Yadkin Project Relicensing (FERC No. 2197)
Fish and Aquatics IAG and Water Quality IAG Joint Meeting
October 7, 2003

Alcoa Conference Center
Badin, North Carolina

Final Meeting Summary

Meeting Agenda

See Attachment 1.

Meeting Attendees

See Attachment 2.

Introductions and Agenda Review

Jane Peeples, Meeting Director, opened the meeting with introductions. Wendy Bley, Long View Associates, reviewed the meeting agenda. She said that staff from Normandeau Associates would present a summary of preliminary data on the water quality and tailwater fish and aquatic studies initiated over the summer.

Update on Water Quality Studies and Data

Don Kretchmer, Normandeau Associates, prefaced the discussion of water quality data by saying that he had completed only a preliminary analysis of the data. Don reviewed the objectives of the water quality monitoring study: 1) to characterize the baseline water quality in the Project reservoirs and tailwaters, 2) evaluate the effects of Project operations on reservoir water quality, and 3) evaluate the effects of Project operations on tailwater water quality (see presentation - Attachment 3).

Don said that Normandeau is monitoring water quality at 21 stations throughout the system for nutrients, temperature, oxygen, solids, and metals on a monthly basis. He explained that the water quality data collected at the Yadkin Project from June 1999 through August 2003 represent a wide range of hydrometerologic conditions. Don showed a hydrograph for the period 1999 through 2003. He noted that 1999 and 2000 were fairly normal years, 2001 had a dry summer, 2002 had the driest summer of record, and 2003 was wet. Don discussed water levels at High Rock and Narrows reservoirs for the period 1999 through 2003.

Don reviewed the total phosphorus and chlorophyll a data for the period June 1999 through June 2003 for each reservoir. He noted the numerous phosphorus samples above 50 ug/l (see presentation), indicative of nutrient rich water. He added that phosphorus and chlorophyll a levels drop as you move down through the system. Don committed to taking a closer look at the 200+ ug/l data. Wilson Laney, U.S. Fish and Wildlife Service (USFWS), wondered whether

these spikes in the data correspond to high flow events. Don said that the spikes do not correspond with high flows. Chris Goudreau, North Carolina Wildlife Resources Commission (NCWRC), asked if the data, as represented, are an average of all the monitoring stations combined. Don explained that the data are from a single monitoring station.

Don briefly discussed total suspended solids (TSS) in the system. Don showed the mean TSS in mg/L +/- two standard deviations for each of the four reservoirs (see presentation). He noted that TSS decrease as you move through the system.

Don reported that Normandeau has collected continuous dissolved oxygen and temperature data in the Narrows and Falls tailraces for the period 2000 through 2003. Normandeau started collecting continuous dissolved oxygen and temperature data in the High Rock and Tuckertown tailraces in 2003 at the request of the Issue Advisory Group (IAG). Don showed the minimum daily dissolved oxygen in mg/l for each reservoir (see presentation). Don said that there were a fair number of readings below 4.0 mg/l. Don stated that data collected during the period August 22 through September 1, when Yadkin was generating and spilling, would help answer a question posed by the IAG – how does generation and/or spill impact dissolved oxygen levels downstream. Wilson Laney asked if dissolved oxygen dropped after generation ceased. Don said yes, in a lot of instances.

Don said that Normandeau had been unable to complete the specific lateral mixing investigations in the vicinity of the dams because of abnormally high water flows. He noted that the monthly summer surveys immediately downstream of the dams indicate little variability in dissolved oxygen levels.

Don said that Normandeau analyzed 10 largemouth bass fillets, 10 black crappie fillets, and 10 channel catfish fillets for total mercury. All of the samples had concentrations < 0.15 mg/kg (ppm) total mercury, well below the FDA (Food and Drug Administration) action level for methyl mercury (1.0 mg/kg (ppm)). Ray Allen, City of Albemarle, asked if the fish analyzed were from all four Project reservoirs. Don answered no, all of the fish were collected from the Tuckertown tailrace/Narrows Reservoir. Robert Petree, SaveHighRockLake.org, questioned why fish from High Rock Reservoir were not sampled. Wendy Bley explained that the North Carolina Division of Water Quality (NCDWQ) suggested the fish be taken from the Tuckertown tailrace/Narrows Reservoir. Robert and Larry Jones, High Rock Lake Association, both said that High Rock Reservoir, specifically Abbotts Creek, had been under a consumption advisory for many years in the past for mercury contamination caused by the P.R. Mallory Battery plant. Darlene Kucken, NCDWQ, said the rationale for choosing to analyze fish from Narrows Reservoir was based on recent water quality samples, which showed higher levels of mercury in Narrows Reservoir. She said that she is unaware of any consumption advisory for High Rock Reservoir, other than the general consumption advisory in North Carolina waters south and east of Interstate 85. Mark Oden, High Rock Business Owners Group, commented that because TSS are highest in High Rock, it only makes sense to analyze fish captured from High Rock for total mercury.

Wendy Bley asked if Yadkin Project operations has anything to do with the issue of mercury in High Rock Reservoir. Larry said that the amount of contaminated sediment in High Rock Reservoir is an issue (i.e. more sediment, more contamination).

Andy Abramson, Land Trust for Central North Carolina, said that fish tissue data for the entire Project area would be necessary to best understand the problem and to determine how to address it.

Wendy Bley suggested that Normandeau get the most recent fish tissue data from the NCDWQ for Abbotts Creek to determine if additional fish tissue sampling in High Rock is warranted. Darlene Kucken said that the most recent fish tissue sampling in Abbotts Creek was about two years ago. She clarified that the North Carolina Department of Health and Human Services posts fish consumption advisories (www.epi.state.nc.us/epi/fish/current.html), not the NCDWQ.

Continuing his presentation, Don discussed the relationship between flow and TSS and between water level and TSS in the arms of High Rock Reservoir. Generally, at Station H1 (upper High Rock), if the water level was low, TSS were low and if the water level was high, TSS were high. Similarly, at Station H1, if river flows were low, TSS were low and if river flows were high, TSS were high. At Station H8 (Second Creek arm), the opposite was true – if the water level was low, TSS were high and vice versa. Mark Oden asked Don which side of the Second Creek bridge Normandeau is sampling on. He said that the station location may be impacting the data.

Sediment Fate and Transport

Don said that Al Larson, Normandeau Associates, would be completing the Sediment Fate and Transport literature review. Don listed the reports that would be included in the literature review (see presentation). He asked to be made aware of any additional sources of information. Don summarized the initial findings from the literature review:

- Suspended sediment is one of the principal water quality problems in the Yadkin Pee Dee River Basin;
- The source of the sediment has changed overtime; in the past the major source was agricultural land use and more recently sediment is coming from land development and urban areas; and
- Total suspended sediment concentration in the Yadkin River has declined over the long-term due to decreasing agricultural land, but may begin to increase due to increasing land development and urbanization.

Don also reviewed estimates of sediment transport and loading to the Yadkin Project reservoirs: based on Harnes and Meyer – 73% or 1.1×10^6 tons and based on Fischer 78% or 1.6×10^6 tons of sediment have been deposited in the Yadkin Project reservoirs. Mark Oden asked what portion of the total sediment in the Yadkin Project reservoirs is in High Rock Reservoir. Don said that Normandeau would try to estimate the amount of sediment in High Rock as part of the study. Larry Jones questioned the validity of basing the study on 30-year old data. He said that during this time, farmers switched from tillage to no tillage of their farms. Larry identified the age of the data as a weakness in the study. Don said that Normandeau has also collected solids data, which

will also be included in the analysis. Chris Goudreau asked if the estimates were based on TSS data. If so, Chris questioned if bedload is captured in the estimates. Don agreed to explore this issue further.

In summary, Don said that Normandeau would continue to monitor reservoir water quality monthly and dissolved oxygen and temperature in the tailraces continuously through November and would plan to conduct the lateral dissolved oxygen survey in summer 2004.

Darlene Kucken asked how frequently the IAG would be provided updates on the water quality monitoring (e.g. quarterly). Wendy Bley explained that the first time the IAG would see a comprehensive look at the water quality data collected at the Yadkin Project would be in a draft study report. She said that Normandeau would continue to monitor water quality through the end of the year. At this time, Normandeau would start work on a draft study report, which will be reviewed by the IAG. She said that a draft study report might be available around this same time next year (October 2004). Wendy noted that Normandeau would have to complete the lateral surveys next summer. Darlene asked if the monthly water quality monitoring and continuous dissolved oxygen and temperature monitoring would only be through the end of 2003. Wendy said yes. She said that the continuous monitors below Narrows and Falls were a compliance requirement as part of the development upgrades and would continue into next year.

Ben West, U.S. Environmental Protection Agency, stated that Alcoa Power Generating Inc. (APGI) had submitted an application for a license variance to drawdown Narrows Reservoir for an aquatic habitat assessment in December 2003 and questioned whether or not it would be worthwhile to collect water quality data during the drawdown, in the event Narrows is operated with a drawdown in the future. Wendy said that Normandeau would collect water quality data in December, as part of the monthly reservoir water quality sampling. She offered to have Normandeau coordinate their December sampling with the planned drawdown. Wendy also noted that there would be only one data point (one monthly sample) during the drawdown. Wendy saw no value in running the continuous monitors during this timeframe.

Update on Tailwater Fish and Aquatic Studies

Gene Ellis, APGI, Yadkin Division, distributed copies of a base map of the Yadkin Pee-Dee River basin.

Rick Simmons, Normandeau Associates, discussed the status of various fish and aquatic studies. He said that the Fish Entrainment Evaluation is underway and should be completed by November. He said that Normandeau conducted tailwater fish and mussel sampling in August and September 2003. He noted that the tailwater sampling would continue in November. Rick stated that the habitat assessment surveys at High Rock and Narrows reservoir are planned for November and December 2003. He said that the work on Narrows is tentatively scheduled for the week of December 8. Darlene Kucken asked Rick to describe how the reservoirs would be drawn down. Rick said that High Rock would be drawn down according to its operating curve. Gene Ellis said that APGI anticipates it taking 7 days to pull Narrows Reservoir down 15-20 feet with 10 days of study and another 7 days to fill the reservoir back up. Mark Oden asked if APGI plans to, in advance of the Narrows drawdown, draw down High Rock Reservoir to capture

inflows. Gene said that it was a possibility and there would be considerable public communication and outreach regarding the planned drawdown of Narrows. Wendy Bley said that what can actually be accomplished will depend on the weather and river flows (i.e. a 15-20 foot drawdown may not be possible).

Chris Goudreau asked if FERC had responded to APGI's request for a license variance. Wendy replied no. Ben West asked if there is any reason to believe that FERC will deny the request. Wendy said no; APGI has completed the consultation with the state and federal resource agencies and the drawdown would be done as part of the Project relicensing. Gene noted that APGI had received a couple of emails from a resident on Narrows Reservoir who is displeased with the planned drawdown.

Larry Jones commented that before High Rock Reservoir is drawn down for the winter, someone should note (i.e. get out in boats) the resurgence of aquatic vegetation that occurred over the summer. Rick said that the aerial photographs taken over the summer should show the vegetation. Larry said that because the vegetation is growing up in the coves, it would not likely be visible on the aerial photos. Rick suggested that Larry share his comment with Sarah Allen, Normandeau Associates, who is conducting the wetlands assessment.

Continuing, Rick summarized the results of the Yadkin tailwater fish collections (see presentation – Attachment 4):

- 24 fish species captured in the Falls tailrace via gill nets, boat electrofishing, and backpack shocking and seining; the habitat in the tailrace is mostly boulder/cobble with submerged trees around islands
- 23 fish species captured in the Narrows tailrace via gill nets, boat electrofishing, and backpack shocking and seining; the primary habitat type in the Narrows tailrace is cobble/boulder
- 26 fish species captured in the Tuckertown tailrace via gill nets, boat electrofishing, and backpack shocking and seining; the dominant habitats include cobble/boulder substrates in the upper tailwater, and overhanging and submerged trees/limbs
- 27 fish species captured in High Rock tailrace via gill nets, boat electrofishing, and backpack shocking and seining; the habitat in the tailrace is mostly boulder/cobble with overhanging vegetation

Mark Oden asked Rick about the total number of fish captured. Rick said that he has not yet calculated the total number of fish captured, but said that the study report would include a catch per unit effort (CPUE).

Continuing, Rick summarized the number and species of mussels collected in the Project tailwaters (see presentation). Rick noted that many more mussels were collected from the Falls tailrace because the habitat in the tailrace is more riverine. He noted that the visibility in the High Rock tailrace was poor. Larry Jones commented that the lakebed was covered with mussel shells last summer. He suggested monitoring High Rock. Rick said that any relic shells found by residents could be turned over to Normandeau for inclusion in the study. Rick asked that residents also indicate the location where the shell was found.

Robert Petree asked why the fish and mussel surveys are being limited to the Project tailwaters. Rick said that the tailwaters are a good place to look because if there are dissolved oxygen problems affecting the fish community, it would likely be in the tailwaters. The tailwaters also offer good fish spawning habitat. Robert said that he is concerned that Normandeau is not sampling for fish in High Rock Reservoir. Rick said that of the four Project reservoirs, High Rock has the greatest number of fish species (about 40). He said that because Progress Energy sampled High Rock in 2000, Normandeau was not asked to sample the reservoir. Robert and Larry Jones expressed their concerns about the impact of the drought on the fish community during the past summer. Larry commented that it is important to know how the fish community is impacted by extreme drawdowns so that these impacts can be avoided in the future.

Update on Progress Energy's Instream Flow Studies

Wendy Bley provided an update on the planned Progress Energy instream flow study in the lower Yadkin Pee-Dee River. As background, Wendy explained that at the February 2003 IAG organizational meeting, several agencies and organizations raised the issue of understanding the effect of Project operations on river flows and aquatic habitat in the lower river below Blewett Falls. APGI was asked to cooperate with Progress Energy to evaluate these potential impacts. She said that when Progress Energy convened their Resource Workgroups (RWG) in May 2003, they received the same study request. She said that that Progress Energy felt strongly about conducting the study themselves because their two developments directly affect the lower river. Wendy said that APGI committed to participate in the Water Resources RWG and to update regularly the APGI Fish and Aquatics IAG on the progress of the study. Wendy said that the RWG meeting schedule is posted on the Progress Energy relicensing website. Larry Jones asked if all the RWG meetings are in Pinehurst, North Carolina. Wendy answered yes.

Wendy explained that Progress Energy will be conducting instream flow studies in two separate river reaches: 1) between Tillery Dam and Blewett Falls Dam (about 17 miles) and 2) from below Blewett Falls to an undefined location (possibly to Cheraw or Florence, South Carolina). Wendy said that the first step in the study would be to map the aquatic habitat. She explained that the outcome of the study would be an understanding of the relationships between river flows and aquatic habitat conditions.

Schedule and Next Meeting

Wendy tentatively scheduled the next meeting of the Fish and Aquatics IAG for February 3, 2004. Larry Jones asked that APGI email the IAG regarding the dates for the aquatic habitat mapping on High Rock and Narrows reservoirs. Rick said that Normandeau might be soliciting some help from the reservoir residents.

Attachment 1 – Meeting Agenda

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

Water Quality and Fish and Aquatics Issue Advisory Groups Joint Meeting

Tuesday, October 7, 2003
Alcoa Conference Center
Badin, North Carolina

1:00 PM – 3:00 PM

Preliminary Agenda

1. Introductions, Review Agenda
2. Update on Water Quality Studies and Data
3. Update on Tailwater Fish and Aquatic Studies
4. Update on Plans for Reservoir Aquatic Habitat Assessments
5. Update on Progress' Instream Flow Studies in Lower Yadkin/Pee Dee River
6. Schedule and Agenda for Next Meeting

Attachment 2 – Meeting Attendees

Name	Organization
Andy Abramson	Land Trust for Central North Carolina
Ben West	US Environmental Protection Agency
Chris Goudreau	NC Wildlife Resources Commission
Darlene Kucken	NC Division of Water Quality
Don Kretchmer	Normandeau Associates
Donley Hill	US Forest Service
Donna Davis	Stanly County Utilities
Gene Ellis	APGI, Yadkin Division
Jane Peeples	Meeting Director
Jody Cason	Long View Associates
Julian Polk	PB Power
Larry Jones	High Rock Lake Association
Lee Hinson	Concerned Property Owners of High Rock Lake
Mark Oden	High Rock Business Owners Group
Raymond Allen	City of Albemarle
Rick Simmons	Normandeau Associates
Robert Petree	SaveHighRockLake.org
Steve Reed	NC Division of Water Resources
Wendy Bley	Long View Associates
Wilson Laney	US Fish and Wildlife Service

Attachment 3 – Presentation

Interim Yadkin Project Water Quality Summary: June 1999 - August 2003

10/7/03

Normandeau Associates

Study Objectives

- Characterize baseline water quality in reservoirs and tailwaters
- Evaluate effects of project operations on reservoir water quality
- Evaluate effects of project operations on tailwater water quality

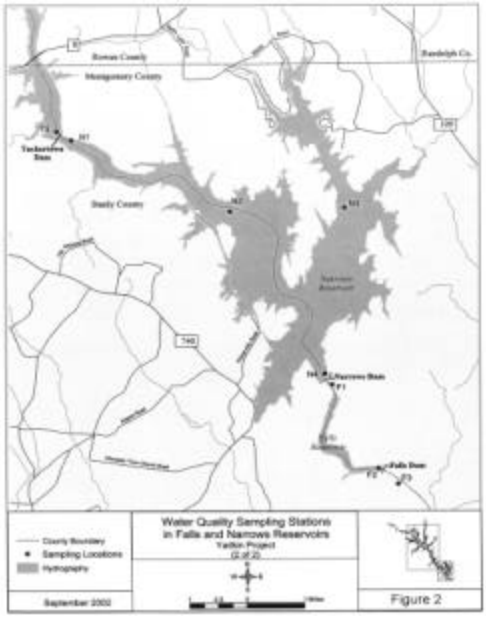
Study Components

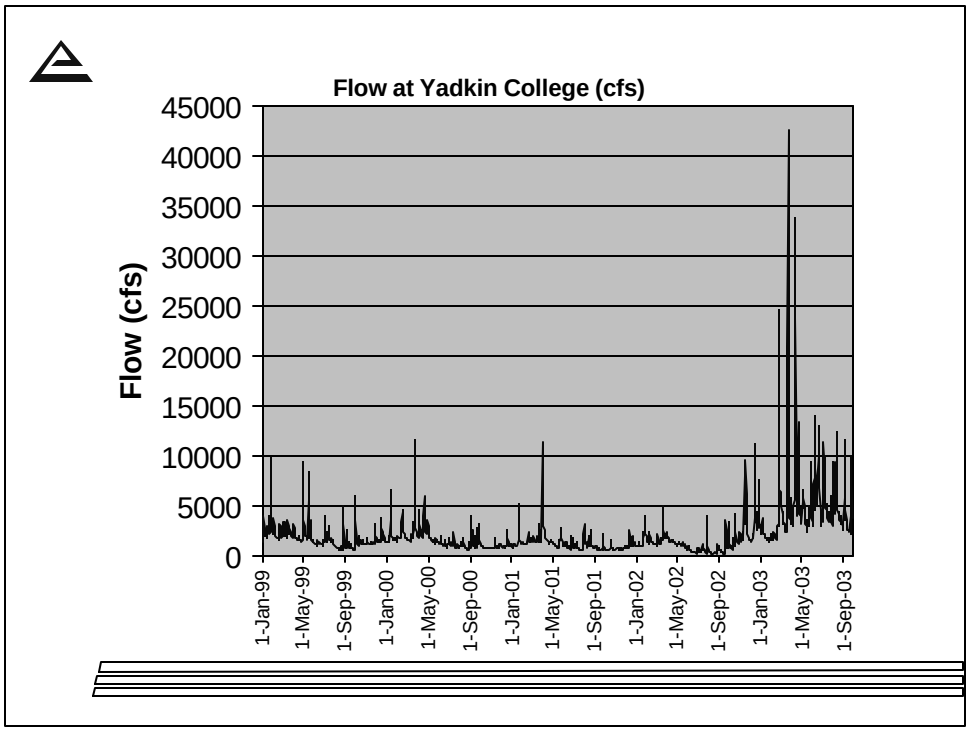
- Monthly water quality monitoring at 21 stations throughout system for nutrients, temp, oxygen, solids, metals and others
- Continuous monitoring of dissolved oxygen in each tailwater
- Specific lateral mixing investigations
- Fish tissue investigation in Narrows Reservoir

Preliminary Results

- Results are from June 1999 through August of 2003
- Span a wide range of hydrometeorologic conditions
- Full report of findings will be prepared at end of study


Water Quality Sampling Stations
in High Rock and Tuckertown Reservoirs
Yadkin Project
(1 of 2)
County Boundary
Sampling Locations
Hydrography
September 2002
Figure 1


Water Quality Sampling Stations
in Falls and Narrows Reservoirs
Yadkin Project
(2 of 2)
County Boundary
Sampling Locations
Hydrography
September 2002
Figure 2


Flow at Yadkin College (cfs)
Flow (cfs)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1-Jan-99
1-May-99
1-Sep-99
1-Jan-00
1-May-00
1-Sep-00
1-Jan-01
1-May-01
1-Sep-01
1-Jan-02
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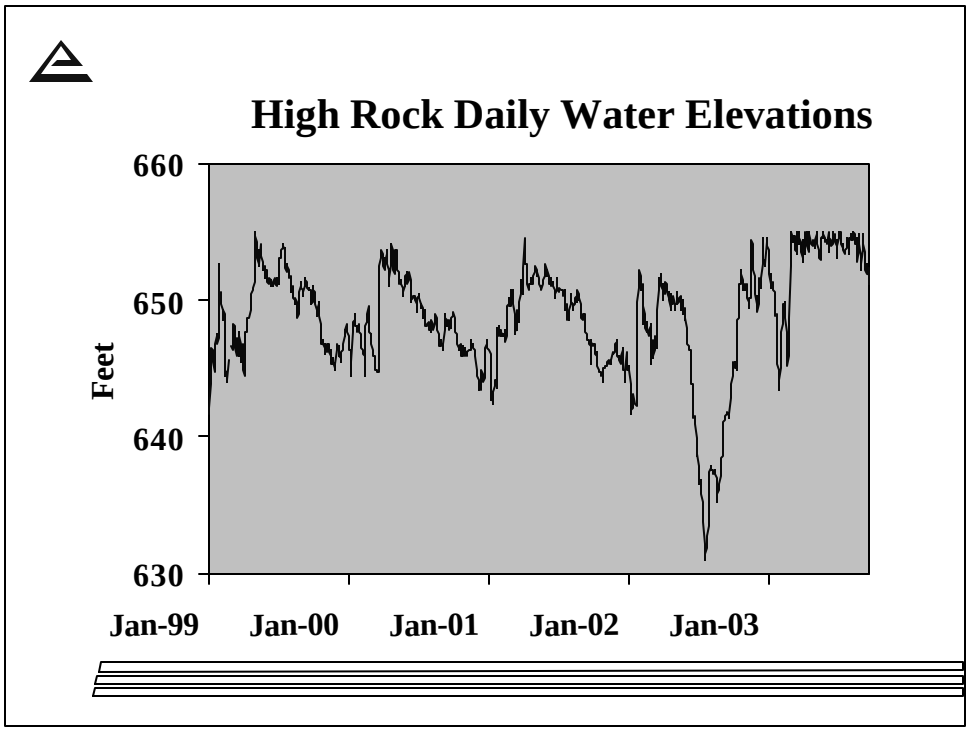
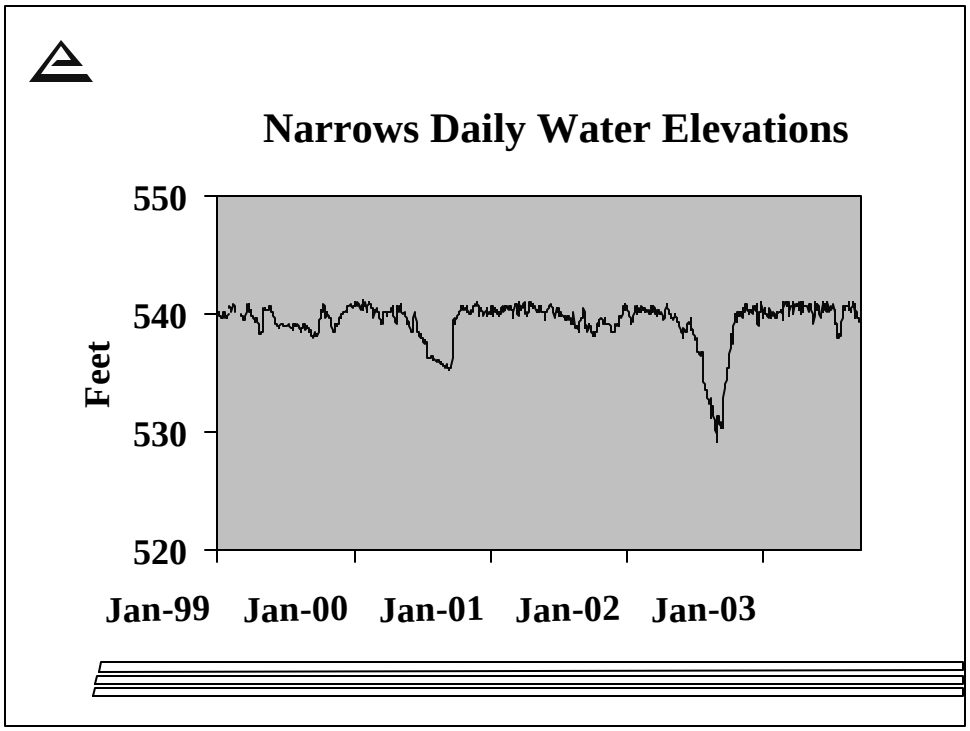
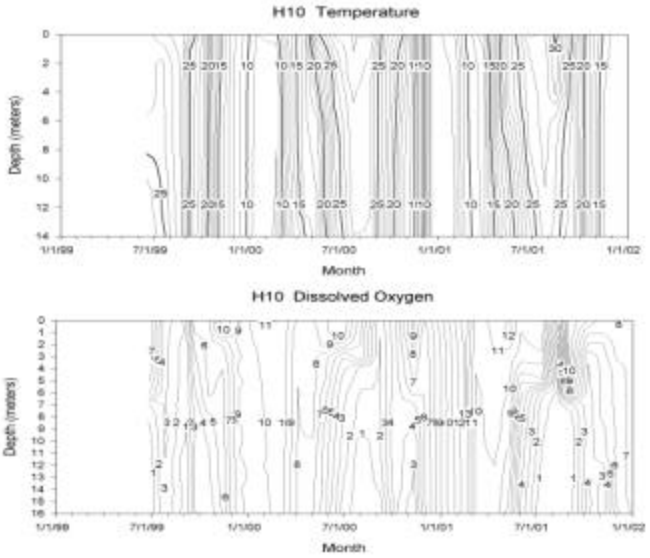
1-Sep-02
1-Jan-03
1-May-03
1-Sep-03


High Rock Daily Water Elevations
Feet
660
650
640
630
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03

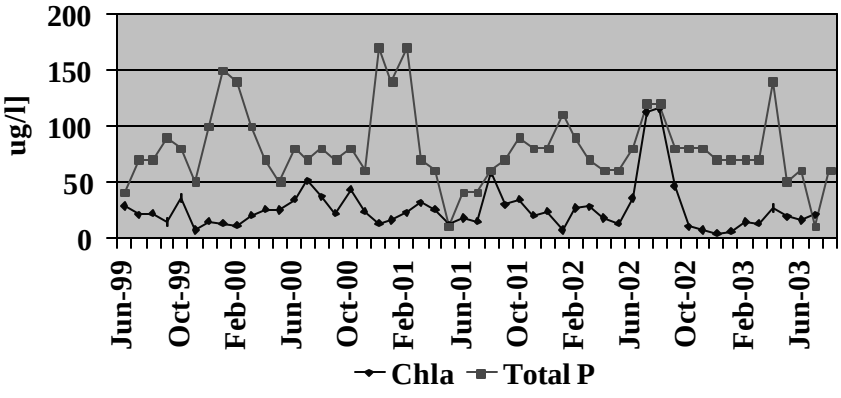


Monthly Monitoring

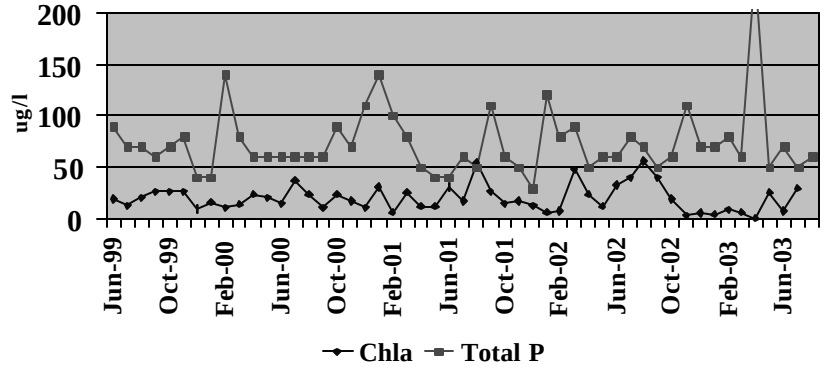
June 1999-August 2003



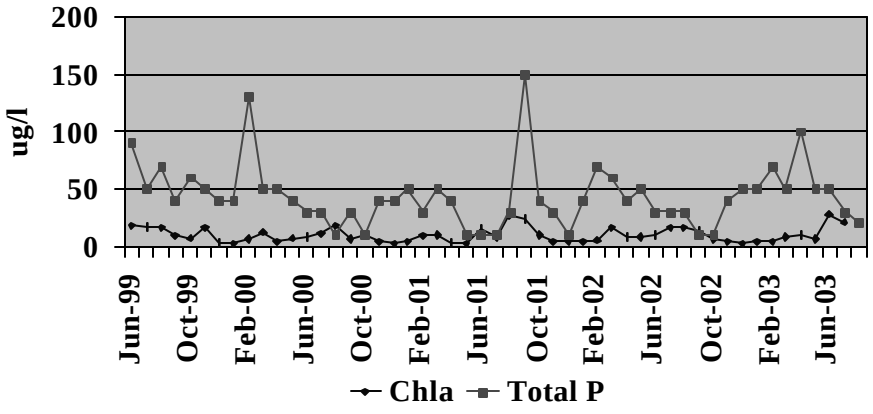
High Rock TP/Chl a



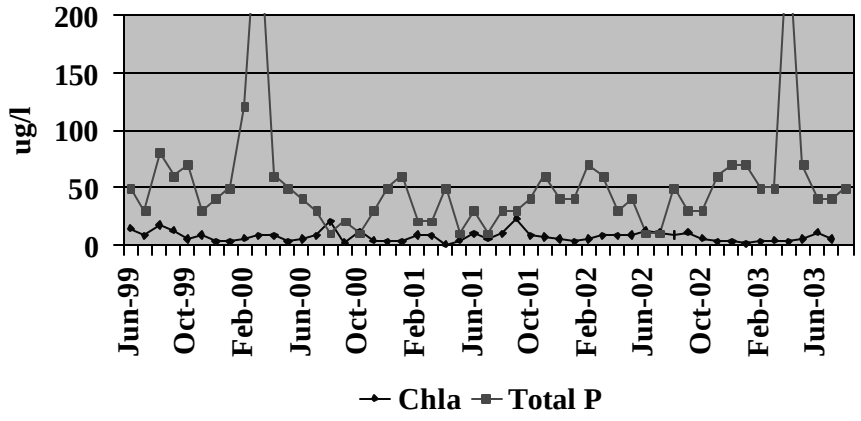
Tuckertown TP/Chl a



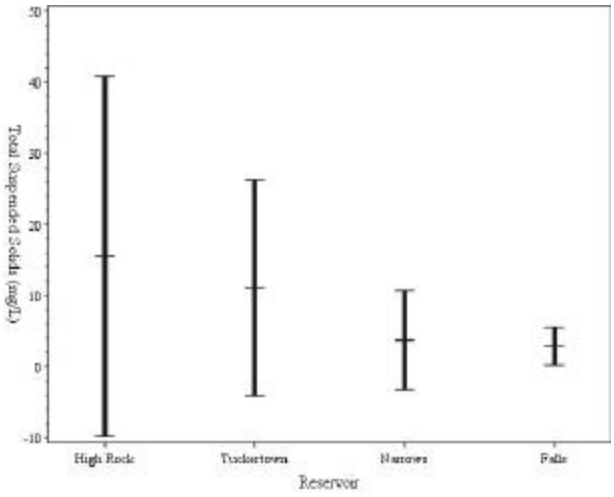
Narrows TP/Chl a



Falls TP/Chl a



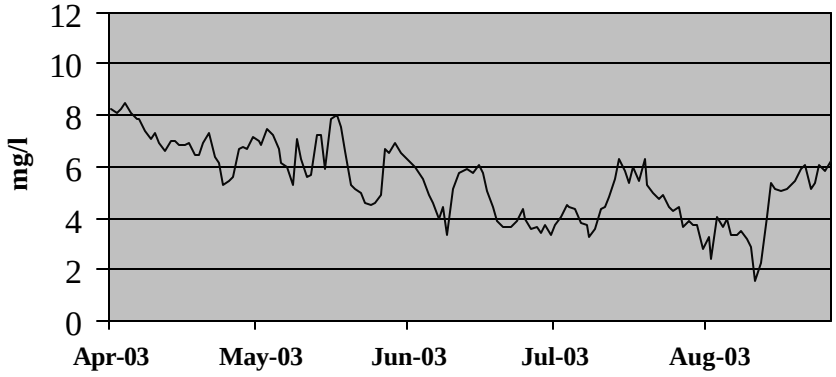
TSS



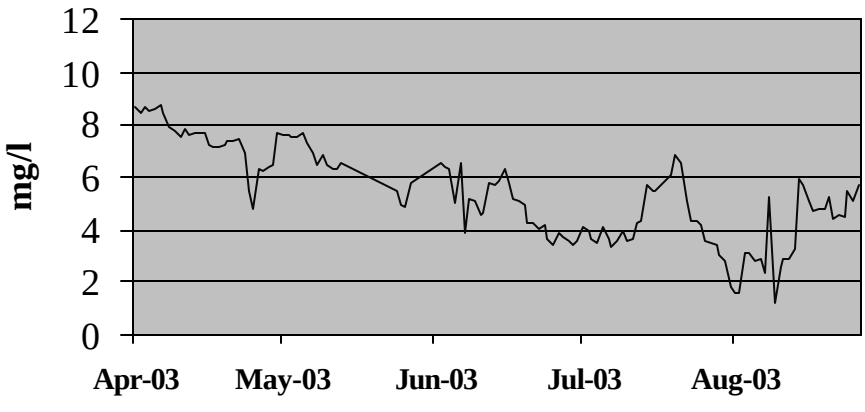
Continuous monitoring/tailraces

- 2000 – 2003 for Falls and Narrows
- 2003 for High Rock and Tuckertown

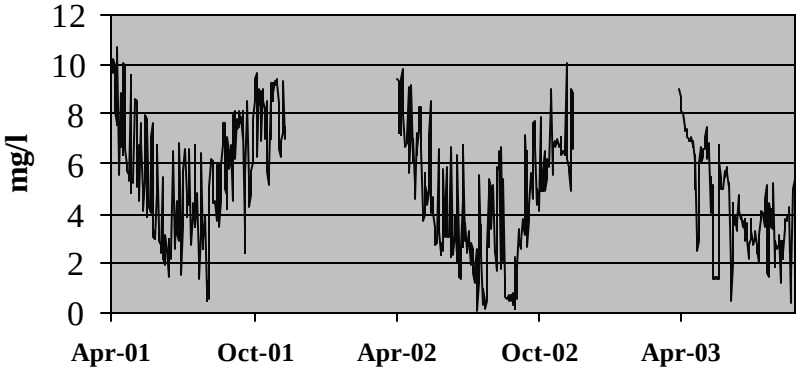
High Rock Minimum DO

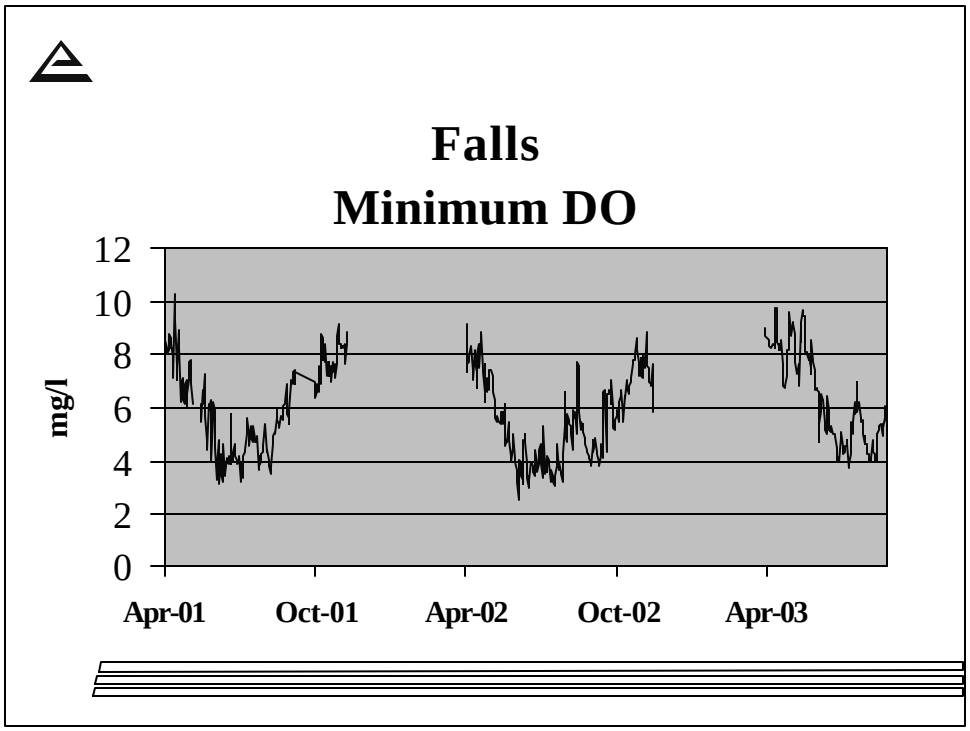


Tuckertown Minimum DO



Narrows Minimum DO





Lateral surveys in vicinity of dams

- Full study not completed due to abnormally high water this year
- Monthly summer surveys immediately downstream of dams indicate little variability

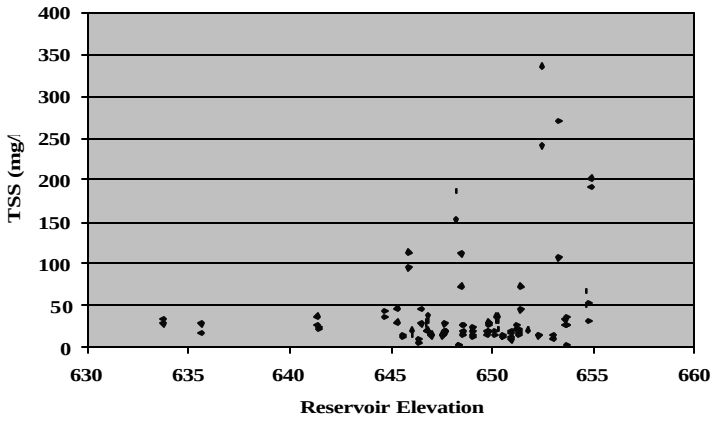
Fish Tissue Data

- 10 largemouth bass, 10 black crappie and 10 channel catfish collected. Fillets analyzed for total mercury.
- All samples had concentrations < 0.15 mg/kg (ppm) total Hg based on EPA method 245.1.
- FDA action level for methyl Hg is 1.0 mg/kg (ppm) (FDA 2001).

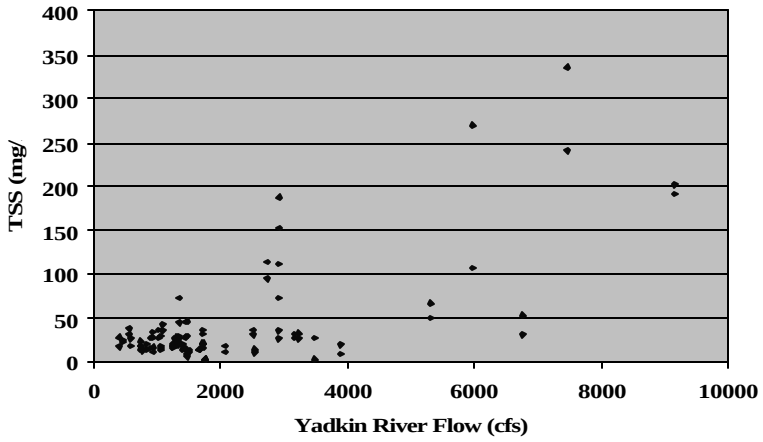
Water levels/water quality

- Looked at relationship between flow and TSS and between water level and TSS in the arms of High Rock Reservoir
- Need to look at chlorophyll a to help explain some of the points
- Next step may be multiple regression

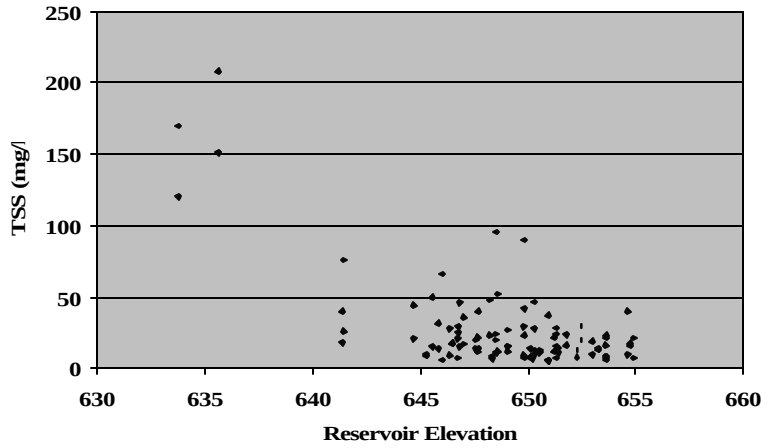
Upper High Rock-Station H1



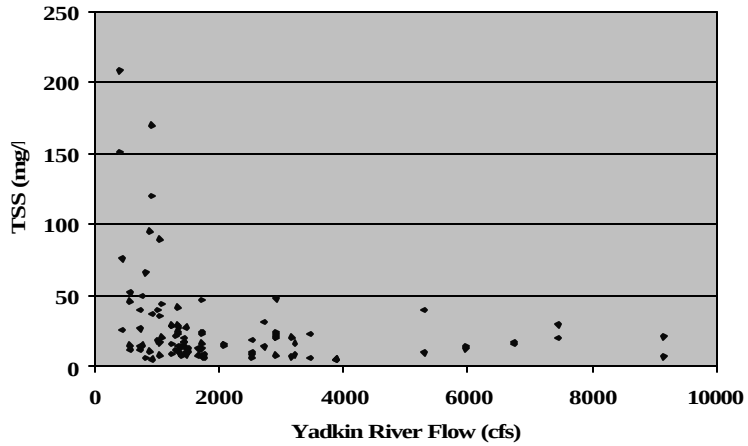
Upper High Rock Station H1



Second Creek Arm -Station H8



Second Creek Arm - Station H8



SEDIMENT REVIEW:

TASK ONE

REVIEW OF EXISTING LITERATURE INCLUDING REPORTS FROM:

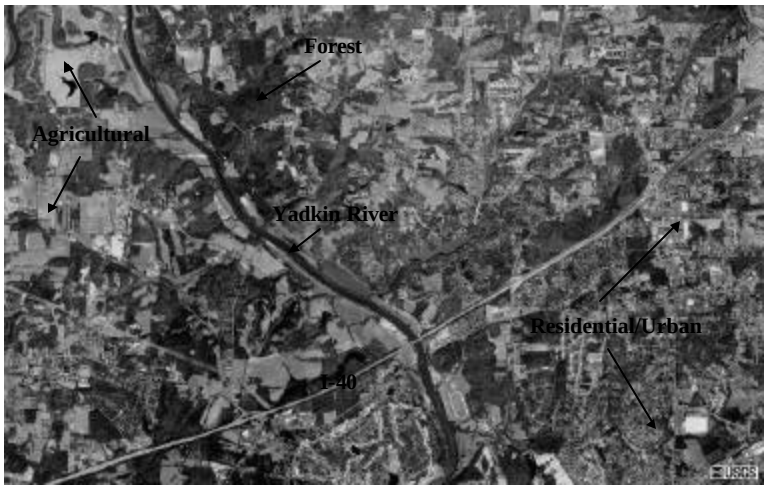
- **DUKE UNIVERSITY**
  - **NORWOOD - 2001**
  - **HENKELS - 2000**
  - **KRISHNASWAMY AND OTHERS – 2000**
  - **RICHTER AND OTHERS – 1995**
  - **FISHER – 1993**
- **NORTH CAROLINA DNR - 2003**
- **SOIL CONSERVATION SERVICE – 1979**
- **UNITED STATES GEOLOGICAL SURVEY**
  - **HARNED AND MYER – 1983, WSP 2185-E**
  - **SIMMONS – 1993, WSP 2364**

SEDIMENT REVIEW:

INITIAL FINDINGS FROM LITERATURE REVIEW:

- **SUSPENDED SEDIMENT IS ONE OF THE PRINCIPAL WATER QUALITY PROBLEMS IN THE YADKIN-PEE DEE RIVER BASIN.**
- **SOURCE OF SEDIMENT HAS CHANGED OVER TIME, IN THE PAST THE MAJOR SOURCE WAS AGRICULTURAL LAND USE, MORE RECENTLY SEDIMENT IS DERIVED FROM LAND DEVELOPMENT AND URBAN AREAS.**
- **TOTAL SUSPENDED SEDIMENT CONCENTRATION IN YADKIN RIVER HAS DECLINED OVER THE LONG TERM DUE TO DECREASING AGRICULTURAL LAND, BUT MAY BEGIN TO INCREASE DUE TO INCREASING LAND DEVELOPMENT AND URBANIZATION.**

MIXED LAND USE IN YADKIN RIVER BASIN NEAR CLEMMONS, NORTH CAROLINA



SEDIMENT REVIEW:

SEDIMENT TRANSPORT AND LOADING TO RESERVOIRS

ESTIMATES FROM HARNED AND MYER (1983) AND FISCHER (1993):

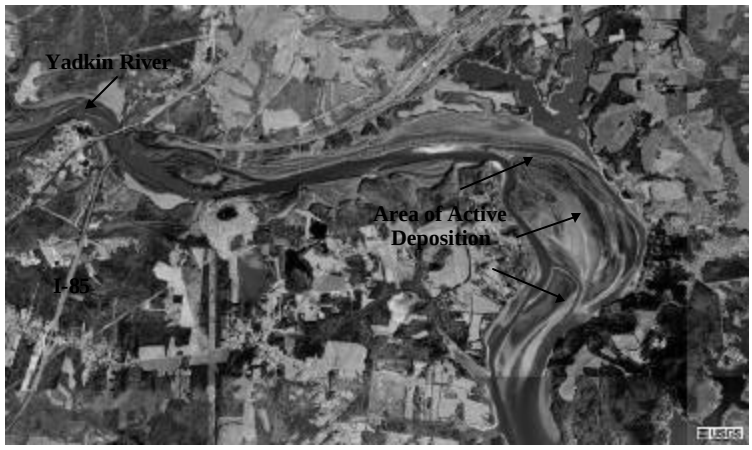
HARNED AND MEYER (1974 TO 1978)

AVE. ANNUAL INPUT TO SIX RESERVOIRS: 1.5 x 10^6 TONS
AVE. ANNUAL OUTPUT TO PEE DEE RIVER: 3.9 x 10^5 TONS
SEDIMENT DEPOSITED IN RESERVOIRS: 73% or 1.1 x 10^6 TONS

FISCHER (1974 TO 1988)

AVE. ANNUAL INPUT TO SIX RESERVOIRS: 2.1 x 10^6 TONS
AVE. ANNUAL OUTPUT TO PEE DEE RIVER: 4.6 x 10^5 TONS
SEDIMENT DEPOSITED IN RESERVOIRS: 78% or 1.6 x 10^6 TONS

YADKIN RIVER DISHARGING TO HIGH ROCK LAKE NEAR YADKIN, NORTH CAROLINA



Ongoing Studies

- Monthly monitoring continues
- Lateral dissolved oxygen survey next summer
- Continuous dissolved oxygen monitoring continues

Attachment 4 - Presentation

Normandeau Associates

Yadkin tailwater fish collections

- Falls tailwater fish sampling - 8/26 thru 8/28 fished gill nets & boat electrofishing (day & night)
- Backpack shocking & seining done on 9/16
- Habitat mostly boulder/cobble with submerged trees around islands – most fish captured around the islands

Falls Tailwater Species List

24 Species

Black Crappie**	Longnose Gar	Striped Bass
Blueback Herring	Pumpkinseed	Threadfin Shad
Bluegill	Redbreast Sunfish	Warmouth
Blue Catfish	Redear Sunfish	White Catfish
Channel Catfish	Satinfin Shiner*	White Crappie**
Flathead Catfish**	Shorthead Redhorse	White Perch
Gizzard Shad	Silver Redhorse	Yellow Bullhead*
Largemouth Bass	Spotted Sucker*	Yellow Perch

* *Not collected by Progressive Energy in 2000 Study*
** *Not collected by Progressive Energy in tailwater, however, collected in reservoir*

Narrows Tailwater Fish Collection

- Gill nets & boat shocking done 8/28 thru 9/1
- Backpack shocking & seining done 8/29 in shallow areas
- Cobble/boulder primary habitat type

Narrows Tailwater Species List

23 Species

Black Crappie	Gizzard Shad	Shorthead Redhorse
Blueback Herring	Golden Shiner	Striped Bass
Bluegill	Green Sunfish	Threadfin Shad
Blue Catfish	Largemouth Bass	Warmouth
Carp	Pumpkinseed	White Catfish
Channel Catfish	Redbreast Sunfish	White Perch
Flat Bullhead*	Redear Sunfish	Yellow Perch
Flathead Catfish	Satinfin Shiner*	

* *Not collected by Progressive Energy in 2000 Study*

Tuckertown tailwater fish sampling

- Gill nets & boat electrofishing done 9/1 thru 9/4
- Backpack shocking & seining done on 9/3
- Cobble/boulder substrate in upper tailwater, overhanging trees & submerged trees/limbs dominant habitat downstream

Tucker Town Tailwater Species List

26 Species

Black Crappie	Green Sunfish	Shorthead Redhorse
Blueback Herring	Hybrid Bass	Silver Redhorse*
Bluegill	(Striped X White)	Striped Bass
Blue Catfish	Largemouth Bass	Threadfin Shad
Carp	Longnose Gar	Warmouth
Channel Catfish	Pumpkinseed	White Catfish
Flathead Catfish	Quillback*	White Crappie
Gizzard Shad	Redbreast Sunfish	White Perch
Golden Shiner	Redear Sunfish	Yellow Perch

* *Not collected by Progressive Energy in 2000 Study*

High Rock tailwater fish sampling

- Gill nets set 9/4 but had to retrieve on 9/5 due to spill (12 spp captured then)
- Returned 9/15 – gill nets & boat e-fish done 9/15 - 9/18
- Backpack shocking & seining done 9/16
- Boulder/cobble in tailrace with overhanging vegetation – rip-rap at boat ramp held numerous sunfish & lgm. bass

High Rock Tailwater Species List

27 Species

Black Crappie
Bluegill
Blue Catfish
Carp
Channel Catfish
Flathead Catfish
Gizzard Shad
Golden Shiner
Green Sunfish
Hybrid Bass (Striped X White)
Largemouth Bass
Longnose Gar
Pumpkinseed
Quillback
Redbreast Sunfish
Redear Sunfish
River Carpsucker
Satinfin Shiner
Shorthead Redhorse
Silver Redhorse
Smallmouth Buffalo*****
Striped Bass
Threadfin Shad
Warmouth
White Catfish
White Crappie
White Perch

* *Not collected by Progressive Energy in 2000 Study*

Tailwater Fish Sampling-Aug 03

Mollusca collected September 2003, Yadkin Project

	Falls		Narrows		Tucker Town		High Rock	
Species	Live	Relic	Live	Relic	Live	Relic	Live	Relic
Anodonta implicata		8	1	4				
Elliptio complanata	142	80	1					
Elliptio lanceolata	27	11						
Liptio spp.	9	2						
Lampsilis radiata *	2							
Utterbackia imbecillis	1		1					
Villosa sp. *		3						
Campeloma decisum							25	1
Corbicula fluminea	A	A	A	A	A	A	A	A

A = Abundant ***** *= Identification being verified*

Mussels collected at Falls tailwater