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**ASSESSING THE BREEDING STATUS  
OF THE BLUE-WINGED WARBLER ON TAPOCO  
PROJECT LANDS**



**Center for Conservation Biology  
College of William and Mary**

# **ASSESSING THE BREEDING STATUS OF THE BLUE-WINGED WARBLER ON TAPOCO PROJECT LANDS**

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**Project Funded By:  
P. B. Power**



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## EXECUTIVE SUMMARY

As part of the federal re-licensing program for the Tapoco Division of Alcoa Power Generating Inc. an inventory of sensitive species was conducted by the Tennessee Chapter of The Nature Conservancy. A multi-agency review of inventory information identified additional information needs pursuant to the re-licensing process. Among others, the panel identified the Blue-winged Warbler as a species that may depend on wetlands subject to impact from fluctuations in water levels. The Blue-winged Warbler is a small, insectivorous bird that utilizes a broad spectrum of weedy, shrubby, and second growth habitats; from dry, brushy hillsides to damp floodplain scrub habitat. Because the species nests on or near the ground it may be negatively impacted by periodic flooding.

During the summer of 2001, habitat patches believed to have the highest potential to support Blue-winged Warblers were surveyed for breeding birds. Although these habitats support a diverse avian community, no Blue-winged Warblers were detected. The majority of patches did not contain habitat consistent with those required by Blue-winged Warblers. The few patches that did contain habitat consistent with those used elsewhere by Blue-winged Warblers and that supported species typically associated with Blue-wings were very small and isolated. Currently, habitats adjacent to Tapoco Project waters and subject to impacts from water fluctuations do not appear to support Blue-winged Warblers.

# **BACKGROUND**

## **Context**

In 1998, The Nature Conservancy of Tennessee conducted an inventory of rare, threatened and endangered species (RTE's) that occur on Tapoco Project lands and waters in Tennessee and North Carolina. The RTE inventory project was initiated to assist in the federal re-licensing efforts of the Tapoco Division of Alcoa Power Generating Inc. (Tapoco) for its Tapoco Hydroelectric Project (FERC No. 2169). This project was concluded at the end of 1999.

Following a multi-agency review of the results from the RTE project, additional species have been identified as being of "special interest" to various participating agencies, including the U.S. Fish and Wildlife Service, U.S. Forest Service, and National Park Service. Blue-winged Warblers were named as one of those species. Where suitable habitats occur adjacent to Project waters, fluctuations in water levels could potentially impact breeding sites. Although the species is not currently known to occur on Project lands, there is concern that some of the most suitable habitat may be located in areas most susceptible to flooding, thereby requiring a survey of candidate sites within the Project area floodplain.

## **Blue-winged Warbler**

The Blue-winged Warbler is a small, insectivorous bird that utilizes a broad spectrum of weedy, shrubby, and second growth habitats; from dry, brushy hillsides to damp floodplain scrub habitat. Slightly less than 5 inches long, they appear predominantly yellow, with an olive back and blue-gray wings with two whitish wing bars. They have a thin black bill with a black facial line connecting the bill and eye. Blue-wings breed from the Midwest east to southern New England, and sporadically through the southern Appalachians at elevations to 2000ft. Nests are usually located on, or very near, the ground. The species overwinters in Mexico and northern Central America.

Blue-winged Warblers have undergone a dramatic range expansion since the early 20<sup>th</sup> century and now occupy much of the former range of their sibling species, the Golden-winged Warbler, whose populations are in serious decline. The species holds no formal protective status at either the federal or state level beyond that afforded all migratory birds under the Migratory Bird Treaty Act.

## **Objectives**

The primary objective of this project was to document the status of Blue-winged Warblers within the range of habitats located adjacent to Tapoco Project waters. A secondary objective was to document any additional species detected within each survey site to provide a cumulative species list for targeted habitats.

## **METHODS**

### **Study Area**

The Tapoco Project Area is located within portions of Graham and Swain Counties in North Carolina, and Blount and Monroe Counties in Tennessee. Project lands are situated primarily within the western edge of the Blue Ridge physiographic province, in the foothills of the Unaka Mountains. Federal lands surround the property for the most part, with portions of the Great Smoky Mountains National Park, the Cherokee National Forest, and the Nantahala National Forest bordering the Tapoco Project lands. Overall, the terrain is extremely rugged and heavily forested. Elevations range from approximately 800 to 2500 feet above sea level, although surrounding mountains can reach elevations of 3,000 to 4,000 feet.

Study sites for this project were limited to island, wetland, and shoreline habitats within the floodplain of Project area waters. Specifically, areas surveyed included priority habitats identified in Figures 1-9 and described below as:

- 1) Shoreline wetlands and small island wetlands within Cheoah Reservoir.
- 2) Shoreline wetlands and small island wetlands on Chilhowee Reservoir, including identified cove wetlands on Abrams Creek and Chilogattee Branch.
- 3) Cheoah River corridor (approximately 9 mile reach from Santeetlah Dam to confluence with Little Tennessee River.
- 4) Wetlands associated with tributary arms of Santeetlah Reservoir.

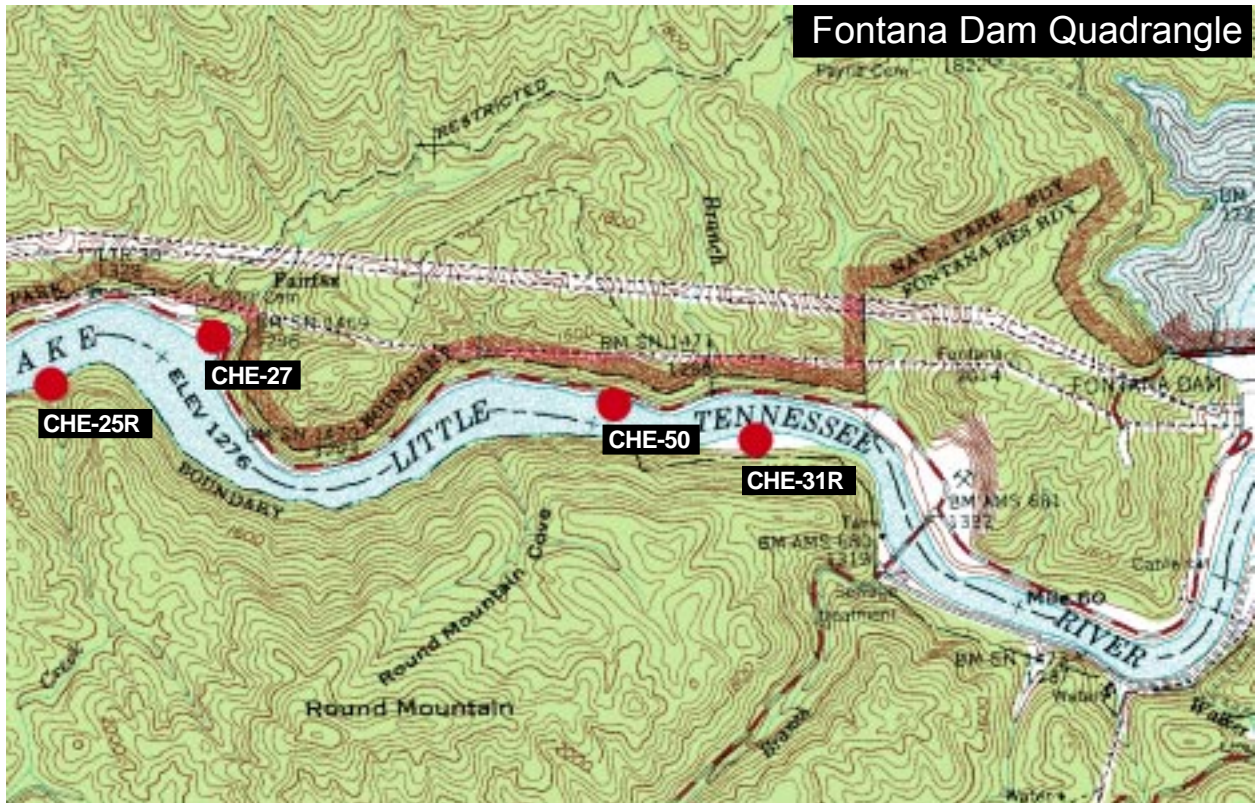


Figure 1. Shoreline and small island wetland sites surveyed within Cheoah Reservoir.

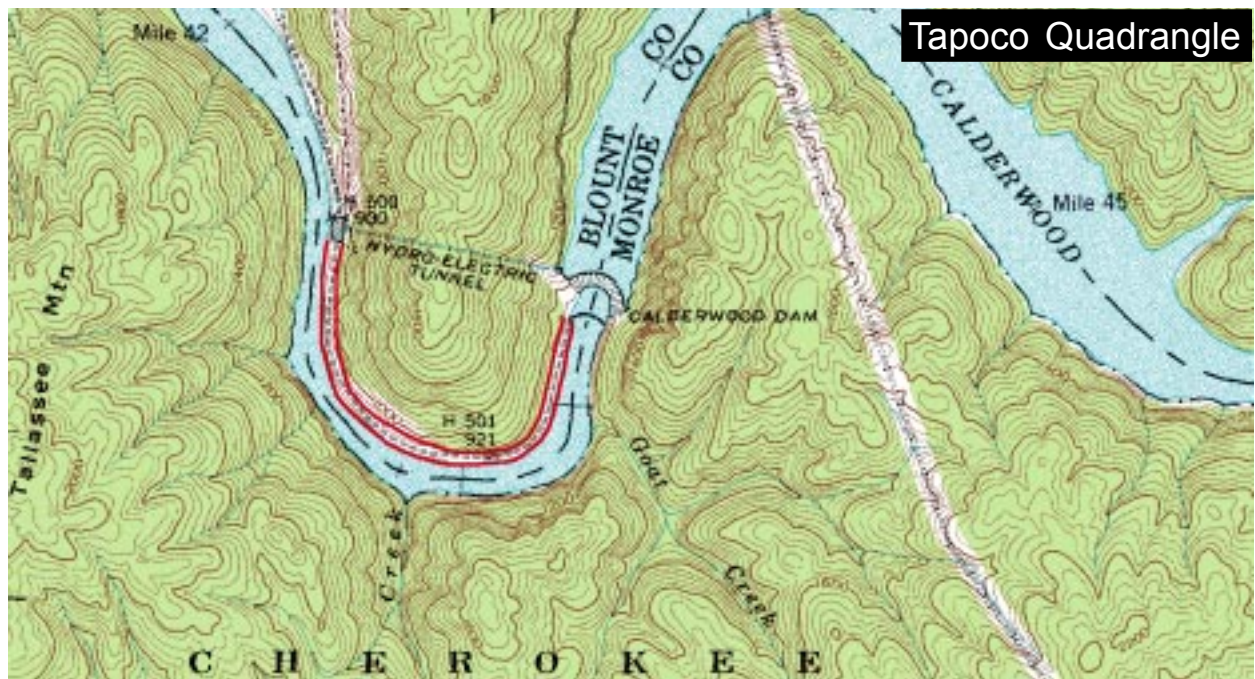


Figure 2. Calderwood Dam loop road at upper Chilhowee Reservoir.





Figure 3. Island sites surveyed within upper Chilhowee Reservoir.

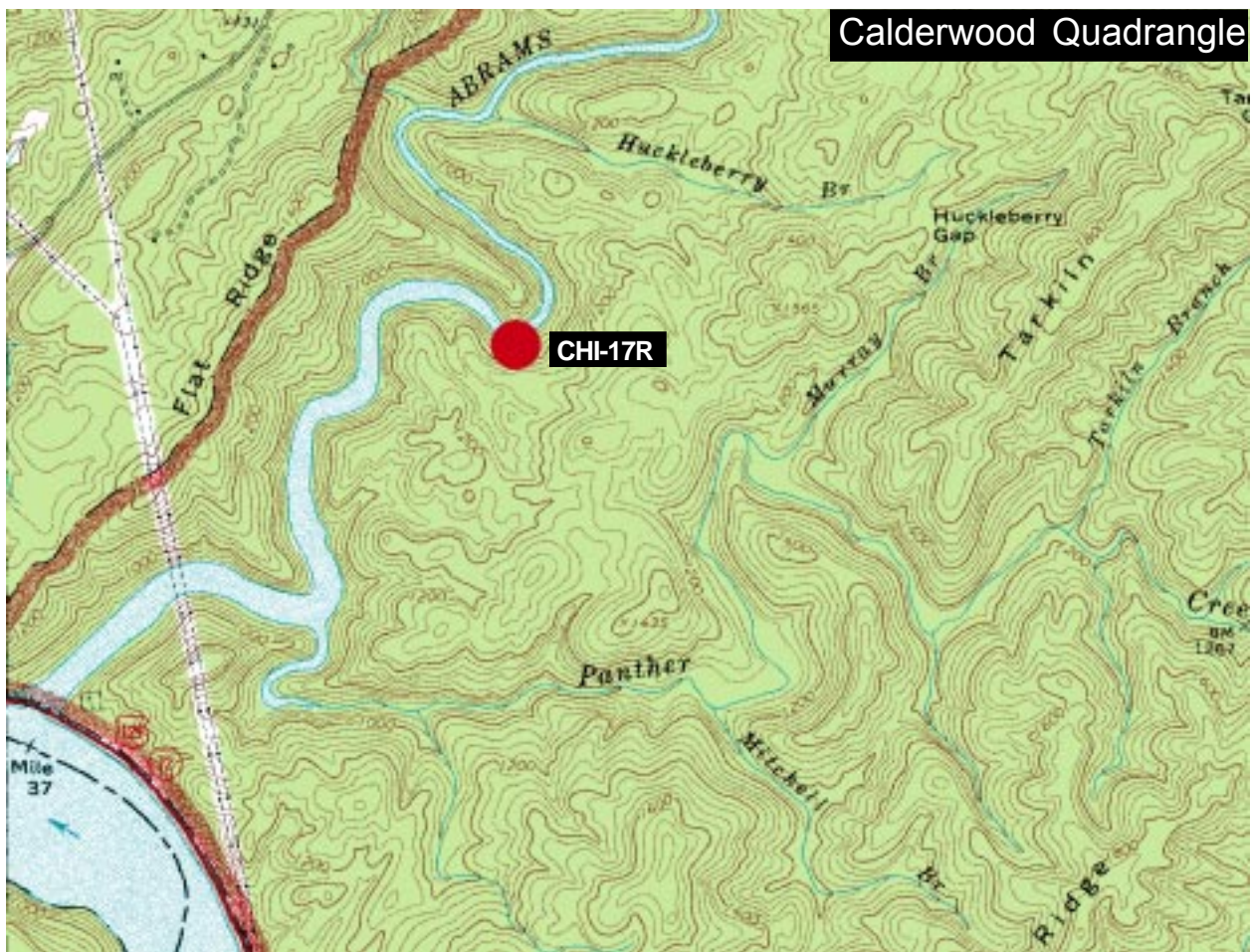


Figure 4. Abrams Creek survey site off of Chilhowee Reservoir.

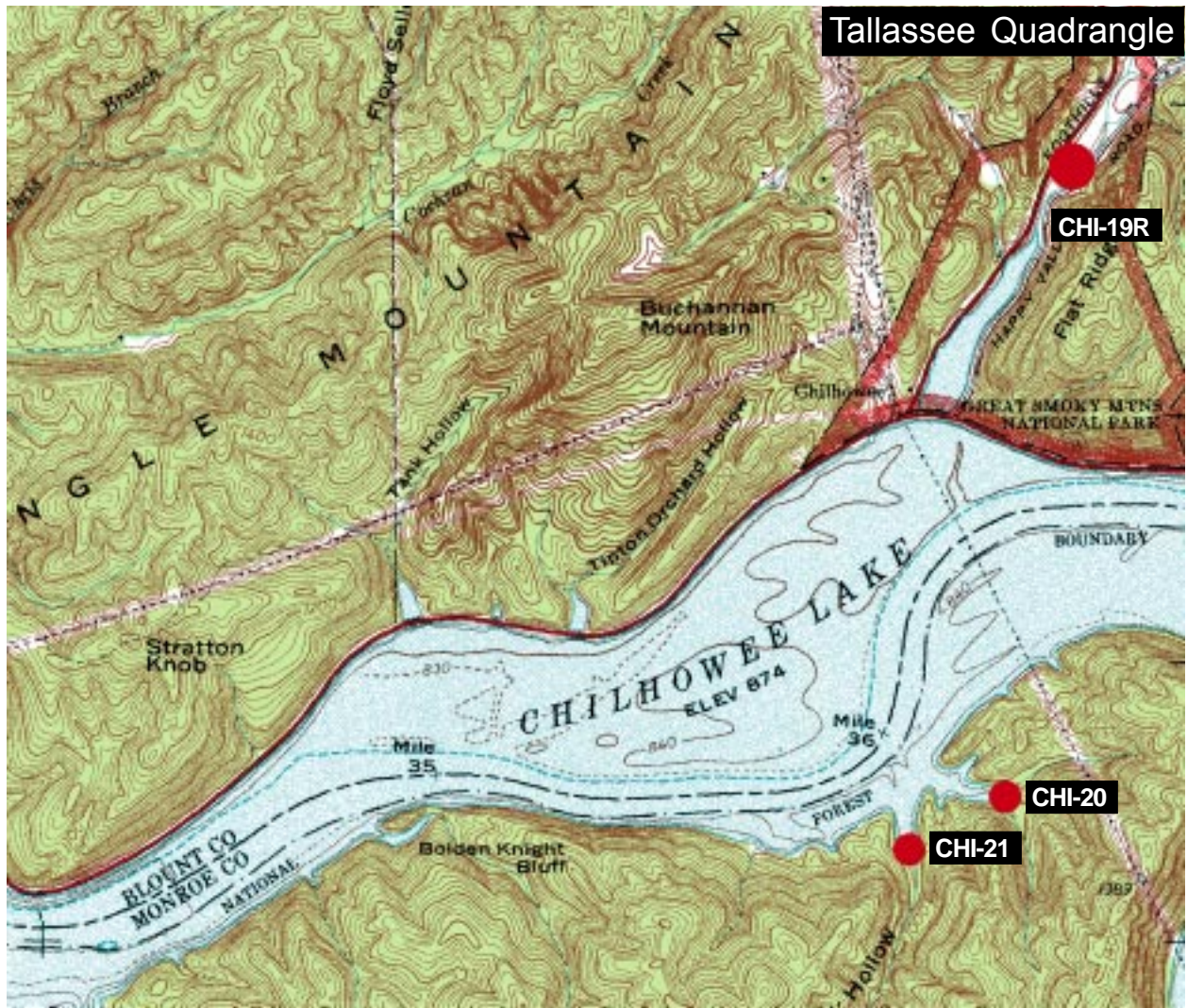


Figure 5. Lower Chilhowee Reservoir survey sites including Chilogatee Branch.



Figure 6. Cheoah River corridor survey stops along NC Rt. 129 (Map 1).

Tapoco Quadrangle

Fontana Dam  
Quadrangle

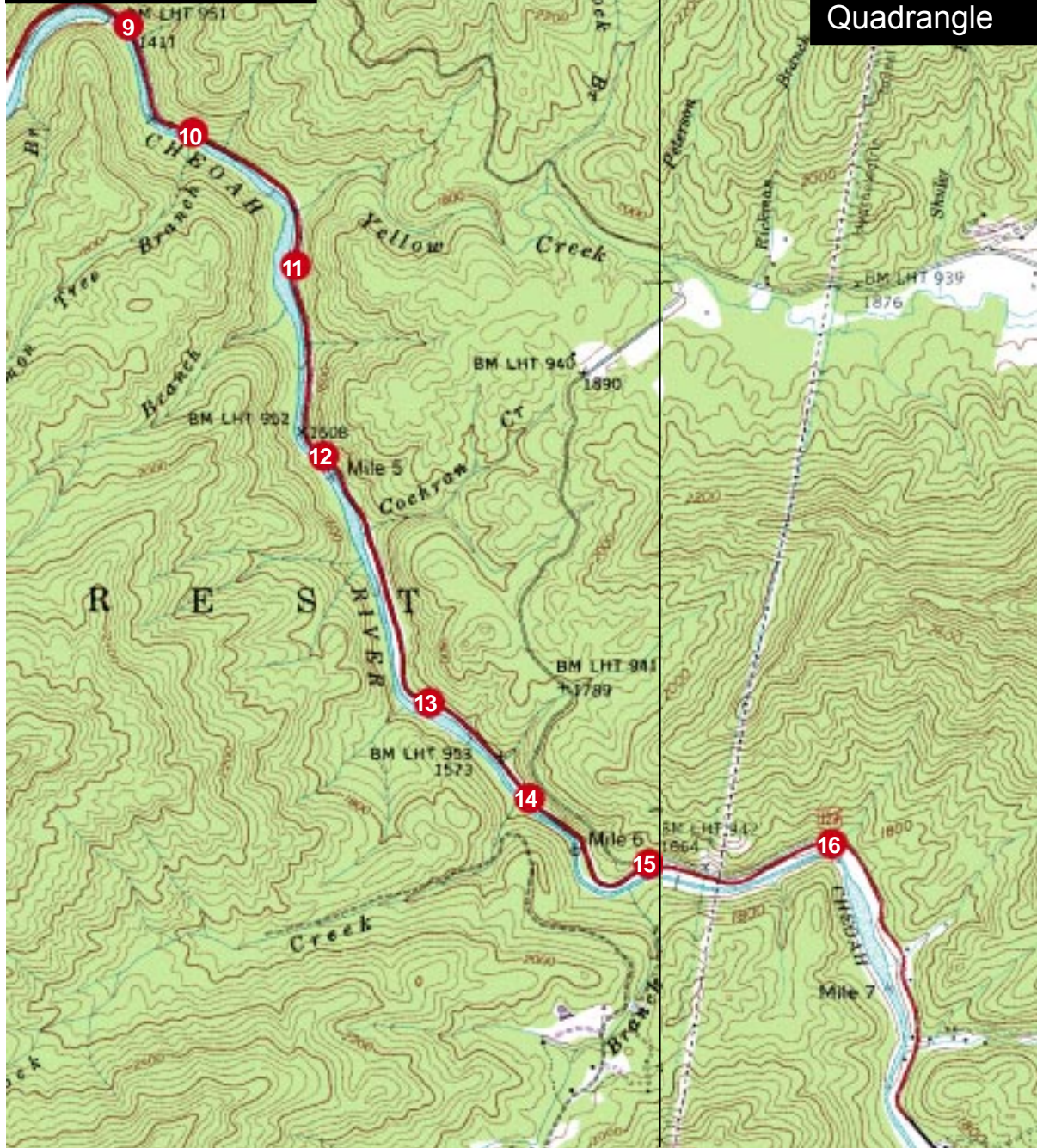


Figure 7. Cheoah River corridor survey stops (Map 2).



Figure 8. Survey sites associated with tributary arms of Santeetlah Reservoir (Map 1).

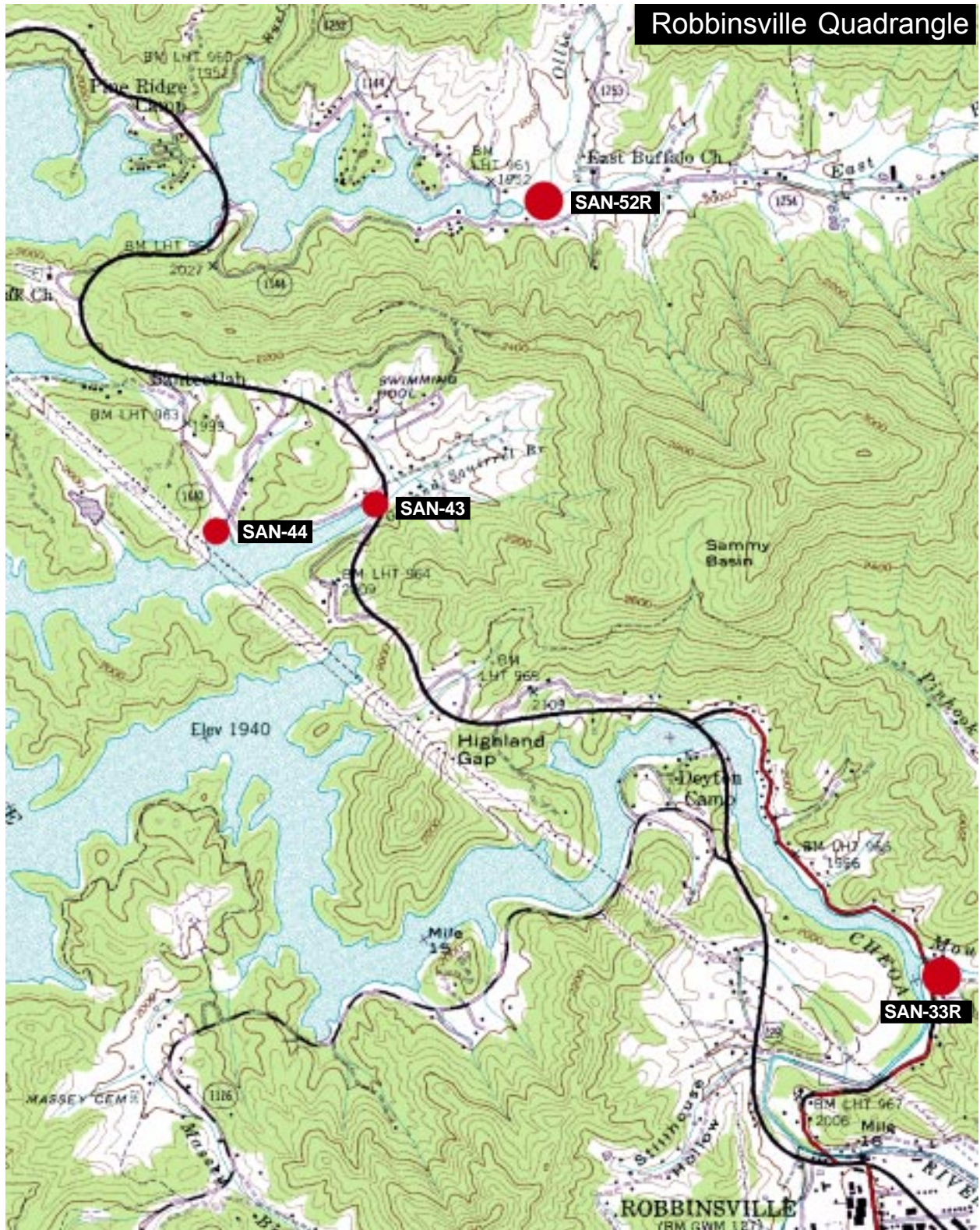


Figure 9. Survey sites associated with tributary arms of Santeetlah Reservoir (Map 2).

## **Survey Techniques**

Birds within targeted wetlands were surveyed using standard point count techniques or walking surveys. Seven-minute point counts were used to (1) survey small isolated wetlands where all birds could be seen or heard from a single vantage point or (2) subsample the Cheoah River corridor. For isolated wetlands, the observer stood on adjacent uplands or positioned a boat near the wetland and recorded all birds seen or heard within the wetland for a 7-min period. For the Cheoah River, the observer stopped at approximately 1 km intervals along North Carolina Route 129 between Santeetlah Dam and the Little Tennessee River and conducted point counts from the riverbank. Walking surveys were used for the larger island patches within Chilhowee and Cheoah Reservoirs and along the loop road adjacent to Calderwood Dam. The observer walked slowly throughout the target habitat recording all birds seen or heard. All surveys were conducted between 30 June and 2 July, 2001. In order to maximize detection rates, all surveys were conducted between 0.5 and 4.5 hr after dawn.

All point counts included a 2-min listening period followed by a 5-min playback. A portable compact disc player with a 9-volt amplifier was used for broadcasting playbacks. The playback consisted of alternating 30-sec segments of male advertising calls of the Blue-winged Warbler and 30-sec segments of silence. Playbacks were used to improve detection of potential Blue-winged Warblers by eliciting a response from any resident bird.

## **RESULTS**

Surveys of targeted wetlands resulted in the detection of 54 avian species (Appendix I). Species represented components of bird communities from forested habitats, early successional habitats, and aquatic habitats. No Blue-winged Warblers were detected. In general, habitat patches were too small and isolated or did not contain appropriate vegetational components. Below is a description of results for individual water bodies.

### **Chilhowee Reservoir**

Seven different habitat patches were surveyed within the Chilhowee Reservoir system. This included two forested islands, four cove wetlands, and one shoreline segment adjacent to the Calderwood Dam. A total of 40 avian species were detected within targeted patches (Appendix II).

The two vegetated islands surveyed within Chilhowee Reservoir supported a diverse bird community. These islands were composed of second growth forest surrounded by low wetlands and meadows. Forest cover was restricted to topographic highs located in the center of the islands. Lush wetlands and meadows were positioned toward the ends. Conditions within the meadows represented some of the most promising habitat for Blue-winged Warblers within this reservoir. Several bird species associated with Blue-winged Warblers were present here including Indigo Buntings and Orchard Orioles. Although overall bird density was high within these patches, no Blue-winged Warblers were detected.

Cove wetlands targeted within Chilhowee Reservoir were positioned at the toe of small streams entering the reservoir. These small wetlands were formed from silt deposits where fast-flowing streams reach the lake. Although Blue-winged Warblers utilize meadows of similar formation, the habitats within Chilhowee were too small and closed. Due to the slope and narrow gauge of streams, only a fine ribbon of wetland extended up from the reservoir. These wetlands were nearly completely obscured by trees. Although numerous birds were present in adjacent forests, no Blue-winged Warblers were detected. These wetlands currently have no potential to support Blue-winged Warblers or associated species with similar habitat requirements.

The loop road adjacent to Calderwood Dam was positioned between a thin agricultural field and an embankment that fell down to the river. The ecotone along both the river and the agricultural field supported a diverse bird community. No Blue-winged Warblers were detected within this location. The habitat did support several species with similar habitat requirements. However, the habitat in the uplands rather than that along the river shoreline appeared to be more appropriate.

## **Cheoah Reservoir**

Four targeted wetland patches were surveyed within the Cheoah Reservoir system. Wetland patches included a single forested island and three delta marshes formed at the mouths of creeks entering the reservoir. A total of 21 avian species were detected within targeted patches (Appendix III).

Habitat on the forested island was similar in structure and composition to upland deciduous forests of the region. Canopy dominants included American sycamore, red maple, and river birch. The island supported no open wetland or early successional patches. Although the island supported a diverse bird community, no Blue-winged Warblers were detected. Available habitat was not consistent with requirements of Blue-winged Warblers or associated species.



The three wetland patches surveyed within Cheoah Reservoir were formed on silt deposits where streams enter the lake. These patches supported a diversity of herbaceous plants, black willow, and hazel alder. However, the patches were relatively small (<0.5 ha). No Blue-winged Warblers were detected.

### **Santeetlah Reservoir**

Seven targeted wetland patches were surveyed within the Santeetlah Reservoir system. Wetlands were formed on silt deposited near the mouths of streams. Topographic relief is much less around Santeetlah compared to Chilhowee and Cheoah reservoirs. This difference is particularly evident along the eastern shoreline of Santeetlah where the land is relatively flat and supports farming. In general, wetland meadows were more extensive and open compared to those on Chilhowee and Cheoah. A total of 23 avian species were detected within targeted patches (Appendix IV).

Of those patches surveyed, SAN-52R and SAN-43 were the most extensive and supported the most diverse bird community. SAN-52R was the most extensive and was embedded within an agricultural landscape. Of all patches observed on Santeetlah Reservoir, this patch had the most potential to support Blue-winged Warblers. Although several associated species were observed within this patch, Blue-winged Warblers were not detected.

The remaining wetland patches surveyed within Santeetlah Reservoir were much smaller in area. These patches were composed of small clusters of black willow. Two of these patches were nearly underwater when the survey was conducted. None of these patches supported habitat consistent with that required by Blue-winged Warblers.

### **Cheoah River**

The Cheoah River corridor was sampled by stopping along North Carolina Route 129 on approximately 1 km intervals where pull-offs were available. In this location, the river is narrow with low flow over small rocks and larger boulders. The river has intermittent pools within a narrowly confined flood plain. The vegetation within the river basin is dominated by hazel alder and supports scattered patches of bunch grasses and forbs. A total of 21 avian species were detected across 16 points (Appendix V).

Most of the bird species detected along the Cheoah River corridor were associated with the adjacent forest habitat or the shrub cover along the rivers edge. Wetlands formed where small tributaries entered the river were minimal. No Blue-winged Warblers were detected along the river. Available habitat did not contain the ground-level vegetation required by this species. The potential of this section of the river to support Blue-winged Warblers is very low.

## **CONCLUSIONS**

Priority habitats within the Tapoco Project Area support a diverse bird community. Although the Blue-winged Warbler may occur within the regional area, there is no evidence that this species breeds within the floodplain habitats of the project area. No Blue-winged Warblers were detected within target patches. Currently, habitats within the surrounding upland landscape appear more likely to support Blue-winged Warblers than those within the floodplain. Habitat within target patches does not appear to be suitable for breeding Blue-winged Warblers. Either patches did not contain vegetational elements required by this species or they were too small and isolated to support a breeding pair.

## **ACKNOWLEDGEMENTS**

We appreciate the efforts of Wendy Bley in providing administrative assistance through all aspects of this project. Sue Fugate provided onsite logistical assistance. Brett Williams and Lindy Ammons were invaluable in providing boat transportation to wetland patches on Chilhowee and Cheoah Reservoirs. This project was funded by P.B. Power.

**Appendix I.** List of species detected within targeted habitat patches of Tapoco Project Area.

<b>Common Name</b>	<b>AOU</b>	<b>Species Name</b>
Mallard	132	<i>Anas platyrhynchos</i>
Wood Duck	144	<i>Aix sponsa</i>
American Woodcock	228	<i>Scolopax minor</i>
Turkey Vulture	325	<i>Cathartes aura</i>
Eastern Screech-Owl	373	<i>Otus asio</i>
Green Heron	201	<i>Butorides virescens</i>
Mourning Dove	316	<i>Zenaida macroura</i>
Black-billed Cuckoo	388	<i>Coccyzus erythrophthalmus</i>
Belted Kingfisher	390	<i>Ceryle alcyon</i>
Downy Woodpecker	394	<i>Picoides pubescens</i>
Red-bellied Woodpecker	409	<i>Melanerpes carolinus</i>
Northern Flicker	412	<i>Colaptes auratus</i>
Chimney Swift	423	<i>Chaetura pelagica</i>
Ruby-throated Hummingbird	428	<i>Archilochus colubris</i>
Eastern Kingbird	444	<i>Tyrannus tyrannus</i>
Great-crested Flycatcher	452	<i>Myiarchus crinitus</i>
Eastern Phoebe	456	<i>Sayornis phoebe</i>
Acadian Flycatcher	465	<i>Empidonax virescens</i>
Blue Jay	477	<i>Cyanocitta cristata</i>
American Crow	488	<i>Corvus brachyrhynchos</i>
Brown-headed Cowbird	495	<i>Molothrus ater</i>
Orchard Oriole	506	<i>Icterus spurius</i>
Common Grackle	511	<i>Quiscalus quiscula</i>
American Goldfinch	529	<i>Carduelis tristis</i>
Song Sparrow	581	<i>Melospiza melodia</i>
Eastern Towhee	587	<i>Pipilo erythrophthalmus</i>
Northern Cardinal	593	<i>Cardinalis cardinalis</i>
Indigo Bunting	598	<i>Passerina cyanea</i>
Scarlet Tanager	608	<i>Piranga olivacea</i>
Summer Tanager	610	<i>Piranga rubra</i>
Barn Swallow	613	<i>Hirundo rustica</i>
Cedar Waxwing	619	<i>Bombycilla cedrorum</i>
Red-eyed Vireo	624	<i>Vireo olivaceus</i>
White-eyed Vireo	631	<i>Vireo griseus</i>
Black-and-white Warbler	636	<i>Mniotilta varia</i>
Worm-eating Warbler	639	<i>Helmitheros vermivorus</i>
Northern Parula	648	<i>Parula Americana</i>

**Appendix I.** –continued- List of species detected within targeted habitat patches of Tapoco Project Area.

<b>Common Name</b>	<b>AOU</b>	<b>Species Name</b>
Yellow-throated Warbler	663	<i>Dendroica dominica</i>
Black-throated Green Warbler	667	<i>Dendroica virens</i>
Pine Warbler	671	<i>Dendroica pinus</i>
Louisiana Waterthrush	676	<i>Seiurus motacilla</i>
Common Yellowthroat	681	<i>Geothlypis trichas</i>
Yellow-breasted Chat	683	<i>Icteria virens</i>
Hooded Warbler	684	<i>Wilsonia citrina</i>
American Redstart	687	<i>Setophaga ruticilla</i>
Gray Catbird	704	<i>Dumetella carolinensis</i>
Brown Thrasher	705	<i>Toxostoma rufum</i>
Carolina Wren	718	<i>Thryothorus ludovicianus</i>
White-breasted Nuthatch	721	<i>Sitta carolinensis</i>
Eastern Tufted Titmouse	731	<i>Parus bicolor</i>
Carolina Chickadee	736	<i>Parus carolinensis</i>
Blue-gray Gnatcatcher	751	<i>Polioptila caerulea</i>
Wood Thrush	755	<i>Hylocichla mustelina</i>
American Robin	761	<i>Turdus migratorius</i>

**Appendix II.** List of species detected for targeted habitat patches along Chilhowee Reservoir.

<b>Species</b>	<b>CHI-03</b>	<b>CHI-04</b>	<b>CHI-17R</b>	<b>CHI-19R</b>	<b>CHI-20</b>	<b>CHI-21</b>	<b>Loop</b>
Mallard		X					
American Woodcock	X						
Turkey Vulture							X
Eastern Screech-Owl		X					
Green Heron				X			
Mourning Dove				X			
Black-billed Cuckoo		X					
Belted Kingfisher		X					
Downy Woodpecker			X			X	X
Northern Flicker					X		X
Eastern Kingbird	X	X		X			
Great-crested Flycatcher					X		
Eastern Phoebe				X			X
Acadian Flycatcher			X	X			X
American Crow							X
Orchard Oriole	X						
Common Grackle	X	X		X			X
American Goldfinch	X	X		X			X
Song Sparrow	X	X		X			
Northern Cardinal	X	X		X			X
Indigo Bunting	X	X		X			X
Scarlet Tanager					X		X
Summer Tanager							X
Barn Swallow		X					
Red-eyed Vireo			X	X	X		X
White-eyed Vireo							X

**Appendix II.** –continued- List of species detected for targeted habitat patches along Chillhowee Reservoir.

Species	CHI-03	CHI-04	CHI-17R	CHI-19R	CHI-20	CHI-21	Loop
Worm-eating Warbler							X
Northern Parula			X				
Yellow-throated Warbler	X		X		X		
Pine Warbler					X	X	
Common Yellowthroat	X	X		X			X
Yellow-breasted Chat							X
American Redstart		X					
Gray Catbird	X			X	X		X
Brown Thrasher							X
Carolina Wren	X	X			X		X
Eastern Tufted Titmouse			X		X	X	X
Carolina Chickadee	X	X		X	X	X	X
Blue-gray Gnatcatcher	X	X			X		X
Wood Thrush					X		

**Appendix III.** List of species detected for selected locations along Cheoah Reservoir.

<b>Species</b>	<b>CHE-25R</b>	<b>CHE-31R</b>	<b>CHE-27</b>	<b>CHE-50</b>
Mallard				X
Belted Kingfisher			X	
Downy Woodpecker		X		
Red-bellied Woodpecker		X		
Great-crested Flycatcher		X		
Acadian Flycatcher		X	X	
American Goldfinch	X		X	X
Northern Cardinal		X	X	
Indigo Bunting		X		X
Summer Tanager	X			
Red-eyed Vireo		X		
Black-and-white Warbler		X	X	
Yellow-throated Warbler	X			
Pine Warbler			X	
Common Yellowthroat	X			X
Hooded Warbler	X	X	X	
American Redstart				X
Gray Catbird		X		
Carolina Wren		X		
Eastern Tufted Titmouse	X	X		
Carolina Chickadee	X	X		X

**Appendix IV.** List of species detected for targeted habitat patches along Santeetlah Reservoir.

Species	SAN-52R	SAN-43	SAN-44	SAN-31R	SAN-20	SAN-19	SAN-33R
Green Heron			X				
Mourning Dove	X	X					
Black-billed Cuckoo							X
Belted Kingfisher							X
Downy Woodpecker				X			
Brown-headed Cowbird	X	X					
Orchard Oriole	X						
Common Grackle	X						
American Goldfinch		X			X		X
Song Sparrow	X	X					X
Eastern Towhee	X	X					
Northern Cardinal	X	X					
Indigo Bunting	X						
Cedar Waxwing	X	X					
Red-eyed Vireo				X	X		
Northern Parula				X	X		
Common Yellowthroat	X		X				X
Hooded Warbler				X			
Brown Thrasher	X						
White-breasted Nuthatch				X			
Carolina Chickadee			X				X
Wood Thrush							X
American Robin		X					



**Appendix V.** List of species detected within targeted points along the Cheoah River corridor.

Species	Pt1	Pt2	Pt3	Pt4	Pt5	Pt6	Pt7	Pt8	Pt9	Pt10	Pt11	Pt12	Pt13	Pt14	Pt15	Pt16
Wood Duck						X									X	
Ruby-throated Hummingbird							X					X				
Eastern Phoebe								X								
Acadian Flycatcher						X					X	X		X		
American Goldfinch		X			X	X										X
Song Sparrow											X	X	X		X	
Eastern Towhee													X			
Northern Cardinal								X	X			X				X
Indigo Bunting		X		X		X	X	X	X			X	X	X		X
Scarlet Tanager												X				
Red-eyed Vireo								X	X			X		X		X
Yellow-throated Warbler													X	X		
Black-thr Green Warbler								X	X	X			X	X		
Louisiana Waterthrush	X			X	X		X						X	X		
Common Yellowthroat					X		X			X		X				
Hooded Warbler						X		X								
American Redstart				X											X	
Gray Catbird								X		X			X	X		X
Eastern Tufted Titmouse				X								X			X	
Carolina Chickadee	X			X	X			X	X	X					X	X
Blue-gray Gnatcatcher							X						X			