Yadkin Hydroelectric Project (FERC No. 2197)
Fish and Aquatics (RTE aquatic) Issue Advisory Group
Final Meeting Summary

April 9, 2003
Badin, North Carolina

Meeting Agenda

See Attachment 1.

Meeting Attendees

See Attachment 2.

Welcome and Introductions

Gene Ellis, Yadkin, opened the meeting with introductions and a review of the agenda. Gene also introduced Jane Peeples, Meeting Director, who reviewed several process-related issues (meeting norms and schedule).

Jane Peeples reviewed the posted "meeting norms", which had been presented and agreed to at the February 28, 2003 Issue Advisory Group (IAG) Organizational Meeting: meetings begin and end on time; agenda is followed; needed information resources are available; tangible process is made; all decisions are clearly understood; agenda for next meeting is discussed at the close of each meeting; and group members demonstrate effective meeting behaviors.

Jane discussed the relicensing schedule. She said three-days had been set aside each month through the end of the year for Yadkin Project IAG meetings to avoid any conflicts with other regional relicensing meetings (May 20-22; June 3-5; July 8-10; August 5-7; September 2-4; October 7-9; November 4-6; and December 2-4). Jane noted that all three meeting days might not be used each month – for example, only two of the meeting days in April were used (April 9 and 10) for IAG meetings. She explained that the Fish and Aquatics and Recreation, Aesthetics, and Shoreline Management IAGs met in April because of the time sensitivity of the proposed studies. She said that the Wetlands, Wildlife, and Botanical IAG would also meet in April on April 25, 2003. She noted that Yadkin had not yet scheduled meetings of the Operations Model IAG, County Economic Impacts IAG, or Cultural Resources IAG for April or May (all IAGs will not meet every month).

Continuing, Jane said that the purpose of the meeting was to review draft study plans for fish and aquatic studies. She said that based on the comments received at the meeting, Yadkin and its consultants would revise the draft study plans. The revised draft study plans would then be distributed (electronically) to the IAG for a second review. Yadkin and its consultants would then finalize the study plans and initiate the field studies.

Hearing no questions about meeting norms or schedule, Jane Peeples introduced Wendy Bley, Long View Associates, who provided a review of the March 12, 2003 Fish and Aquatics IAG meeting.

Review of March 12, 2003 IAG Meeting

Wendy briefly summarized the fish and aquatic issues discussed at the March 12, 2003 IAG meeting: reservoir and tailwater fisheries and aquatic habitat; fish entrainment; diadromous fishes; downstream instream flows; and habitat fragmentation. She noted that the IAG would discuss draft study plans for a Reservoir Fish and Aquatic Habitat Assessment, a Tailwater Fish and Aquatic Biota Assessment, and a Fish Entrainment Study (see Attachments 3 through 5). Wendy noted that diadromous fishes and downstream instream flows would need to be addressed in cooperation with the downstream licensee, Progress Energy. She recalled a suggestion at a previous IAG meeting to organize a joint workgroup (of participants in both relicensings) to address such issues. Wendy said that Yadkin was open to discussing such a joint workgroup, but noted that Progress would not meet with its Resource Workgroups until the first week of May 2003 and said that she thought any decision about such a workgroup would have to wait. Finally, Wendy said that the resource agencies had expressed a concern about the Project dams and reservoirs acting as barriers and creating fragmented habitat (habitat fragmentation). She said that Normandeau Associates (NAI) had conducted a habitat fragmentation study at Alcoa Power Generating Inc.'s Tapoco Project. Wendy said that before planning and initiating this study, Yadkin is interested in meeting with the resource agencies to review the Tapoco Habitat Fragmentation Draft Study Report and to scope the Yadkin Habitat Fragmentation Study. She suggested that the IAG discuss the issue of habitat fragmentation at the Yadkin Project at the end of the day, time permitting.

Review of Draft Fish and Aquatic Study Plans

Wendy mentioned that copies of the Reservoir Fish and Aquatic Habitat Assessment, Tailwater Fish and Aquatic Biota Assessment, and the Fish Entrainment Study (Attachments 3 through 5) were distributed electronically to the IAG on April 4, 2003 for their review in advance of the meeting (hardcopies were available at the meeting). Wendy asked Rick Simmons, NAI, to review each of the draft study plans with the IAG.

Reservoir Fish and Aquatic Habitat Assessment

Rick Simmons said that the Reservoir Fish and Aquatic Habitat Assessment (Reservoir Assessment) would evaluate the effects of Yadkin Project reservoir operations on fish and aquatic habitat. Specifically, the study would map the existing aquatic habitat in the drawdown zones of High Rock and Narrows reservoirs and the littoral zones of Tuckertown and Falls reservoirs and evaluate the impacts of fluctuating water levels on the existing fishery and aquatic habitats in the four impoundments.

Rick summarized the methodology for the habitat surveys and reservoir level fluctuation evaluation (see Attachment 3).

Larry Jones, High Rock Lake Association, suggested that NAI, rather than relying on visual surveys of the drawdown and littoral zones, use echo sounders (hydro acoustics), which facilitate habitat mapping under full pond conditions (no reservoir drawdown would be necessary). He noted that if High Rock Reservoir were drawn down 10 feet or more, NAI would not be able to access the dry coves by boat. Larry recommended Biosonics Inc. specifically (www.biosonicsinc.com).

Rick acknowledged that NAI might have to walk the coves. He suggested that NAI might need to survey the cove areas before the drawdown. Rick noted several concerns about using hydro acoustics to map aquatic habitat: reservoir turbidity; inability to distinguish between habitat types (rock – boulder or cobble); and the inability to quantify the amounts of available habitat.

Gerrit Jobsis, South Carolina Coastal Conservation Commission (SCCCL) and American Rivers, asked how NAI would ground truth the habitat surveys. Rick explained that NAI would film the entire shoreline of each reservoir using a digital movie camera. Gerrit asked how often NAI would actually look at the substrates to ground truth what is being filmed. Gerrit suggested that the study plan include more detail about ground truthing. Wendy stated that NAI would map every square meter of the reservoir shorelines using a Trimble GPS unit coupled with a laser and calculate habitat types (e.g. woody debris, cobble, boulder and ledge, sand/clay etc.). In addition, NAI will have a video record of all the shoreline. Gerrit asked that NAI detail and document its proposed methodology in a revised study plan. Rick offered to provide Gerrit, and others, a copy of the Santeetlah Reservoir Habitat Assessment Final Report (an example of similar work conducted at APGI's Tapoco Project). Gerrit thought it would be helpful to receive a copy of the report.

Lawrence Dorsey, North Carolina Wildlife Resources Commission (NCWRC), asked if NAI would use set criteria to determine whether the habitat type is woody debris or rock etc. Rick answered yes. He said, for example, trees are divided into many categories – standing trees, brush, heavily branched trees, medium branched tree, no branched tree, Christmas trees etc. Wendy agreed to outline the criteria for each of the habitat types in the revised study plan.

The draft study plan states "areas of significant erosion will also be located and filmed during the survey". Donley Hill, U.S. Forest Service (USFS), asked how "significant erosion" would be defined. Rick said that he would have to wait until he gets into the field to determine specific criteria. Wendy Bley asked if Donley or others had suggestions about criteria for "significant erosion". She noted that some judgment would be involved. She also said that it would not be very useful if NAI mapped the entire shoreline as eroding. Donley said that "significant erosion" could be defined as erosion that is active and ongoing (evidence of fallen trees, with a linear extent of greater than 50 feet).

Mark Bowers, U.S. Fish and Wildlife Service (USFWS), asked if there are any plans to shoot additional aerial photographs. Wendy said that Yadkin has good photos of winter conditions (when the reservoir is drawn down), but no color photos of the vegetative season (June and July) for the wetlands delineation. She said that Yadkin was planning to shoot aerial photos in June and July. Mark suggested a comparison to other older photographs to estimate the amount of cubic yards of soil that have been lost to erosion. Larry Jones agreed that Yadkin should overlay

archived photos and surveys of the reservoirs with more current photos to see how much/far the reservoir has moved. Mark said that it is important to catalogue areas of erosion so that the areas can be prioritized for management (e.g. vegetative plantings). Wendy thought it important to look at the changes in the shoreline over time, but noted that this type of examination does not indicate whether the erosion is active and ongoing. Wendy expanded the criteria for significant erosion, as defined by Donley, to include "and resources are being impacted" – "active and ongoing, and resources are being impacted".

Mark Bowers asked if the Water Quality IAG planned to study erosion and sedimentation. Wendy said that erosion is a water quality issue, but said if the concern is more about impacts to existing resources (habitat – e.g. spawning areas lost to deposition) it should be studied within the Fish and Aquatics IAG. Mark said that it would be important not to separate habitat from water quality, which can affect habitat. Wendy said that to the extent necessary, the two IAGs would coordinate on any erosion and sedimentation studies.

Gerrit Jobsis commented that it would be important to establish quantitative criteria in the study plan to evaluate effects of erosion on spawning habitats for individual fish species of interest. Rick stated they would note areas where sedimentation appears to be impacting habitat, but noted that it would be difficult to distinguish between sedimentation caused by shoreline erosion and sedimentation caused by upstream sources.

Rick said that for the reservoir level fluctuation evaluation, NAI would consider habitat needs, spawning times etc. for the particular fish species (especially the littoral species). He said that NAI would determine what habitat the species seeks out and spawns in, quantify the habitat available, and determine how life histories are impacted by reservoir fluctuations. Chris Goudreau, NCWRC, asked if it would be possible, at the conclusion of the study, to query a database to determine how much habitat meets certain HSI (Habitat Suitability Index) criteria. Rick said, for example, if a fish needs woody debris and 3-4 feet of water, the data collected could be used to quantify the amount of habitat that would be available.

Wendy cautioned the group about moving too far ahead. She said that the first step is to agree on the methodology for collecting and having the habitat information in a format that can then be used in a variety of evaluations. She was hesitant to define HSI-type criteria. Gerrit said that it is important to structure the study to collect the information needed for habitat suitability evaluations. Rick stated that NAI collected habitat data three or four layers deep at Santeetlah Reservoir. Lawrence Dorsey noted that there are numerous studies linking species to substrate types. He thought the study, as proposed, is adequate as long as the habitat data collected by NAI is robust enough to make decisions about habitat availability. He added that the ability to query a habitat database would be advantageous.

Chris Goudreau commented that the Santeetlah Reservoir Habitat Assessment was very well done. He said that the only trouble he had with the assessment and final product was the incompatibility with North Carolina's other data files (GIS data layers). Rick offered to have NAI's GIS technician contact North Carolina's GIS technician to ensure that the Yadkin habitat data file is compatible with North Carolina's other data files.

After a break, Rick showed an example of a habitat mapping product from the Santeetlah Reservoir Habitat Assessment. Lawrence Dorsey asked if sand and clay would be the default habitat type. Rick said that it is likely that NAI will break this habitat type down even further. Mark Bowers encouraged NAI to look at the county soil survey maps, which he said are fairly reliable.

Mark said he recognized that High Rock is the storage reservoir and therefore the focus of the habitat assessment. However, he suggested that the other Project reservoirs, specifically Narrows Reservoir, have the potential under a new license to be operated with a larger drawdown. He did not want to be stuck guessing about the habitat impacts from drawdowns on the other Project reservoirs. Jim Melton, SaveHighRockLake.org, agreed that draw down areas should be studied at the other Project reservoirs (in addition to High Rock). Rick said that the typical drawdown at Narrows Reservoir is approximately 3 ft. Rick proposed mapping only the littoral zones at Tuckertown and Falls reservoirs, which are operated essentially as run-of-river (little to no storage and therefore limited fluctuation). Mark again suggested that NAI use the echo sounders (which do not require a reservoir drawdown).

Wendy Bley said that the typical drawdown at Narrows Reservoir is 3 ft. She noted that under Yadkin's current license, Yadkin could draw the reservoir down about 6.5 ft, although it has not happened frequently in the past. Wendy said that the IAG would have to decide if an assessment of three additional feet at Narrows adds sufficient additional value to the study. She reminded the group that NAI would also be mapping all of the aquatic water beds (from the aerial photos), which will likely make up a large portion of total habitat at the reservoir.

Larry Jones stated that Yadkin's license allows a 24 ft drawdown at Narrows Reservoir. Gene explained that if Narrows Reservoir is drawn down more than about 6.5 ft, then High Rock Reservoir has to be drawn down 24 ft. Larry suggested that FERC could issue a license variance. Gene said that while a 6.5 ft draw down at Narrows Reservoir is allowed under the license, Yadkin would have to be conservative and operate above that level (more like a 5 ft draw). Larry said the echo sounders could be used to map aquatic habitat at full pool.

Lawrence Dorsey said that he was in favor of assessing a 5 ft draw at Narrows Reservoir. He said that he would be hesitant to use an echo sounder.

Mark Bowers thought that Yadkin could use some storage at Tuckertown and Falls to provide a couple hundred cfs for downstream flows and alleviate the burden of a drawdown at High Rock and Narrows reservoirs. He said that the Yadkin Project is the storage in the river basin and is in control of how much water Progress is getting.

Chris Goudreau asked if the assessment would include SAV (submerged aquatic vegetation). Rick replied that the Wetland and Riparian Habitat Assessment, also being conducted by NAI, would identify and map aquatic beds. Rick asked if water willow grows in rock habitat. Wendy answered that water willow grows in a variety of substrates.

Mark Bowers suggested that NAI use hydro acoustics to quantify underwater vegetation. He recommended Biosonics. Rick said he felt more comfortable with a aerial photos and some

ground truthing. He said that he has worked with Biosonics equipment and found that it did not work.

Mark asked NAI to focus on predators and prey being together during drawdowns as a component of the reservoir level fluctuation evaluation.

Chris Goudreau asked about the use of NCWRC fishery data to evaluate the effects of alternative reservoir fluctuations (as described in the study plan). Rick said that he would be using the NCWRC data to compile a list of reservoir fish species. Wendy said that it would be important to understand NCWRC management priorities. Chris said that he is currently trying to finalize a management plan. Rick asked Chris to let him know if there is a species of particular interest to the NCWRC.

Tailwater Fish and Aquatic Biota Assessment

Rick Simmons said that the Tailwater Fish and Aquatic Biota Assessment (Tailwater Assessment) would evaluate the effects of Yadkin Project reservoir releases on tailwater fish, macroinvertebrates, and aquatic habitat and assess the current status of rare, threatened, and endangered (RTE) aquatic species at the Project. Specifically, the study would describe the tailwater habitats; inventory and assess the resident tailwater fish community, as well as macroinvertebrate and mussel species; and search for RTE fish and mussel species. Rick summarized the methodology for the Tailwater Assessment (see Attachment 4).

Mark Bowers commented that a component of the study should be an evaluation of the peaking regime below the dams. Mark said that peaking causes changes in the amount and quality of available habitat below the dams. He was specifically concerned about the potential for fluctuations of 5-6 ft. in the tailwater twice a day. Rick said that NAI would plan to sample the tailwaters during times of generation and no generation. Sampling will also be conducted on a seasonal basis (spring, summer, and fall). Rick noted that the tailwaters at the Yadkin Project are not typical tailwaters (i.e. the reservoirs back right up to the dams). He said that 5-6 ft fluctuations in the tailwater are not very common at the Yadkin Project. Chris Goudreau said that there might be some observable differences in species when the generators are on, particularly for mobile species.

Gerrit Jobsis commented on the study plan's lack of detail. He said that there were many study components (water quality and low dissolved oxygen; effect of ramping rates on utilization of habitat etc.) that were discussed at the March 12, 2003 IAG meeting, but not included in the draft study plan. He noted that the study plan does not include a sampling design or a discussion of the level of confidence in the data collected. Rick said that he had intentionally left the study plan general in anticipation of receiving additional details from the IAG. Rick said that temperature and dissolved oxygen data is collected at all fish sampling stations. With regard to ramping, Rick said that there is no great dewatering of the tailwaters below the dams and powerhouses when generation ends. He said, based on his experience, that NAI would likely catch the same fish species during and after generation. Gerrit stated that during discharges of water with low dissolved oxygen, fish would move out of the tailwater. He asked that NAI compare periods of low dissolved oxygen and no low dissolved oxygen.

Darlene Kucken, North Carolina Division of Water Quality (NCDWQ), asked Rick to discuss the macroinvertebrate sampling. Rick explained that an underwater airlift will be used to collect macroinvertebrate samples (2 m^2 sample size) along two transects in each of the tailwaters. Darlene commented that flow can be an important factor for macroinvertebrates - she specifically questioned the effect of heavy scours on the macroinvertebrates in the tailwaters. Rick said that he thought dissolved oxygen would have a bigger impact on the macroinvertebrates than flow in the Project tailwaters.

Chris Goudreau asked about the extent of the mussel surveys. Rick said that NAI would survey for mussels along the entire transect and one meter upstream and downstream of the transect. Chris asked that this detail be included in the study plan. Mark Bowers asked that NAI (Pennington and Associates (PAI) will actually conduct the mussel surveys) also walk the shoreline of each tailwater looking for fresh and dead mussel shells.

Chris stated that the tailwater transects might not cross areas of good mussel habitat, as identified in the habitat survey. He suggested that NAI also focus on these areas of good habitat (in addition to survey work along the transects). Mark said that the USFWS could help to identify mussel habitat in the Project tailwaters.

Wendy Bley suggested that the IAG (resource agencies and others) schedule a tailwaters site visit to discuss transect selection and identify habitat types sometime in June, before the summer sampling.

Chris Goudreau asked if there is a sampling technique better directed at the redhorse (Carolina and robust) species. Rick answered that the shoal areas at each development will be targeted for spawning redhorse species when water temperatures are between 18°C and 24°C. Lawrence Dorsey commented that there is no “tried and true” method for capturing the redhorses. He said that catch rates are about one per year for the robust redhorse.

Gerrit said that NAI should begin sampling by August to capture the low dissolved oxygen period. Gerrit asked that NAI also determine the extent of the low dissolved oxygen “plume” and its effect on fish movements into and out of the tailwater. Wendy agreed that it would be important to document the existing conditions in the tailwaters but she thought the focus should also be on establishing a baseline so that when there are dissolved oxygen improvements (upgrades/air injections etc.) it will be possible to document the improvements. She questioned spending a lot of effort on documenting something that is known not to be good. Wendy said that locating the downstream extent of the low dissolved oxygen discharge could be a component of the water quality study. Gerrit agreed that baseline information is very important. He said that he wants to ensure that the new license protects water quality and to do so there needs to be adequate documentation of impacts of Project operations on water quality.

After lunch, the IAG scheduled a tailwater site visit for Tuesday, June 3, 2003. Lawrence offered logistical support (boats).

Fish Entrainment Evaluation

Rick Simmons said that the Fish Entrainment Study would evaluate the potential for entrainment of resident fishes and diadromous fish species, which are candidates for possible reintroduction, at the Yadkin Project powerhouses. Rick summarized the methodology for the Fish Entrainment Study (see Attachment 5). He noted that NAI will rely on EPRI's (Electric Power Research Institute) compilation of entrainment data from 43 hydro sites to estimate entrainment rates for fishes of three size groups at the Yadkin Project. He proposed evaluating fish species targeted for fisheries management by resource agencies and species that are prone to entrainment.

Mark Bowers assumed that it was implied in the study plan, but asked that NAI use similar sized reservoirs with similar generating capacities included in the EPRI compilation when evaluating entrainment potential at Yadkin.

Chris Goudreau asked that the study's objectives discuss an evaluation of the potential not only for entrainment, but also impingement and turbine mortality. Chris noted that there are studies that demonstrate that impingement is negligible because of the rack size and spacing (e.g. two inch bar spacing), but asked that impingement be discussed in the study report anyway. Chris suggested that Yadkin distribute a copy of the Tapoco Project Fish Entrainment Assessment Final Report so the IAG can determine if the study methodology is sufficient.

Jim Melton asked about the impact of fluctuating reservoirs and drawdowns on entrainment. Rick responded that generally, entrainment increases with a drawdown (because the fish are pulled down closer to the intakes).

Habitat Fragmentation

Wendy Bley said that Yadkin had been asked to conduct a habitat fragmentation study to identify isolated and fragmented populations and evaluate the fragmentation effects of dams and reservoirs at the Project. She noted that a similar study had been conducted at APGI's Tapoco Project. She explained that the Stream Habitat Fragmentation Evaluation Report had never been reviewed with the Tapoco Fish and Aquatics Workgroup or finalized because of Doug Neiman's (NAI) illness. For those not familiar with the Tapoco study, Wendy explained that the study modeled the system to determine what portion of the watershed was being separated or "de-linked" from the rest of watershed. Wendy suggested that the Tapoco study be used to focus study efforts at the Yadkin Project. She said that the IAG could start by learning more about the characteristics of the watershed and understanding the species of concern and their distribution in the watershed through a literature review.

Mark Bowers agreed that a first step could be to examine historical fish and mussel collections to determine where species have been extirpated or exist only in low numbers.
For diadromous fish species, Gerrit suggested a review of historic literature in local libraries and newspapers, as well as legal records. Rick said that NAI was already working with museums and talking with an anthropologist at Applachian State. He also emphasized the value of Indian sites and archaeological data. Mark mentioned Moravian records at the Forsyth County Library.

Wendy encouraged the IAG to think beyond the literature review. She stated that she thought the Tapoco relicensing participants were most frustrated with the Stream Habitat Fragmentation Evaluation because it did not identify present-day and ongoing fragmentation effects that could possibly be managed through changes in Project operations or other management decisions. She thought that the study could, among other things, identify which tributaries have the potential to be repopulated.

Donley Hill said that ultimately the results of a habitat fragmentation evaluation could become the basis for some agreement on in-kind restoration or some other appropriate mitigation. He asked that the study report identify any opportunities for resource enhancement. Donley said that the USFS is particularly interested in information that helps them identify opportunities to restore or enhance species diversity in headwater and tributary streams. He acknowledged that if there are obvious disjunct populations that can not be expected to be restored, it would be reasonable to pursue in-kind resource enhancements in other portions of the same watershed. Donley suggested that macrohabitat variables, such as temperature, could be used as a first filter for determining if fragmentation is occurring. Wendy commented that she thought it more appropriate for the study to focus on determining appropriate protection, mitigation, and enhancement (PME) measures rather than focusing on documenting a problem that is clearly a problem. Gerrit stated that it will be important for the study to identify the ongoing impacts caused by the presence of the dams and reservoirs. Mark asked that the study include some quantification of impacts, such as loss of spawning habitat in river miles.

Gerrit asked about next steps. Wendy suggested a conference call with Doug Neiman to discuss study objectives, methodology, reporting etc. However recognizing that Doug's work schedule is uncertain, Wendy suggested that NAI begin completing some Phase I work (i.e. literature review; habitat characterization on a macro level; ranking of tributaries, etc.). Rick Simmons agreed to develop a Habitat Fragmentation Study Phase I draft study plan. Wendy agreed to distribute a copy of the Tapoco Project Stream Habitat Fragmentation Draft Report to the IAG.

Schedule and Agenda for Next Meeting

Before the meeting adjourned, Gerrit asked about outstanding requests for an assessment of sediment and how area dams have affected the downstream transport of sediments and their availability downstream and the NCWRC request for an assessment of the potential for the removal of small dams on tributaries in the Yadkin Pee Dee River basin as mitigation. Wendy answered that the Water Quality IAG would address sedimentation and sediment transport. Wendy said she thought that the NCWRC request to study dam removal on tributaries in the river basin as an opportunity for mitigation would be covered in the Habitat Fragmentation Study. Chris Goudreau agreed.

Wendy said that NAI would revise the draft study plans based on comments received. She said that NAI would go ahead and revise the Tailwater Fish and Aquatic Biota Assessment, but would likely revise the study plan again after the June 3, 2003 site visit to add more detail. Wendy said that after a comment period, Yadkin will finalize the study plan or, if there were still major issues to be discussed, would schedule a conference call.

The meeting adjourned at about 2:00 p.m.

Attachment 1 – Meeting Agenda

Yadkin Project
(FERC No. 2197)
Communications Enhanced Three-Stage Relicensing Process

Fish and Aquatics Issue Advisory Group Meeting

Wednesday, April 9, 2003
Alcoa Conference Center
Badin, North Carolina

9:00 AM – 4:00 PM

Preliminary Agenda

1. Introductions, Review Agenda

2. Review of March 12, 2003 IAG Meeting

3. Review of Draft Fish and Aquatics Study Plans

   I. Reservoir Fish and Aquatic Habitat Assessment
      i. Aquatic Habitat Assessment
      ii. Reservoir Fluctuation Evaluation
   II. Tailwater Fish and Aquatic Assessment
   III. Fish Entrainment Evaluation

4. Schedule and Agenda for Next Meeting

Attachment 2 – Meeting Attendees

Name	Organization	Email
Andy Abramson	Land Trust	andy@landtrustcnc.org
Bob Smet	APGI, Yadkin Division	robert.smet@alcoa.com
Chris Goudreau	NC Wildlife Resources Commission	goudrecj@wnclink.com
Darlene Kucken	NC Division of Water Quality	darlene.kucken@ncmail.net
Donley Hill	US Forest Service	donleyhill@fs.fed.us
Gene Ellis	APGI, Yadkin Division	gene.ellis@alcoa.com
Gerrit Jobsis*	SC Coastal Conservation Commission	scrivers@bellsouth.net
Jane Peeples	Meeting Director	jpeeples@carolinapr.com
Jim Melton	SaveHighRockLake.org	jrmelton@lexcominc.net
Jody Cason	Long View Associates	jjcason@worldnet.att.net
Julian Polk	APGI, Yadkin Division	julian.polk@alcoa.com
Larry Jones	High Rock Lake Association	larry@foxhollowfarm.org
Lawrence Dorsey	NC Wildlife Resources Commission	dorseylg@vnet.net
Mark Bowers	US Fish and Wildlife Service	mark_bowers@fws.gov
Nolan Reid	Piedmont Boat Club	nreid65@aol.com
Randy Benn	Yadkin counsel	dbenn@llgm.com
Rick Simmons	Normandeau Associates	rsimmons@normandeau.com
Ryan Heise	NC Wildlife Resources Commission	ryan.heise@earthlink.net
Wendy Bley	Long View Associates	bleylva@aol.com

*By phone

Attachment 3 – Reservoir Fish and Aquatic Habitat Assessment Draft Study Plan

Yadkin Project (FERC No. 2197)
Reservoir Fish and Aquatic Habitat Assessment

Draft Study Plan
4/4/03

Background

Alcoa Power Generating Inc. (APGI) is the licensee for the Yadkin Hydroelectric Project. The Yadkin Project is currently licensed by the Federal Energy Regulatory Commission (FERC) as Project No. 2197. This license expires in 2008 and APGI must file a new license application with FERC on or before April 30, 2006 to continue operation of the Project.

The Yadkin Project consists of four reservoirs, dams, and powerhouses (High Rock, Tuckertown, Narrows, and Falls) located on a 38-mile stretch of the Yadkin River in central North Carolina. The Project generates electricity to support the power needs of Alcoa's Badin Works, to support its other aluminum operations, or is sold on the open market.

As part of the relicensing process, APGI prepared and distributed, in September 2002, an Initial Consultation Document (ICD), which provides a general overview of the Project. Agencies, municipalities, non-governmental organizations and members of the public were given an opportunity to review the ICD and identify information and studies that are needed to address relicensing issues. To further assist in the identification of issues and data/study needs, APGI has formed several Issue Advisory Groups (IAGs) to advise APGI on resource issues throughout the relicensing process. IAGs will also have the opportunity to review and comment on Draft Study Plans. This Draft Study Plan has been developed in response to comments on the ICD and through discussions with the Fish and Aquatics IAG, to provide additional necessary information for consideration in the relicensing process.

Issues

The following issue was raised during initial consultation regarding reservoir fisheries and aquatic habitat at the Yadkin Project:

- Evaluate the effects of Yadkin Project reservoir operations on fish and aquatic habitat

Study Objectives

On March 12, 2003 the Fish and Aquatics IAG met and discussed objectives for the reservoir fishery and aquatic habitat study. Over the course of those discussions the following objectives were identified for the study.

- Map the existing aquatic habitat in the drawdown zones of High Rock and Narrows reservoirs and the littoral zones of Tuckertown and Falls reservoirs for inclusion in a GIS based (ARC View) database.

- Evaluate the impacts of fluctuating water levels under existing Project operations on the existing fishery and aquatic habitats in the four impoundments.

Methods-Habitat surveys

The habitat mapping portion of the study will be conducted by Normandeau Associates Inc. (NAI) and will entail the following:

- Significant aquatic habitat will be mapped in the drawdown zones of High Rock and Narrows and the littoral zones of Tuckertown and Falls reservoirs during the fall/early winter of 2003 using a Trimble GPS unit coupled with a laser, digital movie camera, laptop computer and Hydro Pro software. The laser scope will enable a crew to pinpoint and outline important habitat features from a boat (sub-meter accuracy) to calculate habitat area. Habitat types will include, but not be limited to stream confluences, aquatic vegetation, woody debris (natural and cut), structures (piers, docks, marinas, etc.), rock habitat – gravel, cobble, boulder and ledge, and sand/clay habitat.

- In Tuckertown and Falls reservoirs, habitat mapping will be conducted in the littoral zone (approximately 1 meter deep) during fall 2004. Because drawdowns are minimal in these two reservoirs, detailed mapping will be limited to exposed shoreline substrates and other observable habitat features, such as aquatic vegetation, lap trees, and rock outcroppings.

- Habitat data will be imported into an ARC View data file so the amount of aquatic habitat (acres and ft^2) can be calculated. High Rock and Narrows will include bathymetry in 2 ft contour intervals.

- During the habitat surveys, the entire shoreline of all four reservoirs will be filmed with a digital movie camera connected to the Trimble GPS unit. Areas of significant erosion will also be located (lat/lon) and filmed during this survey.

- Significant wetlands (water willow, etc.) will be imported into this ARC View file upon completion of the wetland delineation work, tentatively scheduled for 2004.

- Docks and piers, which are already a data layer in the Yadkin GIS system, will be layered into the habitat data file

Methods – Reservoir level fluctuation evaluation

The reservoir fluctuation evaluation portion of the study will also be conducted by Normandeau and will entail the following:

- Evaluate effects of current Project operations and water level fluctuations on existing fishery and aquatic habitats, including impacts to fish species of management concern during the spawning season and impacts due to daily and seasonal drawdowns. Fish species evaluated will primarily include all those that spawn in the littoral zone, such as largemouth bass, sunfish species (bluegill, pumpkinseed etc). Other fish, such as the forage species that are pelagic spawners (threadfin and gizzard shad, blueback herring)

will also be evaluated. The habitat surveys discussed above will be used to quantify impacts of fluctuations on fish and aquatic habitats.

- Evaluate effects of alternative reservoir fluctuations, such as reduced drawdown zone, seasonal changes to rule curve (fill reservoir sooner or hold full longer, etc.)
    - Assess existing water level fluctuation and drawdown data for the reservoirs, calculate median, mean low and mean high water levels from long term data sets and prepare a graph for a 12-month cycle to assess impacts (this data will also be used for wetlands evaluation).
    - Use fishery data collected by NCWRC, Yadkin consultants (recent CP&L fish sampling in four reservoirs) and upcoming tailwater fisheries sampling beginning in 2003 to conduct this evaluation.

Reporting

Results of this evaluation will be reported in draft and final study reports. A draft study report will be prepared and distributed to the Fish and Aquatics IAG for review and comment, approximately three months after the completion of data collection. IAG comments will be addressed in a final study report. Interim results, such as draft habitat maps of the reservoirs, may be shared with the IAG as such information becomes available, prior to completion of the draft study report.

Attachment 4 – Tailwater Fish and Aquatic Biota Assessment Draft Study Plan

Yadkin Project (FERC No. 2197)
Tailwater Fish and Aquatic Biota Assessment

Draft Study Plan
4/4/03

Background

Alcoa Power Generating Inc. (APGI) is the licensee for the Yadkin Hydroelectric Project. The Yadkin Project is currently licensed by the Federal Energy Regulatory Commission (FERC) as Project No. 2197. This license expires in 2008 and APGI must file a new license application with FERC on or before April 30, 2006 to continue operation of the Project.

The Yadkin Project consists of four reservoirs, dams, and powerhouses (High Rock, Tuckertown, Narrows, and Falls) located on a 38-mile stretch of the Yadkin River in central North Carolina. The Project generates electricity to support the power needs of Alcoa's Badin Works, to support its other aluminum operations, or is sold on the open market.

As part of the relicensing process, APGI prepared and distributed, in September 2002, an Initial Consultation Document (ICD), which provides a general overview of the Project. Agencies, municipalities, non-governmental organizations and members of the public were given an opportunity to review the ICD and identify information and studies that are needed to address relicensing issues. To further assist in the identification of issues and data/study needs, APGI has formed several Issue Advisory Groups (IAGs) to advise APGI on resource issues throughout the relicensing process. IAGs will also have the opportunity to review and comment on Draft Study Plans. This Draft Study Plan has been developed in response to comments on the ICD and through discussions with the Fish and Aquatics IAG, to provide additional necessary information for consideration in the relicensing process.

Issues

The following issues were raised during initial consultation regarding tailwater fish and aquatic biota at the Yadkin Project:

- Effects of Yadkin Project reservoir releases on tailwater fish, macroinvertebrates and aquatic habitat

- Current status of rare, threatened and endangered (RTE) aquatic species at the Yadkin Project that could be impacted by Project operations

Objectives

On March 12, 2003 the Fish and Aquatics IAG met and discussed objectives for the tailwater fish and aquatic biota study. Over the course of those discussions the following objectives were identified for the study.

- Describe tailwater habitats in all four Yadkin development tailwater areas.

- Inventory and assess the resident fish community in the Project tailwaters on a seasonal basis (spring, summer & fall) to develop baseline data that can be used to detect changes over time. Evaluate the impacts of existing Project operations on tailwater fish community.

- Inventory and assess the macroinvertebrate and mussel species in the Project tailwaters on a seasonal basis to develop baseline data that can be used to detect changes in these communities over time. Evaluate impacts of existing Project operations on tailwater macroinvertebrate community and describe tailwater habitats.

- Search for RTE mussel species in Project tailwaters.

- Search for RTE fish species, including the Robust and Carolina Redhorse species, in the Project tailwaters during the spring (spawning period) and during the summer and fall fish surveys.

Methods

The tailwater fish and aquatic biota assessment will be conducted by Normandeau Associates Inc. (NAI) with assistance from Pennington Associates and will entail the following:

- Intensive electrofishing and gill netting in the four tailwaters during spring, summer and fall. Spring sampling will be conducted in late April/May 2004 to document resident fish use of tailwater areas and to search for RTE redhorse species. Summer sampling will occur in August 2003 and fall sampling will be performed in November 2003.

- Permanent fish sampling and macroinvertebrate stations will be established (using GPS) in the Project tailwaters, along with transects set-up to conduct mussel searches. Transect/station locations will be determined in the field in consultation with agencies. Habitat types at each location will be described.

- Normandeau and Pennington will use scuba gear to search for mussels and to collect macroinvertebrates in the Project tailwaters summer (August, 2003), fall (November, 2003), and spring (May, 2004). An underwater airlift will be used to collect macroinvertebrate samples (2 m^2 sample size) along 2 transects in each of the developments tailwaters – one transect near each powerhouse and the other located downstream in the lower tailrace (to be determined in field). Three 2 m^2 macroinvertebrate samples will be collected from each transect at 25%, 50% and 75% of the distance along each transect (six samples from each tailwater/sample period). (Note: Any RTE redhorses captured will be released after identification. Any RTE mussel species found will be identified, their location marked with GPS and returned to the location)

Reporting

Results of this evaluation will be reported in draft and final study reports. A draft study report will be prepared and distributed to the Fish and Aquatics IAG for review and comment, approximately three months after the completion of data collection. IAG comments will be addressed in a final study report. Interim results, such as results of seasonal tailwater fish sampling, and mussel searches, may be shared with the IAG as such information becomes available, prior to completion of the draft study report.

Attachment 5 – Fish Entrainment Study Draft Study Plan

Yadkin Project (FERC No. 2197)
Fish Entrainment Study

Draft Study Plan
4/4/03

Background

Alcoa Power Generating Inc. (APGI) is the licensee for the Yadkin Hydroelectric Project. The Yadkin Project is currently licensed by the Federal Energy Regulatory Commission (FERC) as Project No. 2197. This license expires in 2008 and APGI must file a new license application with FERC on or before April 30, 2006 to continue operation of the Project.

The Yadkin Project consists of four reservoirs, dams, and powerhouses (High Rock, Tuckertown, Narrows, and Falls) located on a 38-mile stretch of the Yadkin River in central North Carolina. The Project generates electricity to support the power needs of Alcoa's Badin Works, to support its other aluminum operations, or is sold on the open market.

As part of the relicensing process, APGI prepared and distributed, in September 2002, an Initial Consultation Document (ICD), which provides a general overview of the Project. Agencies, municipalities, non-governmental organizations and members of the public were given an opportunity to review the ICD and identify information and studies that are needed to address relicensing issues. To further assist in the identification of issues and data/study needs, APGI has formed several Issue Advisory Groups (IAGs) to advise APGI on resource issues throughout the relicensing process. IAGs will also have the opportunity to review and comment on Draft Study Plans. This Draft Study Plan has been developed in response to comments on the ICD and through discussions with the Fish and Aquatics IAG, to provide additional necessary information for consideration in the relicensing process.

Issues

During initial consultation, resident fish entrainment was raised as an issue to be addressed during the relicensing of the Project. The potential for entrainment of diadromous fish species that may be restored to Yadkin Project waters in the future was also identified as a potential relicensing issue.

Objectives

On March 12, 2003, the Fish and Aquatics IAG met and discussed objectives for the fish entrainment study. Over the course of those discussions, the following objectives were identified for the study.

- Evaluate the potential for entrainment of resident fishes at the four Yadkin Project powerhouses.
- Evaluate the potential for entrainment of diadromous fish species, which are candidates for possible reintroduction to Yadkin Project waters.

Methods

The entrainment evaluation will be conducted by Normandeau Associates Inc. (NAI) and will entail the following:

- Conduct a desktop entrainment evaluation using existing fisheries information from the Project reservoirs. Fish species evaluated will include those targeted for fisheries management by resource agencies and species that are prone to entrainment, such as threadfin and gizzard shad, American shad and blueback herring. Other species such as largemouth bass, striped bass and the common centrachids (crappies, pumpkinseed, bluegill and redbreast sunfish) could be evaluated, depending on agency interest.

- Physical data from each development will be reviewed, including intake configuration and characteristics (depth, location, presence of "skimmer walls", rack size and spacing and calculated intake velocities).

- Turbine types, operating head and existing Project operations at each development will also be analyzed and incorporated into the entrainment assessment.

- Water quality data from each reservoir will be reviewed to determine if it effects the seasonal distribution of fishes and hence entrainment potential.

- Where safety conditions allow, limited measurement of approach velocities may be conducted to ground truth calculated intake approach velocities.

Reporting

Results of this evaluation will be reported in draft and final study reports. A draft study report will be prepared and distributed to the Fish and Aquatics IAG for review and comment, approximately three months after the completion of data collection. IAG comments will be addressed in a final study report. Interim results, such as calculated and measured intake approach velocities, may be shared with the IAG as such information becomes available, prior to completion of the draft study report.