MEETING NOTES

SOUTH CAROLINA ELECTRIC & GAS COMPANY
SALUDA HYDRO PROJECT RELICENSING
RT&E SPECIES TECHNICAL WORKING COMMITTEE

Carolina Research Park
May 3, 2006

Final csb 6-2-06

ATTENDEES:

Bill Argentieri, SCE&G
Bob Seibels, River Banks Zoo
Tom Eppink, SCANA Services
Ron Ahle, SCDNR
Dick Christie, SCDNR
Shane Boring, Kleinschmidt Associates
Jeni Summerlin, Kleinschmidt Associates
Amanda Hill, USFWS
Sam Drake, L. Murray Association

ACTION ITEMS:

- Compare DNR's CWCS species list to species tracking table

Ron Ahle

- Add Saluda crayfish, wood stork, ivory-billed woodpecker to tracking sheet

Shane Boring

- Provide Arnie Eversol's study on the Saluda crayfish

Amanda Hill

DATE OF NEXT MEETING:

July 26, 2006 at 9:30 AM

Location: SCE&G Offices at Carolina Research Park
111 Research Drive
Columbia, SC 29203

MEETING NOTES:

These notes serve to be a summary of the major points presented during the meeting and are not intended to be a transcript or analysis of the meeting.

Shane Boring opened the meeting at approximately 12:30 PM and noted that the focus of the meeting would be to discuss: (1) action items from previous meeting minutes, (2) the 2006 wood stork survey, (3) species tracking table, and (4) set a date for the next meeting.

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Review of Action Items

Shane briefly discussed action items listed in previous meeting notes. He noted that an email was sent out to inform all committee members that the 1999 Rocky Shoal Spider Lily Report for the Columbia Hydro Project was available for download from the Kleinschmidt ftp site. Shane then distributed copies of the species account for Saluda darter from SCDNR's Comprehensive Wildlife Conservation Strategy (CWCS), noting that it provides the most up-to-date information on the species (Attachment A).

Species Tracking Table

Shane distributed the Rare, Threatened, and Endangered (RT&E) Species Tracking Sheet (Attachment B). He noted that the list of species included in the tracking sheet are those listed in the USFWS's comments on the Initial Consultation Document (ICD) and that the sheet will be used to track the status of various species through the relicensing process. Shane added that the next step will be to begin looking at habitat and known species occurrences to determine which of these have potential to occur in the project area. Amanda Hill added that if there's a chance that project operations have an effect on one of these species, then additional efforts may be needed. The group briefly examined the tracking sheet and Ron Ahle noted that wood stork and Saluda darter should be added to the list. It was noted that the ivory-billed woodpecker should also be included on the list. The group suggested that the table should be grouped by birds, plants, fish, etc. Amanda H. also suggested, and the group agreed, that the scientific names should be sorted alphabetically. Ron A. mentioned that he would look through DNR's list of species addressed in the CWCS for any species that may not have been included in the USFWS species list.

2006 Wood Stork Survey Observations

Shane informed the group that the wood stork aerial surveys are continuing on a monthly basis and will be carried out through November of this year. He noted that in discussion with Tom Murphy, there have been no sightings of wood storks in the project boundaries this year. He added that Tom noted numerous drying pools in the Saluda River upstream of Lake Murray during the April survey, providing good wood stork habitat, but none were being used. He added that Tom M. documented 40 great blue heron nests at the Tossity Creek and Silverstreet colony sites during the April fly-over.

Date/Location of Next Meeting

The group agreed to meet again on July 26, 2006, at Carolina Research Park, with August 14th, 15th, or 16th as alternate dates if committee members are not able to attend.

Attachment A

Species Account for Saluda Darter
(Source: SCDNR Comprehensive Wildlife Conservation Strategy)

Highest Conservation Priority – Other Species

Christmas Darter *Etheostoma hopkinsi*
Saluda Darter *Etheostoma saludae (*form of *E. collis)*
Redeye Bass *Micropterus coosae*

Contributors: Dan Rankin and Jason Bettinger

DESCRIPTION

Taxonomy and Basic Description

The Christmas darter (Rohde et al. 1994) is a member of the family Percidae; this diverse family contains approximately 150 species of darters, all of which are found in rivers, lakes, swamps and springs of eastern North America. The Christmas darter belongs to the genus *Etheostoma,* the largest genus of North American fishes (Jenkins and Burkhead 1994). The Christmas darter is the only South Carolina representative of the subgenus *Oligocephalus,* one of the largest subgenera of *Etheostoma.* Two subspecies have been identified: *E. binotatum* from the Savannah River drainage in both Georgia and South Carolina and *E. hopkinsi* from the Altamaha and Ogeechee river drainages in Georgia. Kuehne and Barbour (1983) have hypothesized possible species level differentiation of *E. binotatum* and *E. hopkinsi* due to marked differences in appearance of breeding males. The colorful Christmas darter ranges in length from 41 to 71 mm (1.6 to 2.8 inches). As is typical of other members of the subgenus *Oligocephalus*, the Christmas darter has a small conical head, broad frenum and two anal spines. Breeding males have a blue marginal and a red sub-marginal band on the spiny dorsal fin (Kuehne and Barbour 1983). This darter has 10 to 12 dark green bars on its side, separated by a red bar in a mature male and a yellow bar in the female. Its greenish back has eight dark saddles and its belly is light green.

Hubbs and Cannon (1935) first described the Saluda darter (*Etheostoma saludae)* from the Saluda River system of the Santee drainage. They described the fish as a separate species from Carolina darter (*Etheostoma collis*). Collette (1962) was uncertain if *E. saludae* was specifically or subspecifically different from *E. collis collis*, the Carolina darter of the Pee Dee and Catawba (Santee drainage) drainages and *E. collis lepidinion* of the Roanoke, Neuse and Cape Fear drainages. Collette (1962) and Page (1983) noted *E. saludae* differed from the two Carolina darter subspecies principally in having interorbital pores (2 versus 0) and in number of anal spines (2 versus 1). Kuehne and Barbour (1983) listed the Saluda darter as a separate species but stipulated, "…the two forms (*saludae* and *collis*) may not actually be specifically distinct." Jenkins and Burkhead (1994) stated they found no "sufficiently

distinctive" character for taxonomic recognition of *E. saludae* or subspecific recognition within the *E. collis* group. Robins et al. (1991), Rohde et al. (1994) and Nelson et al. (2004) followed that the Saluda darter was conspecific with the Carolina darter; all adopted the scientific name *E. collis* for the broadened species with no subspecific distinctions. However, Rohde (pers. comm.) now feels *E. saludae* may be specifically or subspecifically different. Currently, it is still not clear if *E. saludae* is a separate species from *E. collis*; however, there is sufficient genetic and morphologic difference between the two that they should be managed separately as evolutionary significant units (J. Quattro, pers. comm.). The Saluda darter is plain in color with brown on the back and sides and a yellow to white belly. The sides have a dozen or so brown blotches and are speckled with brown dots. This small darter only reaches about 60 mm (2.4 inches).

The redeye bass is a member of the family Centrarchidae. Redeye bass represent one of only two native black basses in South Carolina; both smallmouth and spotted bass (*Micropterus dolomieu* and *M. punctulatus*, respectively) are introduced in this state. The closest relative of the redeye bass is the shoal bass (*M. cataractae*), which is endemic to the Apalachicola River system (Lee et al. 1980). Redeye bass are similar in structural features and more closely related to spotted bass than to smallmouth bass. However, redeye bass are known to hybridize with both species (Turner and Bulow 1989; Pierce and Van Den Avyle 1997; Philipp et al. 2002). In native stream habitat, redeye bass range in length from 144 to 381 mm (5.6 to 15 inches) (Rohde et al. 1994); however, in the Savannah River impoundments, redeye bass often exceed this size range. Redeye bass are typically olivaceous to bronze dorsally with black blotching or mottling. The jaw extends even with the back of the eye. Laterally, redeye bass have black vertical bars or blotches, which are not connected unlike the lateral stripe of spotted bass. Redeye bass typically have ten or fewer lateral bars or blotches, whereas spotted bass generally have more than ten. Redeye bass have ventro-lateral streaks that are typically darker and more irregular than those in spotted bass. A white margin on the upper and lower tips of the caudal fin and often along the margin of the anal fin is a key character. This margin may be less obvious in older specimens. The anal fin typically has dark pigmentation. About sixty percent of redeye bass from the upper Savannah River basin possess a tooth patch on the tongue (SCDNR unpublished data).

Status

The Christmas darter is currently considered stable within its range (Warren et al. 2000). NatureServe (2004) listed the status as apparently secure both globally (G4) and locally in South Carolina and Georgia (S4). The South Carolina Department of Natural Resources Heritage Program lists the Christmas darter as a species of special concern.

Warren et al. (2000) listed the global status of the broader Carolina darter as vulnerable within its range and it is considered a species of special concern in both North Carolina and South

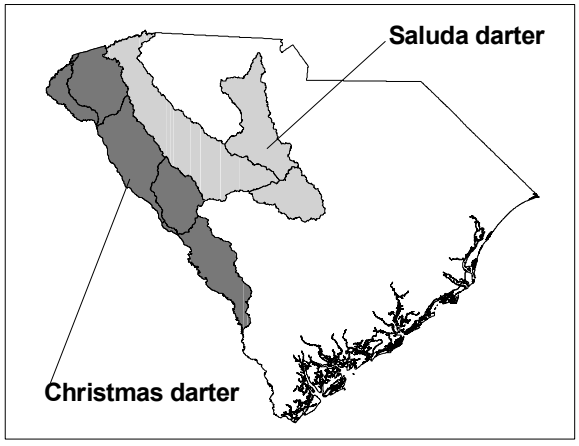
Carolina. NatureServe (2004) considered the global status as undetermined due to inadequate surveys. NatureServe (2004) also listed the local status as undetermined for South Carolina (S?). The local status for North Carolina and Virginia was vulnerable (S3) and imperiled (S2), respectively (NatureServe 2004). Currently, Saluda darter is recognized as a synonym of the Carolina darter; however, our taxa team considered it an evolutionarily significant unit (ESU) of Carolina darter and suggested that it be managed separately. Saluda darter is an imperiled, narrow-range endemic of South Carolina.

The redeye bass is currently stable (Warren et al. 2000) and secure (G5) (NatureServe 2004). NatureServe (2004) did not list a state rank for the redeye bass in South Carolina and stream populations appear to be fairly secure. Reservoir populations, on the other hand, are likely imperiled due to potential displacement by spotted bass and hybridization with nonnative black bass species (smallmouth bass and spotted bass). In Tennessee, redeye bass are considered vulnerable (S3) and in North Carolina they are considered imperiled (S1), largely due to their limited range (NatureServe 2004).

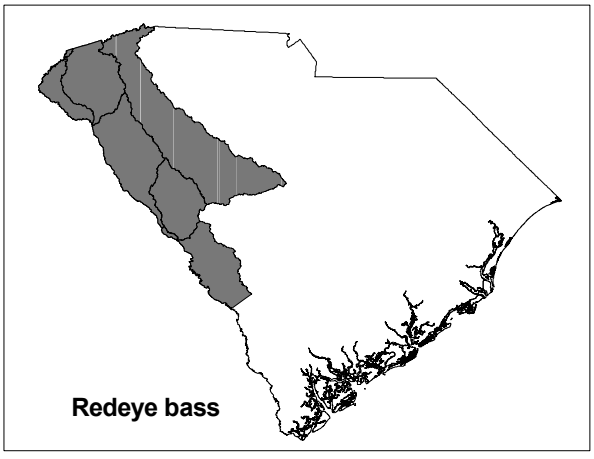
POPULATION DISTRIBUTION AND SIZE

Distribution

The Christmas darter is found in the upper Savannah River drainage, primarily above the fall line. Populations identified below the fall line may be Savannah darters. Outside of South Carolina, Christmas darters are found in the Altamaha and Ogeechee drainages in Georgia, both above and below the fall line (NatureServe 2004).



The Saluda darter only occurs in South Carolina, where it is restricted to the Saluda, Broad and Congaree River basins (Kuehne and Barbour 1983).



The native range of the redeye bass includes the Mobile Basin above the fall line and the upper Chattahoochee, Altamaha and Savannah Drainages (Etnier 1993; Rohde 1994; Lee 1980). Ramsey (1973) considered all populations outside this range to be a result of stocking. Redeye bass have also been introduced in Tennessee, Kentucky, California and Puerto Rico (Etnier 1993; Lee 1980). The redeye bass occurs in the Saluda River (Santee drainage), South Carolina, primarily in the river's mainstem and tributaries below the Saluda Dam. One report of redeye from a tributary stream upstream of Saluda Dam is documented in the

Clemson University museum collection. However, redeye bass are conspicuously absent in cool headwater rivers of the North, Middle and South Saluda Rivers and their tributaries, in what appears prime redeye habitat. This would tend to support taxonomists opinion that redeye bass are not native to the Saluda River system. The Chattooga River, once being a tributary to the Chattahoochee system (Ross 1970), likely explains the presence of redeye bass in the Savannah drainage. In South Carolina, redeye bass are also found below the fall line in the mainstem of the Savannah River (SCDNR unpublished data).

Population Size and Trend

The Christmas darter was considered by Kuehne and Barbour (1983) to be currently stable. They note that *E. binotatum* is common in creeks along the fall line containing gravel and rubble substrate and in headwater creeks in the Savannah River drainage. Page and Burr (1991) also refer to the Christmas darter as fairly common. However, areas of abundance are often disjunct. Major land disturbances within critical habitat could cause severe loss within their range. Our taxa team was of the impression that Christmas darter may be in decline within South Carolina.

The Saluda darter is thought to be doing well within its narrow range, with the exception of populations in close proximity to Columbia, South Carolina. There, populations may be in decline due to habitat loss and contamination (F. Rohde, pers. comm.).

Redeye bass appear abundant in upper Savannah River tributaries (SCDNR unpublished data) and in Lakes Jocassee and Hartwell (Duke Power unpublished data; SCDNR unpublished data). Redeye bass appear somewhat resilient to habitat alterations. Coneross Creek, a tributary to the Seneca River arm of Lake Hartwell, harbors good numbers of redeye bass despite being severely impacted both by increased sediment loading from agriculture and development and by greatly increased nutrient loads from a large municipal sewage discharge. Abundance of redeye bass has decreased in Lake Keowee as a result of non-native spotted bass introductions (Duke Power, unpublished data). The same trend is expected in Lakes Jocassee and Hartwell as spotted bass abundance increases. Redeye bass appear to be fairly common in streams of the upper Savannah. Although redeye bass reportedly perform poorly in impoundments within their native range, this species has thrived in the large oligotrophic and mesotrophic reservoirs of the upper Savannah River system, such as Jocassee, Keowee and Hartwell (Barwick and Moore 1983; SCDNR unpublished data). Redeye bass also occur in lakes Russell and Thurmond, although apparently in lower abundance (SCDNR unpublished data). Recent introduction of spotted bass into Lake Keowee has resulted in hybridization with redeye bass and a major decline in redeye bass abundance (Duke Power unpublished data). It is not known what effects spotted bass will have on redeye bass in tributary streams. Many of the tributaries to the lakes have barriers to upstream fish movement, which may protect stream populations of redeye bass from invasion of spotted bass.

HABITAT AND NATURAL COMMUNITY REQUIREMENTS

The Christmas darter inhabits gravel or rubble riffles in cool water springs, creeks and small to medium-sized rivers where stronger currents exist. It sometimes occurs in slower moving waters with submerged vegetation (Rohde et al. 1994).

The Saluda darter inhabits sluggish to calm areas in clear to slightly turbid small streams with a substrate of mud, sand, gravel and/or bedrock (Collette 1962; Rohde et al. 1994). However, in Wateree Creek, a large South Carolina stream, the Saluda darter was found in moderate gradient among coble and leaf packs (pers. obs.).

Redeye bass occur in a variety of habitats in South Carolina from fast flowing, high gradient streams of the Blue Ridge and upper piedmont ecoregions to low gradient streams and the Savannah River below the fall line. It is found in small streams to large rivers and reservoirs.

CHALLENGES

The Christmas darter is currently stable throughout its range; however, the wide separations between critical habitats and healthy populations are a concern. Because of the limited distribution of the Christmas darter within South Carolina, this fish is vulnerable to development, deforestation, loss of riparian cover, siltation and the effects of impoundments within areas of abundance.

The Saluda darter is challenged due to its limited distribution solely within South Carolina. It is especially vulnerable to development because many Saluda darter populations occur in streams within the greater Columbia metropolitan area and are, therefore, increasingly subject to chemical contamination and siltation from urban runoff. Other threats include agricultural runoff and habitat destruction resulting from inundation by dams.

The redeye bass is primarily threatened by the introduction of the non-native spotted bass. Other threats may include deforestation and associated stream warming and siltation, impoundment, acid deposition, and displacement by non-native fishes (D. Rankin, SCDNR, pers. comm.).

CONSERVATION ACCOMPLISHMENTS

Redeye bass habitat is primarily protected by land ownership patterns in some key habitats streams such as Chattooga River, Chauga River, Eastatoee River and Stevens Creek. However, the amount of unprotected habitat for this species far exceeds protected habitat.

CONSERVATION RECOMMENDATIONS

- Determine statewide distribution and population status of Christmas darters, Saluda darter and redeye bass with statewide stream surveys.
- Describe life history and habitat requirements of Christmas darters, Saluda darter and redeye bass.
- Determine the status of known populations of both Christmas and Saluda darters. Saluda darter surveys in the Broad River Drainage are critical to understanding the genetic relationship of *E. saludae* and *E. collis*. Resurvey historically identified locations of Christmas darters below the fall line to determine its current status.
- Conduct a genetic survey to determine the relationship between Christmas and Savannah darters.

- Inventory and monitor water quality and habitat in redeye bass streams to identify water quality threats as well as habitat needs and deficiencies
- Protect critical habitats from future development and further habitat degradation by following best management practices and protecting and purchasing riparian areas.
- Promote land stewardship practices through educational programs both within critical habitats with healthy populations and other areas that contain available habitat.
- Encourage responsible landuse planning.
- Consider species needs when participating in the environmental permit review process.
- Develop a Non-Game Fishes of South Carolina poster and other educational materials in order to raise public awareness of nongame species and their ecological importance to the natural history of South Carolina's aquatic habitats.
- Educate motor vehicle operators of the negative affects of crossing streams at multiple locations and using stream bottoms as trails.
- Monitor the success of redeye bass habitat protection and advocate for additional protection through the environmental permit review process.
- Promote redeye bass as a sport fishery in larger streams.
- Conduct an education and outreach campaign to raise awareness of the impacts of illegal introductions of non-native species.

MEASURES OF SUCCESS

Determining the distribution, life history, habitat needs and southeastern population structure and trends would represent a measure of success for these species. Methods that protect water quality are also likely to protect most of these species. Genetic resolution of the status of the Saluda darter will allow for more specific management protocols for that species.

Attachment B

Saluda Hydroelectric Project Relicensing
Rare, Threatened, and Endangered Species Tracking Sheet

Section 7 Species Tracking Tool: Saluda Relicensing Project

Common Name	*Scientific Name*	Federal Status[1]	Population Status[2]	Critical Habitat Identified	Existing Restoration Plan (FWS or Other)	Counties	Determination of effect	Data Needs/Comments
Bald eagle	*Haliaeetus leucocephalus*	T		No	FWS (Southeastern States)	Lexington, Newberry, Richland, Saluda		
Carolina heelsplitter	*Lasmigona decorata*	E		Yes, but not listed in project boundaries	FWS	Lexington (possible), Newberry (possible), Richland (possible), Saluda (possible)		
Red-cockaded woodpecker	*Picoides borealis*	E		No	FWS	Lexington, Richland, Saluda		
Shortnose sturgeon	*Acipenser brevirostrum**	E		No		Lexington (possible), Richland		
Smooth coneflower	*Echinacea laevigata*	E		No	FWS	Lexington (possible), Richland		
Schweinitz's sunflower	*Helianthus schweinitzii*	E		No	FWS	Lexington		
Southern Dusky Salamander	*Desmognathus auriculatus*	SC		N/A	N/A	Lexington (possible), Richland (possible)		
Dwarf aster	*Aster mirabilis*	SC		N/A	N/A	Lexington (possible)		
Shoal's spider-lily	*Hymenocallis coronaria*	SC		N/A	N/A	Lexington, Richland		
Prairie birdsfoot-trefoil	*Lotus purshianus var. helleri*	SC		N/A	N/A	Lexington (possible), Newberry (possible), Richland (Possible), Saluda (possible)		
Piedmont cowbane	*Oxypolis ternata*	SC		N/A	N/A	Lexington		
Wire-leaved dropseed	*Sporobolus teretifolius*	SC		N/A	N/A	Lexington		
Pickering's morning-glory	*Stylisma pickeringii var. pickeringii*	SC		N/A	N/A	Lexington		
Rayner's blueberry	*Vaccinium crassifolium ssp sempervirens*	SC		N/A	N/A	Lexington, Richland		
American kestrel	Falco sparverius	SC		N/A	N/A	Lexington (possible), Newberry (possible), Richland, Saluda (possible)		
Loggerhead shrike	Lanius ludovicianus	SC		N/A	N/A	Lexington (possible), Newberry (possible), Richland, Saluda (possible)		
Painted bunting	Passerina ciris ciris	SC		N/A	N/A	Lexington (possible), Richland (possible)		
Southern hognose snake	Heterodon simus	SC		N/A	N/A	Lexington (possible), Richland, Saluda		
Robust Redhorse Sucker	Moxostoma robustum	SC		N/A	N/A	Lexington (possible)		

Butternut	Juglans cinerea	SC	N/A	N/A	Newberry (possible)
Biltmore green briar	Smilax biltmoreana	SC	N/A	N/A	Newberry
Sweet pinesap	Monotropsis odorata	SC	N/A	N/A	Newberry
Bachman's sparrow	Aimophia aestivalis	SC	N/A	N/A	Newberry, Saluda, Richland, Lexington
Henslow's sparrow	Ammodramus henslowii	SC	N/A	N/A	Newberry, Saluda, Richland, Lexington
Saluda crayfish	Distocambarus youngineri	SC	N/A	N/A	Newberry
Rough-leaved loosestrife	Lysimachia asperulaefolia	E	No	FWS	Richland
Canby's dropwort	Oxypolis canbyi	E	No	FWS	Richland
Georgia aster	Aster georgianus	C	N/A	FWS	Richland
Sandhills milk-vetch	Astragalus michauxii	SC	N/A	N/A	Richland
Purple balduina	Balduina atropurpurea	SC	N/A	N/A	Richland
Creeping St. John's wort	Hypericum adpressum	SC	N/A	N/A	Richland
Bog spicebush	Lindera subcoriacea	SC	N/A	N/A	Richland
Carolina bogmint	Macbridea caroliniana	SC	N/A	N/A	Richland
Algae-like pondweed	Potamogeton confervoides	SC	N/A	N/A	Richland
False coco	Pteroglossaspis ecristata	SC	N/A	N/A	Richland
Awned meadowbeauty	Rhexia aristosa	SC	N/A	N/A	Richland
Reclined meadow-rue	Thalictrum subrotundum	SC	N/A	N/A	Richland
White false-asphodel	Tofieldia glabra	SC	N/A	N/A	Richland
Carolina darter	Etheostoma collis	SC	N/A	N/A	Richland
Rafinesque's big-eared bat	Corynorhinus rafinesquii	SC	N/A	N/A	Richland
Piedmont bishop-weed	Ptilimnium nodosum	E	No	N/A	Saluda
Little amphianthus	Amphianthus pusillus	T	No	FWS	Saluda
Dwarf burhead	Echinodorus parvulus	SC	N/A	N/A	Saluda
Creeping St. John's wort	Hypericum adpressum	SC	N/A	N/A	Saluda
Savannah lilliput	Toxolasma pullus	SC	N/A	N/A	Saluda

[1] E – Federally Listed as Endangered
T - Federally Listed as Threatened
SC - species is a Candidate for Federal Listing as Threatened or Endangered (species of concern)
EDCH - Federally Listed as Endangered and has Designated Critical Habitat in the counties surrounding the project.
TPDH - Federally Listed as Threatened and has Designated Critical Habitat in the counties surrounding the project.
PE - Presumed extinct/no current status

[2] N - No recent records
E - Extant; occurs within project boundaries

EO - Extant; occurs outside project boundaries
RD - Recently discovered

[3] NE - No Effect
NL - Not likely to adversely affect
LA - Likely to adversely affect