 Through 2000, <a href="http://www.eia.doe.gov/cneaf/electricity/epav2/html_tables/epav2t13pl.html">http://www.eia.doe.gov/cneaf/electricity/epav2/html_tables/epav2t13pl.html</a>; New York Mercantile Exchange, Natural Gas Futures accessed at <a href="http://nymex.com/jsp/markets/ng_fut_csf.jsp">http://nymex.com/jsp/markets/ng_fut_csf.jsp</a>.</p>				

## **Evaluation of Whether Section 7 Implementation will Result in an Increase in the Cost of Energy Distribution in Excess of One Percent**

309. As described in Section 4.2.11, TVA anticipates 38 informal consultations on transmission line construction and maintenance with respect to the mussels during the next ten years. The total administrative costs incurred by TVA as a result of section 7 implementation are \$35,000, while costs associated with project modifications are anticipated to total \$38,000. In 2002, total operating expenses for TVA were \$5.2 billion.<sup>338</sup> Thus, the total costs incurred by TVA as a result of section 7 over ten years (\$73,000) are less than one ten-thousandth of one percent of TVA's operating expenses. The impact to energy distribution is therefore not anticipated to exceed the one percent threshold.

### **Summary**

310. Even in the worst case scenario, reductions in the production of crude oil, coal, or natural gas, and increases in the cost of energy production and distribution resulting from the implementation of section 7 for the mussels are not expected to have a "significant adverse effect," as defined by the Office of Management and Budget, on the supply, distribution, cost, or use of energy.

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<sup>338</sup> Tennessee Valley Authority. 2002. 2002 Annual Report, accessed at <http://www.tva.com/finance/reports/pdf/fy2002ar.pdf>

**APPENDIX D:**

**SECTION 7 AND TECHNICAL ASSISTANCE COSTS FOR THE MUSSELS BY UNIT AND ACTIVITY**

TOTAL COSTS FOR THE MUSSELS (OVER TEN YEARS)								
Unit/Area	Activity (Action Agency)	Section 7 Impact	Range	Costs to the Service	Costs to the Action Agency	Costs to Third Parties	Project Mods	Total Section 7 Costs
1- Duck River	Road and Bridge Construction (TDOT)	5 Formal Consultations	Low	\$3,800	\$19,500	\$47,500	\$9,000	\$79,800
			High	\$22,700	\$32,500	\$53,500	\$75,000	\$184,000
	Road and Bridge Construction (TDOT)	7 - 19 Informal Consultations	Low	\$210	\$9,100	\$8,400	\$12,600	\$30,300
			High	\$3,610	\$74,100	\$181,000	\$285,000	\$543,000
	Road and Bridge Construction (USACE)	2 Informal Consultations	Low	\$60	\$2,600	\$2,400	\$0	\$5,060
			High	\$380	\$7,800	\$19,000	\$0	\$27,200
	Agriculture (USACE/TVA)	2 Informal Consultations	Low	\$60	\$2,600	\$2,400	\$0	\$5,060
			High	\$380	\$7,800	\$19,000	\$0	\$27,200
	Gravel Dredging (USACE)	2 - 5 Informal Consultations	Low	\$60	\$2,600	\$2,400	\$0	\$5,060
			High	\$950	\$19,500	\$47,500	\$0	\$68,000
	Utilities (USACE)	1 - 2 Formal Consultations	Low	\$760	\$3,900	\$9,500	\$0	\$14,200
			High	\$9,080	\$13,000	\$21,400	\$0	\$43,500
	Utilities (USACE)	4 - 8 Informal Consultations	Low	\$120	\$5,200	\$4,800	\$0	\$10,100
			High	\$1,520	\$31,200	\$76,000	\$0	\$109,000
	Utilities (TVA)	6 Informal Consultations	Low	\$180	\$7,800	\$0	\$6,000	\$14,000
			High	\$180	\$7,800	\$0	\$6,000	\$14,000

**TOTAL COSTS FOR THE MUSSELS  
(OVER TEN YEARS)**

<b>Unit/Area</b>	<b>Activity (Action Agency)</b>	<b>Section 7 Impact</b>	<b>Range</b>	<b>Costs to the Service</b>	<b>Costs to the Action Agency</b>	<b>Costs to Third Parties</b>	<b>Project Mods</b>	<b>Total Section 7 Costs</b>	
	Conservation/ Recreation (TVA)	1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$380	\$7,800	\$19,000	\$0	\$27,200	
	Conservation/ Recreation (FWS)	6 Informal Consultations	Low	\$180	\$0	\$0	\$0	\$180	
			High	\$1,140	\$0	\$0	\$0	\$1,140	
	Water Quality Activities (USEPA)	2 Formal Consultations	Low	\$1,520	\$7,800	\$11,800	\$0	\$21,100	
			High	\$9,080	\$13,000	\$33,400	\$0	\$55,500	
	Dam/Reservoir (USACE/TVA)	1 Formal Consultation	Low	\$4,540	\$6,500	\$10,700	\$75,500	\$97,200	
			High	\$0	\$0	\$0	\$102,545	\$103,000	
	NPDES Permit Review	3 Technical Assistance Efforts	Low	\$30	\$0	\$1,800	\$0	\$1,830	
			High	\$30	\$0	\$4,500	\$0	\$4,530	
	2- Bear Creek	Road and Bridge Construction (MS FHWA)	1 Informal Consultation	Low	\$30	\$1,300	\$1,200	\$102,000	\$104,000
				High	\$190	\$3,900	\$9,500	\$115,000	\$129,000
Road and Bridge Construction (AL DOT)		2 Informal Consultations	Low	\$60	\$2,600	\$2,400	\$204,000	\$209,000	
			High	\$380	\$7,800	\$19,000	\$230,000	\$257,000	
Road and Bridge Construction (USACE)		1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$380	\$7,800	\$19,000	\$0	\$27,200	
Agriculture (TVA/USACE)		1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$380	\$7,800	\$19,000	\$0	\$27,200	

**TOTAL COSTS FOR THE MUSSELS  
(OVER TEN YEARS)**

<b>Unit/Area</b>	<b>Activity (Action Agency)</b>	<b>Section 7 Impact</b>	<b>Range</b>	<b>Costs to the Service</b>	<b>Costs to the Action Agency</b>	<b>Costs to Third Parties</b>	<b>Project Mods</b>	<b>Total Section 7 Costs</b>	
	Utilities (USACE)	1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$380	\$7,800	\$19,000	\$0	\$27,200	
	Utilities (TVA)	4 Informal Consultations	Low	\$120	\$5,200	\$0	\$4,000	\$9,320	
			High	\$120	\$5,200	\$0	\$4,000	\$9,320	
	Conservation/ Recreation (TVA)	1 Formal Consultation	Low	\$760	\$3,900	\$9,500	\$0	\$14,200	
			High	\$4,540	\$6,500	\$10,700	\$0	\$21,700	
	Conservation/ Recreation (TVA)	1 Informal Consultation	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$190	\$3,900	\$9,500	\$0	\$13,600	
	Water Quality Activities (USEPA)	1 Formal Consultation	Low	\$760	\$3,900	\$5,900	\$0	\$10,600	
			High	\$4,540	\$6,500	\$16,700	\$0	\$27,700	
	NPDES Permit Review	12 - 32 Technical Assistance Efforts	Low	\$120	\$0	\$7,200	\$0	\$7,320	
			High	\$320	\$0	\$48,000	\$0	\$48,300	
	3- Obed River	Road and Bridge Construction (TDOT)	1 - 2 Formal Consultations	Low	\$760	\$3,900	\$9,500	\$1,800	\$16,000
				High	\$9,080	\$13,000	\$21,400	\$30,000	\$73,500
Road and Bridge Construction (TDOT)		6 - 7 Informal Consultations	Low	\$180	\$7,800	\$7,200	\$10,800	\$26,000	
			High	\$1,330	\$27,300	\$66,500	\$105,000	\$100,000	
Road and Bridge Construction (USACE)		1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$380	\$7,800	\$19,000	\$0	\$27,200	

**TOTAL COSTS FOR THE MUSSELS  
(OVER TEN YEARS)**

<b>Unit/Area</b>	<b>Activity (Action Agency)</b>	<b>Section 7 Impact</b>	<b>Range</b>	<b>Costs to the Service</b>	<b>Costs to the Action Agency</b>	<b>Costs to Third Parties</b>	<b>Project Mods</b>	<b>Total Section 7 Costs</b>	
	Agriculture (NRCS)	20 - 30 Informal Consultations	Low	\$1,240	\$62,800	\$32,800	\$0	\$94,800	
			High	\$1,860	\$94,200	\$46,200	\$0	\$142,000	
	National Park Activities (NPS)	1 Informal Consultation	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$30	\$1,300	\$1,200	\$0	\$2,530	
	Coal Mining (OSM)	0 - 3 Informal Consultations	Low	\$0	\$0	\$0	\$0	\$0	
			High	\$250	\$6,500	\$11,900	\$0	\$18,700	
	Utilities (USACE)	1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$380	\$7,800	\$19,000	\$0	\$27,200	
	Conservation/ Recreation (FWS)	3 Informal Consultations	Low	\$90	\$0	\$0	\$0	\$90	
			High	\$570	\$0	\$0	\$0	\$570	
	4- Powell River	Road and Bridge Construction (TDOT)	0 - 4 Informal Consultations	Low	\$0	\$0	\$0	\$0	\$0
				High	\$760	\$15,600	\$3,800	\$60,000	\$114,000
Road and Bridge Construction (VDOT)		17 Formal Consultations	Low	\$12,900	\$66,300	\$216,000	\$230,000	\$525,000	
			High	\$77,200	\$111,000	\$236,000	\$230,000	\$653,000	
Road and Bridge Construction (USACE)		1 Formal Consultation	Low	\$760	\$3,900	\$9,500	\$0	\$14,200	
			High	\$4,540	\$6,500	\$10,700	\$0	\$21,700	
Road and Bridge Construction (USACE)		1 Informal Consultation	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$190	\$3,900	\$9,500	\$0	\$13,600	

**TOTAL COSTS FOR THE MUSSELS  
(OVER TEN YEARS)**

<b>Unit/Area</b>	<b>Activity (Action Agency)</b>	<b>Section 7 Impact</b>	<b>Range</b>	<b>Costs to the Service</b>	<b>Costs to the Action Agency</b>	<b>Costs to Third Parties</b>	<b>Project Mods</b>	<b>Total Section 7 Costs</b>
	Agriculture (NRCS)	10 Informal Consultations	Low	\$620	\$31,400	\$15,400	\$0	\$47,400
			High	\$620	\$31,400	\$15,400	\$0	\$47,400
	Agriculture (TVA/USACE)	3 - 5 Informal Consultations	Low	\$90	\$3,900	\$3,600	\$0	\$7,590
			High	\$950	\$19,500	\$47,500	\$0	\$68,000
	Utilities (USACE)	0 - 1 Formal Consultation	Low	\$0	\$0	\$0	\$0	\$0
			High	\$4,540	\$6,500	\$10,700	\$0	\$21,700
	Utilities (USACE)	16 Informal Consultations	Low	\$480	\$20,800	\$19,200	\$0	\$40,500
			High	\$3,040	\$62,400	\$152,000	\$0	\$217,000
	Conservation/ Recreation (FWS)	4 Informal Consultations	Low	\$120	\$0	\$0	\$0	\$120
			High	\$760	\$0	\$0	\$0	\$760
	Conservation/ Recreation (TVA)	6 Informal Consultations	Low	\$180	\$7,800	\$7,200	\$0	\$15,200
			High	\$1,140	\$23,400	\$57,000	\$0	\$81,500
	NPDES Permit Review	5 - 9 Technical Assistance Efforts	Low	\$50	\$0	\$3,000	\$0	\$3,050
			High	\$90	\$0	\$13,500	\$0	\$13,600
5- Clinch River	Road and Bridge Construction (TDOT)	0 - 2 Informal Consultations	Low	\$0	\$0	\$0	\$0	\$0
			High	\$380	\$7,800	\$19,000	\$30,000	\$57,200
	Road and Bridge Construction (VDOT)	11 Formal Consultations	Low	\$8,360	\$42,900	\$140,000	\$149,000	\$340,000
			High	\$50,000	\$71,500	\$153,000	\$149,000	\$423,000

**TOTAL COSTS FOR THE MUSSELS  
(OVER TEN YEARS)**

<b>Unit/Area</b>	<b>Activity (Action Agency)</b>	<b>Section 7 Impact</b>	<b>Range</b>	<b>Costs to the Service</b>	<b>Costs to the Action Agency</b>	<b>Costs to Third Parties</b>	<b>Project Mods</b>	<b>Total Section 7 Costs</b>
	Road and Bridge Construction (USACE)	1 Formal Consultation	Low	\$760	\$3,900	\$9,500	\$0	\$14,200
			High	\$4,540	\$6,500	\$10,700	\$0	\$21,700
	Road and Bridge Construction (USACE)	0 - 1 Informal Consultation	Low	\$0	\$0	\$0	\$0	\$0
			High	\$190	\$3,900	\$9,500	\$0	\$13,600
	Agriculture (NRCS)	20 - 25 Informal Consultations	Low	\$1,240	\$62,800	\$30,800	\$0	\$94,800
			High	\$1,550	\$78,500	\$38,500	\$0	\$119,000
	Agriculture (TVA/USACE)	3 - 5 Informal Consultations	Low	\$90	\$3,900	\$3,600	\$0	\$7,590
			High	\$950	\$19,500	\$47,500	\$0	\$68,000
	Coal Mining Permit Review	300 Technical Assistance Efforts	Low	\$3,000	\$0	\$180,000	\$0	\$183,000
			High	\$3,000	\$0	\$450,000	\$0	\$453,000
	Utilities (USACE)	0 - 1 Formal Consultations	Low	\$0	\$0	\$0	\$0	\$0
			High	\$4,540	\$6,500	\$10,700	\$0	\$21,700
	Utilities (USACE)	16 Informal Consultations	Low	\$480	\$20,800	\$19,200	\$0	\$40,500
			High	\$3,040	\$62,400	\$152,000	\$0	\$217,000
	Utilities (TVA)	6 Informal Consultations	Low	\$180	\$7,800	\$0	\$6,000	\$14,000
			High	\$180	\$7,800	\$0	\$6,000	\$14,000
	Conservation/ Recreation (TVA)	12 - 17 Informal Consultations	Low	\$360	\$15,600	\$14,400	\$0	\$30,400
			High	\$3,770	\$66,300	\$162,000	\$0	\$231,000
	Conservation/ Recreation (FWS)	2 Informal Consultations	Low	\$60	\$0	\$0	\$0	\$60
			High	\$380	\$0	\$0	\$0	\$380

**TOTAL COSTS FOR THE MUSSELS  
(OVER TEN YEARS)**

<b>Unit/Area</b>	<b>Activity (Action Agency)</b>	<b>Section 7 Impact</b>	<b>Range</b>	<b>Costs to the Service</b>	<b>Costs to the Action Agency</b>	<b>Costs to Third Parties</b>	<b>Project Mods</b>	<b>Total Section 7 Costs</b>
	Water Quality (USEPA)	1 Formal Consultation	Low	\$760	\$3,900	\$5,900	\$0	\$10,600
			High	\$4,540	\$6,500	\$16,700	\$0	\$27,700
	NPDES Permit Review	2 Informal Consultation	Low	\$60	\$2,600	\$8,400	\$0	\$11,060
			High	\$380	\$7,800	\$31,000	\$0	\$39,180
	NPDES Permit Review	3 - 6 Technical Assistance Efforts	Low	\$30	\$0	\$1,800	\$0	\$1,830
			High	\$60	\$0	\$9,000	\$0	\$9,060
6- Nolichucky River	Road and Bridge Construction (TDOT)	0 - 2 Informal Consultations	Low	\$0	\$0	\$0	\$0	\$0
			High	\$380	\$7,800	\$19,000	\$30,000	\$51,200
	Road and Bridge Construction (USACE)	1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530
			High	\$380	\$7,800	\$19,000	\$0	\$27,200
	Utilities (USACE)	1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530
			High	\$380	\$7,800	\$19,000	\$0	\$27,200
	Conservation/ Recreation (TVA)	2 - 4 Informal Consultations	Low	\$60	\$2,600	\$2,400	\$0	\$5,060
			High	\$760	\$15,600	\$38,000	\$0	\$54,400
	Conservation/ Recreation (FWS)	6 Informal Consultations	Low	\$180	\$0	\$0	\$0	\$180
			High	\$1,140	\$0	\$0	\$0	\$1,140
	Water Quality (USEPA)	1 Formal Consultation	Low	\$760	\$3,900	\$5,900	\$0	\$10,600
			High	\$4,540	\$6,500	\$16,700	\$0	\$27,700
	NPDES Permit Review	1 Technical Assistance Effort	Low	\$10	\$0	\$600	\$0	\$610
			High	\$10	\$0	\$1,500	\$0	\$1,510

**TOTAL COSTS FOR THE MUSSELS  
(OVER TEN YEARS)**

<b>Unit/Area</b>	<b>Activity (Action Agency)</b>	<b>Section 7 Impact</b>	<b>Range</b>	<b>Costs to the Service</b>	<b>Costs to the Action Agency</b>	<b>Costs to Third Parties</b>	<b>Project Mods</b>	<b>Total Section 7 Costs</b>
7- Beech Creek	Road and Bridge Construction (TDOT)	0 - 1 Informal Consultation	Low	\$0	\$0	\$0	\$0	\$0
			High	\$190	\$3,900	\$9,500	\$15,000	\$28,600
	Road and Bridge Construction (USACE)	1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530
			High	\$380	\$7,800	\$19,000	\$0	\$27,200
	Agriculture (NRCS)	20 - 30 Informal Consultations	Low	\$1,240	\$62,800	\$30,800	\$0	\$94,800
			High	\$1,860	\$94,200	\$46,200	\$0	\$142,000
	Utilities (USACE)	1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530
			High	\$380	\$7,800	\$19,000	\$0	\$27,200
	Conservation/ Recreation (FWS)	1 Informal Consultation	Low	\$30	\$0	\$0	\$0	\$30
			High	\$190	\$0	\$0	\$0	\$190
8- Rock Creek	Road and Bridge Construction (USACE)	1 Informal Consultation	Low	\$30	\$1,300	\$1,200	\$0	\$2,530
			High	\$190	\$3,900	\$9,500	\$0	\$13,600
	National Forest Activities (USFS)	0 - 3 Formal Consultations	Low	\$0	\$0	\$0	\$0	\$0
			High	\$15,100	\$63,700	\$0	\$0	\$78,800
	National Forest Activities (USFS)	36 - 33 Informal Consultations	Low	\$1,470	\$185,000	\$0	\$0	\$186,000
			High	\$6,180	\$536,000	\$0	\$0	\$542,000
	Coal Mining	0 - 6 Technical Assistance Efforts	Low	\$0	\$0	\$0	\$0	\$0
			High	\$60	\$0	\$9,000	\$0	\$9,060

TOTAL COSTS FOR THE MUSSELS (OVER TEN YEARS)								
Unit/Area	Activity (Action Agency)	Section 7 Impact	Range	Costs to the Service	Costs to the Action Agency	Costs to Third Parties	Project Mods	Total Section 7 Costs
	Utilities (USACE)	1 Informal Consultation	Low	\$30	\$1,300	\$1,200	\$0	\$2,530
			High	\$190	\$3,900	\$9,500	\$0	\$13,600
	NPDES Permit Review	1 - 3 Technical Assistance Efforts	Low	\$10	\$0	\$600	\$0	\$610
			High	\$30	\$0	\$4,500	\$0	\$4,530
9- Big South Fork	Road and Bridge Construction (TDOT)	1 - 2 Formal Consultations	Low	\$760	\$3,900	\$9,500	\$1,800	\$16,000
			High	\$9,080	\$13,000	\$21,400	\$30,000	\$73,500
	Road and Bridge Construction (TDOT)	5 - 8 Informal Consultations	Low	\$150	\$6,500	\$6,000	\$9,000	\$21,700
			High	\$1,520	\$31,200	\$76,000	\$120,000	\$229,000
	Road and Bridge Construction (KTC)	3 Formal Consultations	Low	\$2,280	\$11,700	\$28,500	\$200,000	\$242,000
			High	\$13,600	\$19,500	\$32,100	\$200,000	\$365,000
	Road and Bridge Construction (USACE)	1 Informal Consultation	Low	\$30	\$1,300	\$1,200	\$0	\$2,530
			High	\$190	\$3,900	\$9,500	\$0	\$13,600
	National Park Activities (NPS)	1 Formal Consultation	Low	\$760	\$3,900	\$9,500	\$0	\$14,200
			High	\$4,540	\$6,500	\$10,700	\$0	\$21,700
	National Park Activities (NPS)	7 Informal Consultations	Low	\$210	\$9,100	\$8,400	\$0	\$17,700
			High	\$1,330	\$27,300	\$66,500	\$0	\$95,100
	Coal Mining (OSM)	11 - 21 Informal Consultations	Low	\$330	\$14,300	\$13,200	\$0	\$27,800
			High	\$790	\$39,900	\$33,500	\$0	\$64,200

**TOTAL COSTS FOR THE MUSSELS  
(OVER TEN YEARS)**

<b>Unit/Area</b>	<b>Activity (Action Agency)</b>	<b>Section 7 Impact</b>	<b>Range</b>	<b>Costs to the Service</b>	<b>Costs to the Action Agency</b>	<b>Costs to Third Parties</b>	<b>Project Mods</b>	<b>Total Section 7 Costs</b>	
	Oil and Gas Development (NPS)	35 - 50 Informal Consultations	Low	\$6,650	\$368,000	\$102,000	\$0	\$476,000	
			High	\$9,500	\$525,000	\$145,000	\$0	\$680,000	
	Utilities (USACE)	1 Informal Consultation	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$190	\$3,900	\$9,500	\$0	\$13,600	
	Utilities (TVA)	4 Informal Consultations	Low	\$120	\$5,200	\$0	\$4,000	\$9,320	
			High	\$120	\$5,200	\$0	\$4,000	\$9,320	
	Conservation/ Recreation (USACE)	1 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$190	\$3,900	\$9,500	\$0	\$13,600	
	NPDES Permit Review	1 Technical Assistance Effort	Low	\$10	\$0	\$600	\$0	\$610	
			High	\$10	\$0	\$1,500	\$0	\$1,510	
	Dam/Reservoir (USACE/TVA)	Project relocation	Low	\$0	\$0	\$0	\$2,230,000	\$2,230,000	
			High	\$0	\$0	\$0	\$4,220,000	\$4,220,000	
	10- Buck Creek	Road and Bridge Construction (KTC)	1 Formal Consultation	Low	\$760	\$3,900	\$9,500	\$100,000	\$114,000
				High	\$4,540	\$6,500	\$10,700	\$100,000	\$122,000
Road and Bridge Construction (USACE)		1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$380	\$7,800	\$19,000	\$0	\$27,200	
Agriculture (NRCS)		2 - 4 Formal Consultations	Low	\$1,520	\$21,000	\$5,800	\$0	\$28,300	
			High	\$18,200	\$52,400	\$16,400	\$0	\$87,000	
Agriculture (NRCS)		10 - 20 Informal Consultations	Low	\$620	\$31,400	\$15,400	\$0	\$47,400	
			High	\$1,240	\$62,800	\$30,800	\$0	\$94,800	

**TOTAL COSTS FOR THE MUSSELS  
(OVER TEN YEARS)**

<b>Unit/Area</b>	<b>Activity (Action Agency)</b>	<b>Section 7 Impact</b>	<b>Range</b>	<b>Costs to the Service</b>	<b>Costs to the Action Agency</b>	<b>Costs to Third Parties</b>	<b>Project Mods</b>	<b>Total Section 7 Costs</b>	
	Agriculture (USACE)	1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$380	\$7,800	\$19,000	\$0	\$27,200	
	Gravel Dredging (USACE)	5 - 10 Formal Consultations	Low	\$3,800	\$19,500	\$47,500	\$0	\$70,800	
			High	\$45,400	\$65,000	\$107,000	\$0	\$217,000	
	Utilities (USACE)	1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$380	\$7,800	\$19,000	\$0	\$27,200	
	Conservation/ Recreation (FWS)	4 Informal Consultations	Low	\$120	\$0	\$0	\$0	\$120	
			High	\$760	\$0	\$0	\$0	\$120	
	NPDES Permit Review	2 - 5 Technical Assistance Efforts	Low	\$20	\$0	\$1,200	\$0	\$1,220	
			High	\$50	\$0	\$7,500	\$0	\$7,550	
	11- Sinking Creek	Road and Bridge Construction (KTC)	1 Formal Consultation	Low	\$760	\$3,900	\$9,500	\$100,000	\$114,000
				High	\$4,540	\$6,500	\$10,700	\$100,000	\$122,000
Road and Bridge Construction (USACE)		1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$380	\$7,800	\$19,000	\$0	\$27,200	
Agriculture (NRCS)		2 - 4 Formal Consultations	Low	\$1,520	\$21,000	\$5,800	\$0	\$28,300	
			High	\$18,200	\$52,400	\$16,400	\$0	\$87,000	
Agriculture (NRCS)		8 - 15 Informal Consultations	Low	\$496	\$25,100	\$12,300	\$0	\$37,900	
			High	\$930	\$47,100	\$23,100	\$0	\$71,100	
National Forest Activities (USFS)		0 - 3 Formal Consultations	Low	\$0	\$0	\$0	\$0	\$0	
			High	\$15,100	\$63,700	\$0	\$0	\$78,800	

**TOTAL COSTS FOR THE MUSSELS  
(OVER TEN YEARS)**

<b>Unit/Area</b>	<b>Activity (Action Agency)</b>	<b>Section 7 Impact</b>	<b>Range</b>	<b>Costs to the Service</b>	<b>Costs to the Action Agency</b>	<b>Costs to Third Parties</b>	<b>Project Mods</b>	<b>Total Section 7 Costs</b>	
	National Forest Activities (USFS)	36 - 33 Informal Consultations	Low	\$1,470	\$185,000	\$0	\$0	\$186,000	
			High	\$6,120	\$536,000	\$0	\$0	\$542,000	
	Coal Mining Permit Review	0 - 6 Technical Assistance Efforts	Low	\$0	\$0	\$0	\$0	\$0	
			High	\$60	\$0	\$9,000	\$0	\$9,060	
	Utilities (USACE)	1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$380	\$7,800	\$19,000	\$0	\$27,200	
	NPDES Permit Review	1 - 3 Technical Assistance Efforts	Low	\$10	\$0	\$600	\$0	\$610	
			High	\$30	\$0	\$4,500	\$0	\$4,530	
	12- Marsh Creek	Road and Bridge Construction (USACE)	1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530
				High	\$380	\$7,800	\$19,000	\$0	\$27,200
		Agriculture (NRCS)	2 - 4 Formal Consultations	Low	\$1,520	\$21,000	\$5,800	\$0	\$28,300
				High	\$18,200	\$52,400	\$16,400	\$0	\$87,000
Agriculture (NRCS)		8 - 15 Informal Consultations	Low	\$496	\$25,100	\$12,300	\$0	\$37,900	
			High	\$930	\$47,100	\$23,100	\$0	\$71,100	
National Forest Activities (USFS)		0 - 3 Formal Consultations	Low	\$0	\$0	\$0	\$0	\$0	
			High	\$15,100	\$63,700	\$0	\$0	\$78,800	
National Forest Activities (USFS)		36 - 33 Informal Consultations	Low	\$1,470	\$185,000	\$0	\$0	\$186,000	
			High	\$6,120	\$536,000	\$0	\$0	\$542,000	
Utilities (USACE)		1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$380	\$7,800	\$19,000	\$0	\$27,200	

TOTAL COSTS FOR THE MUSSELS (OVER TEN YEARS)								
Unit/Area	Activity (Action Agency)	Section 7 Impact	Range	Costs to the Service	Costs to the Action Agency	Costs to Third Parties	Project Mods	Total Section 7 Costs
	NPDES Permit Review	1 - 3 Technical Assistance Efforts	Low	\$10	\$0	\$600	\$0	\$610
			High	\$30	\$0	\$4,500	\$0	\$4,530
13- Laurel Fork	Road and Bridge Construction (USACE)	1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530
			High	\$380	\$7,800	\$19,000	\$0	\$27,200
	Agriculture (NRCS)	10 Informal Consultations	Low	\$620	\$31,400	\$15,400	\$0	\$47,400
			High	\$620	\$31,400	\$15,400	\$0	\$47,400
	Coal Mining Permit Review	0 - 6 Technical Assistance Efforts	Low	\$0	\$0	\$0	\$0	\$0
			High	\$60	\$0	\$9,000	\$0	\$9,060
	Utilities (USACE)	1 - 2 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530
			High	\$380	\$7,800	\$19,000	\$0	\$27,200
	NPDES Permit Review	3 - 5 Technical Assistance Efforts	Low	\$30	\$0	\$1,800	\$0	\$1,830
			High	\$50	\$0	\$7,500	\$0	\$7,550
1- French Broad	Road and Bridge Construction (TDOT)	5 - 10 Formal Consultations	Low	\$3,800	\$19,500	\$47,500	\$9,000	\$79,800
			High	\$45,400	\$65,000	\$107,000	\$150,000	\$367,000
	Road and Bridge Construction (TDOT)	15 - 20 Informal Consultations	Low	\$450	\$19,500	\$18,000	\$27,000	\$65,000
			High	\$3,800	\$78,000	\$190,000	\$300,000	\$572,000
	Road and Bridge Construction (USACE)	1 - 2 Informal Consultations	Low	\$0	\$0	\$0	\$0	\$0
			High	\$380	\$7,800	\$19,000	\$0	\$27,200

**TOTAL COSTS FOR THE MUSSELS  
(OVER TEN YEARS)**

<b>Unit/Area</b>	<b>Activity (Action Agency)</b>	<b>Section 7 Impact</b>	<b>Range</b>	<b>Costs to the Service</b>	<b>Costs to the Action Agency</b>	<b>Costs to Third Parties</b>	<b>Project Mods</b>	<b>Total Section 7 Costs</b>	
	Agriculture (TVA/USACE)	35 Informal Consultations	Low	\$1,050	\$17,500	\$42,000	\$0	\$60,600	
			High	\$6,650	\$17,500	\$102,000	\$0	\$126,000	
	Gravel Dredging (USACE)	0 - 1 Formal Consultation	Low	\$0	\$0	\$0	\$0	\$0	
			High	\$4,540	\$6,500	\$10,700	\$0	\$21,700	
	Utilities (USACE)	1 - 5 Informal Consultations	Low	\$30	\$1,300	\$1,200	\$0	\$2,530	
			High	\$950	\$19,500	\$47,500	\$0	\$68,000	
	Utilities (TVA)	10 Informal Consultations	Low	\$300	\$5,000	\$0	\$10,000	\$15,300	
			High	\$300	\$5,000	\$0	\$10,000	\$15,300	
	Conservation/ Recreation (TVA)	15 Informal Consultations	Low	\$450	\$7,500	\$18,000	\$0	\$26,000	
			High	\$2,850	\$7,500	\$43,500	\$0	\$54,000	
	NPDES Permit Review	2 Technical Assistance Efforts	Low	\$20	\$0	\$1,200	\$0	\$1,220	
			High	\$20	\$0	\$3,000	\$0	\$3,020	
	2- Holston	Road and Bridge Construction (TDOT)	3 - 4 Formal Consultations	Low	\$2,820	\$11,700	\$28,500	\$5,400	\$47,900
				High	\$18,200	\$26,000	\$42,800	\$60,000	\$147,000
Road and Bridge Construction (TDOT)		12 - 16 Informal Consultations	Low	\$360	\$15,600	\$14,400	\$21,600	\$52,000	
			High	\$3,040	\$62,400	\$152,000	\$240,000	\$457,000	
Road and Bridge Construction (USACE)		1 - 3 Informal Consultations	Low	\$0	\$0	\$0	\$0	\$0	
			High	\$570	\$11,700	\$28,500	\$0	\$40,800	

**TOTAL COSTS FOR THE MUSSELS  
(OVER TEN YEARS)**

<b>Unit/Area</b>	<b>Activity (Action Agency)</b>	<b>Section 7 Impact</b>	<b>Range</b>	<b>Costs to the Service</b>	<b>Costs to the Action Agency</b>	<b>Costs to Third Parties</b>	<b>Project Mods</b>	<b>Total Section 7 Costs</b>	
	Agriculture (NRCS)	3 Informal Consultations	Low	\$186	\$9,420	\$4,620	\$0	\$14,200	
			High	\$186	\$9,420	\$4,620	\$0	\$14,200	
	Agriculture (TVA/USACE)	28 Informal Consultations	Low	\$840	\$14,000	\$33,600	\$0	\$48,400	
			High	\$5,320	\$14,000	\$81,200	\$0	\$101,000	
	Utilities (USACE)	5 - 18 Informal Consultations	Low	\$150	\$6,500	\$6,000	\$0	\$12,600	
			High	\$3,420	\$70,200	\$171,000	\$0	\$245,000	
	Utilities (TVA)	8 Informal Consultations	Low	\$240	\$4,000	\$0	\$8,000	\$12,200	
			High	\$240	\$4,000	\$0	\$8,000	\$12,200	
	Conservation/ Recreation (TVA)	12 Informal Consultations	Low	\$360	\$6,000	\$14,400	\$0	\$20,800	
			High	\$2,280	\$6,000	\$34,800	\$0	\$43,100	
	NPDES Permit Review	2 Technical Assistance Efforts	Low	\$20	\$0	\$1,200	\$0	\$1,220	
			High	\$20	\$0	\$3,000	\$0	\$3,020	
	3- Rockcastle	Road and Bridge Construction (KTC)	4 Formal Consultations	Low	\$3,040	\$15,600	\$38,000	\$400,000	\$457,000
				High	\$18,200	\$26,000	\$42,800	\$400,000	\$487,000
Road and Bridge Construction (USACE)		0 - 1 Informal Consultation	Low	\$0	\$0	\$0	\$0	\$0	
			High	\$190	\$3,900	\$9,500	\$0	\$13,600	
National Forest Activities (USFS)		103 Informal Consultations	Low	\$3,480	\$471,000	\$0	\$0	\$475,000	
			High	\$19,500	\$1,690,000	\$0	\$0	\$1,710,000	
Coal Mining Permit Review		2 Technical Assistance Efforts	Low	\$20	\$0	\$1,200	\$0	\$1,220	
			High	\$20	\$0	\$3,000	\$0	\$3,020	

TOTAL COSTS FOR THE MUSSELS (OVER TEN YEARS)								
Unit/Area	Activity (Action Agency)	Section 7 Impact	Range	Costs to the Service	Costs to the Action Agency	Costs to Third Parties	Project Mods	Total Section 7 Costs
	Utilities (USACE)	0 - 1 Informal Consultation	Low	\$0	\$0	\$0	\$0	\$0
			High	\$190	\$3,900	\$9,500	\$0	\$13,600
	NPDES Permit Review	28 - 33 Technical Assistance Efforts	Low	\$280	\$0	\$16,800	\$0	\$17,100
			High	\$330	\$0	\$49,500	\$0	\$49,800
Unassigned	Water Quality Activities (USEPA)	2 Formal Consultations	Low	\$1,520	\$7,800	\$11,800	\$70,000	\$91,100
			High	\$9,080	\$13,000	\$33,400	\$100,000	\$155,000
	Water Quality Activities (USEPA)	22 - 36 Informal Consultations	Low	\$660	\$28,600	\$92,400	\$105,000	\$227,000
			High	\$6,840	\$140,000	\$558,000	\$150,000	\$855,000
	Programmatic Consultation (TVA)	1 Formal Consultation	Low	\$760	\$5,000	\$0	\$0	\$5,760
			High	\$4,540	\$5,000	\$0	\$0	\$9,540
	Private Landowner Assistance	100 Technical Assistance Efforts	Low	\$1,000	\$0	\$60,000	\$0	\$61,000
			High	\$1,000	\$0	\$150,000	\$0	\$151,000
<b>TOTAL COSTS</b>			<b>Low</b>	<b>\$99,000</b>	<b>\$2,407,000</b>	<b>\$1,707,000</b>	<b>\$4,110,000</b>	<b>\$8,322,000</b>
			<b>High</b>	<b>\$637,000</b>	<b>\$6,478,000</b>	<b>\$5,562,000</b>	<b>\$7,662,000</b>	<b>\$20,339,000</b>

Source: Based on conversations with Federal agencies potentially affected by the proposed critical habitat designation.  
Notes: Estimates may not sum due to rounding, have been rounded to three significant digits.