

**J.H. Kerr Reservoir Section 216 Study – Roanoke River
Downstream Riparian Ecosystem Technical Work Group**
Meeting Minutes from 11/13/03 - prepared by Jim Mead

A list of attendees and action items is included after the meeting summary

MEETING SUMMARY

Synopsis of teams leaders' meeting:

- We are in Phase I and our immediate responsibility is to develop a plan of study for this task.
- Rely on Bill Adams, Lisa Hetherman, and Richard Lewis, USACE, to facilitate communication between Task Groups - avoid duplication or things falling through the cracks.
- Go through Bill Adams for Executive committee approval of expenditures associated with developing the study plan. Richard Lewis is an alternate contact if Bill is unavailable.

Ecosystem Impacts – Vegetation:

(Refer to table from cumulative impact assessment during Dominion relicensing – attached)

Townsend –

- Survivorship and growth rate are 2 indicators. The former requires long term data. Growth rate is not hard to measure, but difficult to isolate effects of multiple variables.
- Cliff Hupp has tree cores, but growth rings have not been analyzed. More than just flooding may be a factor (weather, insects, etc)

Miwa – identified 4 indicators

1. Effect on mature trees – survival and productivity, one method to test is dendrochronology
2. Effect on seedlings – need more data, USGS hardwood lab in Mississippi, identify thresholds for survival/mortality – duration of flooding etc.
3. Effect on regeneration – germination, re-sprouting, and seed establishment
4. Effect on seed production – influences recruitment and also mast production for foraging

Sam Pearsall –

- Reference Rachel Hochman's research on seedling response. (Note - this is available on the FERC web site at <http://ferris.ferc.gov/idmws/nvcommon/NVViewer.asp?Doc=1046380:0>, but you will only be able to view it if your browser supports Javascript. If you have trouble going directly to the document, go first to the FERC elibrary search page at <http://ferris.ferc.gov/idmws/search/fercgensearch.asp> Then search for a date range of 7/12/02 only, hydro projects only, and docket number P-2009. The document you want is submittal number 20020712-5013. When you click on this you may be prompted to accept the Java applet. Be aware that this is a large document and may take awhile to load, depending on your Internet connection.)
- In-situ studies should have enclosures
- Curt Richardson at Duke University School of the Environment is setting up a wetlands lab that might be used for this kind of research
- Start with a literature review. The existing review by Hochman focuses more on forest community dynamics, with more is needed on forest productivity.
- Keep in mind that we may be laying the foundation for long-term adaptive management

Jean Richter – she continues to track 100 seedling plots established by Hochman (no enclosures)

Graham – how does coming up with a study plan mesh with long-term adaptive management?

Lewis – USACE has bought into examining a long-term approach as one option

The team agreed to set up a sub-committee to continue detailed discussions on vegetation response. Five Members are: Pearsall, Miwa, Jean Richter, Townsend, and Bob Peete.

Ecosystem Impacts – Animals:

(Refer to table from cumulative impact assessment during Dominion relicensing - attached)

Sam Pearsall

- Lepidoptera – easy to monitor, relocate if unfavorable conditions
- Soil macro-invertebrates – monitor by guilds
- Chimney crayfish – kills have been observed, may be related to water quality
- Turtles – indicator species for bank habitat
- Turkey – indicator species for ground nesting
- Bats – affected by availability of insect prey and access to dead trees (near base of tree)

Jean Richter

- Patuxent Research Center has established four, 200m x 200m study plots on the refuge
- Mammals – studied with sand trackways and trapping
- Survey of crayfish and reptiles
- Hoping to establish control plot in Meherrin floodplain

Sam Pearsall – the following baseline data is available

- Lepidoptera – Steve Hall, Natural Heritage Program
- Wildlife data – NCSU Cooperative Research Unit
- Herpetology – Trip Lamb, ECU
- Turkey nesting – David Cobb, NC Wildlife Resources Commission (WRC)
- Bats – Mary Kay Clark, NC Museum of Natural Science
- Black bear – consult WRC
- Birds – Jean Richter, point counts (60 data sets)
- Data lacking – crayfish, bank community, wood duck, nutria

Miwa – suggested a food chain hierarchy for studying animals

- Base food source – soil macro- invertebrates
- 1st order predator – salamanders
- higher predator – birds

The group also noted that effects of flooding could be broken down into four areas:

1. Survival – drowning, water quality
2. Feeding
3. Reproduction
4. Resting/roosting

Pourtaheri – there may be some overlap here with the sedimentation task group, as sediment deposition can affect vegetation and animals.

Townsend – national ecological indicator study has suggested migratory songbirds and soil macro-invertebrates as key indicators.

Graham – a literature review was conducted as part of Dominion re-licensing (John Cannon, Harza), but needs update and expansion.

Hupp – University of Missouri Press is producing a publication – Bottomland Hardwoods. Contacts are Lee Fredrickson and Sammy King

Sam Pearsall

- Suggested having grad student(s) do as an internship (in between Phase I and II).
- A little bit of literature review on lepidoptera and neotropical migrant birds was done during relicensing.
- Do we need zoologists to review the species table produced during relicensing?

Jean Richter – we need to focus on:

- What is most sensitive
- What responds most quickly
- What can be monitored with reasonable effort

Action Item – contact experts to see if table of animal species should be revised, narrowed, added to

- Sam Pearsall – contact Clark, Cooper, and Braswell at NC Museum regarding bats, crayfish and herps
- Jean Richter – contact Smithsonian regarding birds
- Mead – contact Earl Gillis regarding nutria and black bear
- Miwa – consult International Paper staff person regarding the table

Ecosystem Impacts – Invasive Species:

Miwa – have more suitable conditions for invasives been created?

Sam Pearsall

- May want to remove microstegium from the list (likely a lost cause)
- Include invasives under both the animal and plant categories so we can consider both enhanced pests and suppressed predators

Townsend – suggested a separate category for invasive species, focusing on semi-aquatic plants (parrot feather)

Silviculture:

Miwa

- Overlap with agriculture
- Farm and forest road network layer needs to be added to GIS database
- International Paper (IP) has electronic version of their road network (work out proprietary issues) but includes only horizontal layout, not elevations

Group

- Can we get elevations from the Nature Conservancy's Digital Elevation Model (DEM) when overlay the road network? Yes.
- IP forest manager could identify the areas most susceptible to flood impacts
- DEM based on 1996-2001 data
- Is it worth resolving road elevations with field data or not?
- As needed could GPS points to define road layout, and annotate with information about whether road is built up and how much.

Miwa

- **The key issue for silviculture impacts is operability – both whether roads are flooded or not, and the length of time after inundation that is needed so that they are dry enough to use.**
- **This issue is also a key one for agriculture and recreation**

Townsend

- Use the Nature Conservancy's flood model to identify tracts that flood
- Contact foresters, farmers, and hunt clubs for road layouts. Also county tax and planning info.
- Augment with GPS filed data as needed
- Address recovery time issue through interviews and soil survey info

Recreation:

Group – Proposed that this task group handle road accessibility along with silviculture and agriculture. This task group and the downstream aquatic ecosystem group will address game species productivity. The downstream flow-based recreation task group will handle any other recreation issues.

Note: This was discussed further at the 12/2/03 meeting of the downstream flow-based recreation task group. It was agreed that it would be most efficient to have a single task devoted to developing a single GIS layer to interface forestry, agriculture and recreation access roads with a flood model. Collecting the data and developing the GIS layer will be part of the study plan developed by the downstream riparian ecosystem group. However, the downstream recreation task group also thought it would be advisable to have a separate task in their study plan that involved querying hunting groups and outfitters to identify important access roads. This would be done prior to the task of developing the road GIS layer. The recreation task group will also include analysis of the road network and flood model produced by the riparian task group studies in the recreation task group study plan.

Agriculture:

Jean Richter - will contact Wayne Short with NRCS about representing agricultural interests on this task group. (This action item has been accomplished and Wayne has joined the task group).

Lindsay – RRBA will try to act as a communication channel between the 216 process and downstream agricultural interests.

Other Ecosystem Issues:

Jean Richter – wondered about proceeding with her plans to initiate a bird study next year. Group thought she should proceed.

Miwa – asked about where monetary impacts will be considered. Richard Lewis said that the USACE is required to do this as part of Phase III of the study

Nature Conservancy Model Demonstration – RRBROM and Flood Model:

Emerson – USACE staff has provided Bill Adams with schedule and costs to complete review of RRBROM so that he can get approval from 216 Executive Committee. Once approval granted, estimate 25 days to complete review.

Townsend – the flood model is not a complex flood routing model. Instead it is based on regressions using low level satellite imagery. There is some routing included to consider how water moves during each flood event.

Sam Pearsall – regarding the flood model

- Are other 216 task groups comfortable with a GIS based model?
- Is resolution acceptable? 25m x 25m horizontal and 25 cm vertical, covering an area 137 miles long and 5 miles wide.
- Arc View is needed to run the flood model
- May need to update the vegetation dataset (layer)

Townsend – the flood model has been peer reviewed and has documentation regarding precision

Estimating Costs in Study Plans:

Lewis – USACE uses their salaries and overhead with standard travel rates. Also have established wage rates for contractors that they could provide for various types of contractors.

Wrap-up:

Mead - Other Action Items

- Will line up video equipment to show 18 minute overview of Roanoke River provided by the Nature Conservancy at the next meeting
- Will add Townsend to the list serve for this group
- Will send email to members of vegetation sub-committee to get them started

Next Meeting:

Will be scheduled after 1/1/04 to allow time for sub-committee to do some work, and for other action items to be accomplished.

Action Assignments from 11/13/03			
Who	What	When	Status
Mead	Initiate vegetation sub-committee	ASAP	Pending
Sam Pearsall, Miwa, Jean Richter, Townsend, and Peete	Begin drafting study plan for riparian vegetation issues	December	Pending
Sam Pearsall	Contact Clark, Cooper, and Braswell at NC Museum re: bats, crayfish, & herps	December	Pending
Jean Richter	Contact Smithsonian re: birds	December	Pending
Mead	Contact Gillis re: bear & nutria	December	Pending
Miwa	Consult with IP staff on species list	December	Pending
Jean Richter	Recruit Wayne Short to represent agricultural interests	ASAP	Done
Bill Adams	Consult Executive Committee for approval of \$ for RRBROM review	ASAP	Pending
Emerson et al	Complete RRBROM review	~25 days following release of funds	Pending
Mead	Consult downstream recreation team regarding overlap	12/2/03	Done
Mead	Draft study plan for silviculture/agriculture/recreation	December	Pending

Members	Present	Absent
Jerad Bales	X	
John Dorney		X
John Ellis		X
Jennifer Everett		X
Earl Gillis		X
Bob Graham	X	
John Hazelton	X	
Harvey Hill		X
Adugna Kebede	X	
Bob Lindsay	X	
Jim Mead	X	
Masato Miwa	X	
Linda Pearsall		X
Sam Pearsall	X	
Jean Richter	X	
Jeff Richter	X	

Support Personnel/Presenters/Visitors Present
Dan Emerson, USACE
Cliff Hupp, USGS
Richard Lewis, USACE
Brian McCrodden, Hydrologics
Hasan Pourtaheri, USACE
Phil Townsend, Univ. of Maryland

**STUDIES NEEDED TO DETERMINE IMPACTS (INCLUDING CUMULATIVE IMPACTS)
OF ALTERED HYDRO-REGIME ON TERRESTRIAL ECOSYSTEMS AND ORGANISMS.**

Produced by the Terrestrial Working Group on July 6, 2000.
Based on previous work of the TWG and the Cumulative Impacts Workshop (Raleigh 1999).

**REVIEWERS PLEASE REVIEW FOR COMPLETENESS (REPRESENTATIVENESS, NOT INCLUSIVENESS)
AND ACCURACY. PLEASE ALSO RESPOND AGRESSIVELY TO BLANK CELLS.**

NEEDED FOR:	ESSENTIAL Cause → Effect Directly tied to Mitigation	DESIRABLE Hydro/Eco-System Modeling
NCP LICENSE	N1	N2
CORPS §216 STUDY	C1	C2
LONGTERM AM PARTNERSHIP	P1	P2

Notes: The term “flood” is used throughout to mean inundation of habitat within the floodplain of the Roanoke and its tributaries. The term does not refer to flows that extend out of the floodplain and cause damage to human infrastructure. This table does not include any impacts not related to altered hydro-regime, e.g., fire suppression impacts on cane, while of concern, are not listed here. An assumption in the preparation of this table was that NCP’s peaking does not increase the frequency or duration of floods. Another assumption was that NCP’s influence on releases from Kerr Dam would be covered by the Corps §216 study. If either of these assumptions proves false, most or all of the items with C-codes will acquire an N-code as well. Finally, it is important to note that species and natural communities that prefer mainly wet or mainly dry environments are mainly benefiting from the regulated hydrology of the system, but species and natural

communities that require or are adapted mainly to periodic but short inundations have lost habitat as a result of the regulated hydrology of the river (Townsend 97).

BIOLOGICAL ELEMENT	IND VARIABLE(S)	DEP VARIABLE(S)	CODE(S)¹	COMMENTS
Water Hickory	Freq & Duration of Growing Season Floods	Germination and Survival Growth Mast Production	C1 C2 (N2) C1	Identified by Hochman (99) as a keystone species in bottomland hardwood types. Flood response data collected from the literature.
Overcup Oak	Freq & Duration of Growing Season Floods	Germination and Survival Growth Mast Production	C1 C2 (N2) C1	Identified by Hochman (99) as a keystone species in bottomland hardwood types. Flood response data collected from the literature.
Green Ash	Freq & Duration of Growing Season Floods	Germination and Survival Growth	C1 C2 (N2)	Identified by Hochman (99) as a keystone species in bottomland hardwood types. Flood response data collected from the literature.
Laurel Oak	Freq & Duration of Growing Season Floods	Germination and Survival Growth Mast Production	C1 C2 (N2) C1	Identified by Hochman (99) as a keystone species in bottomland hardwood types. Flood response data collected from the literature.
American Elm	Freq & Duration of Growing Season Floods	Germination and Survival Growth	C1 C2 (N2)	Identified by Hochman (99) as a keystone species in bottomland hardwood types. Flood response data collected from the literature.
Swamp Chestnut Oak	Freq & Duration of Growing Season Floods	Germination and Survival Growth Mast Production	C1 C2 (N2) C1	Identified by Hochman (99) as a keystone species in bottomland hardwood types. Flood response data collected from the literature.

¹ Codes in parentheses are conditional, e.g., (N2) in the first few rows means N2 if NC Power's peaking operations are shown to contribute to the frequency and/or duration of growing season floods.

Bald Cypress	Water Quality during Growing Season Floods	Germination and Survival Growth Mast Production	C1 C1 C1	Extended growing season floods and associated water quality may reduce bald cypress seedling survival and growth.
Cane	Scouring Flows Sediment Deposition Freq & Duration of Growing Season Floods	Germination Germination Survival and growth	C1 C1 P2	Scouring flows and/or sediment deposits are required as seed bed for cane. Impacts of growing season floods are not known.
Sedges and rushes	Altered hydro-regime – specific variables not known	Soft mast production	P2	These are critical producers of wildlife food. Impacts of altered hydro-regime are not known.
Microstegium	Altered hydro-regime – specific variables not known	Germination and survival	C1	Microstegium is a very serious invasive species that is distributed mainly by water. Impacts of altered hydro-regime are not known.
Soil Invertebrates -- the entire fauna in the floodplain sorted by feeding guilds	Altered hydro-regime – specific variables not known	Distribution and abundance	C1	These little known and difficult to monitor species are critical to soil process and are important prey for waterfowl and fish. Impacts of altered hydro-regime are not known.
Lepidoptera distinguished by guild: Hawthorne specialists Cane specialists Cypress specialists	Freq & Duration of Floods	Survival of ground stages Distribution	C1 C1	Hawthorne and cane specialist guilds include rare species. Cypress specialist guild chosen as an indicator of cypress health.

Forest Tent Caterpillar	Freq & Duration of Floods	Survival of ground stages of controlling parasites (flies and wasps). FTC has no ground stage. Impacts of floods on disease organisms (bacteria and fungi) not known.	C1	Annual outbreaks of this species are believed to be encouraged by hydro-regime-related mortality of controlling parasites. During outbreaks, tupelo are largely defoliated, with damage extending to hardwoods. The canopy is opened, exposing floodwaters to sunlight, increasing temperature. Large quantities of frasse are deposited into floodwaters, presumably impacting water quality. Jim Harper (NCSU) has studied elsewhere in the SE.
Gypsy Moth (European)	Altered hydro-regime – specific variables not known	Distribution and abundance. No ground stage.	P2	Gypsy moth is a serious invasive species believed to be just arriving in the Roanoke floodplain. Now at Devil’s Gut. Impacts of hydro-regime (if any) are not known.
Chimney building (mainly terrestrial) crayfish (Cambarus spp.)	Altered hydro-regime – specific variables not known, but prolonged submergence is suspected	Distribution and abundance Large-scale kills	C1 C1	Crayfish are important prey species as well as important macro-detritivores. They also physically alter swamp forest substrates. Frequent, large-scale kills have been observed.
Stream crayfish (Orconectes spp.)	Altered hydro-regime – specific variables not known, but WQ (anoxia) is suspected	Distribution and abundance	C1	Crayfish are important prey species.
Aquatic turtles, esp. Yellow-bellied sliders	Alteration of banks by peaking and/or prolonged flooding.	Bank nesting sites Bank vegetation	N1, C1	Steve Hall believes important habitat along the banks has been lost.
Turkey	Floods during nesting season Frequency and duration of growing season floods	Successful brood production Increased predation based on concentration Survival of critical shrub and forb habitat	C1 C1 C1	

Kentucky Warbler	Floods during nesting season Frequency and duration of growing season floods	Successful brood production Increased predation based on concentration Survival of critical shrub and forb habitat	C1 C1 C1	
Northern Parula				
Cerulean Warbler				
Swainson's Warbler				
Passerines -- Canopy Nesting and Feeding Guilds	Hydrological impacts not known	Populations are declining in the Roanoke for unknown reasons	C2	Per Steve Hall
Wood Duck	Frequency and duration of growing season floods	Survival of critical shrub and forb brood habitat	C1	
Rafenesque's Big-Eared Bat	Water Quality Frequency and duration of floods during breeding season	Distribution and abundance of insect prey Submergence of access to breeding roosts	C1 C2, P1	
Southeastern Myotis	Water Quality Frequency and duration of floods during breeding season	Distribution and abundance of insect prey Submergence of access to breeding roosts	C1 C2, P1	
Black Bear	Frequency and duration of growing season floods	Survival of critical shrub (and forb?) forage	C1	
Nutria				Is hydro-regime helping them?
Other mammals?				

River bank communities	Peaking strategy Frequency and duration of growing season floods	Survival of gramminoids, forbs, and shrubs; degradation of burrow habitat	N1, C1, P1	Peaking and/or inundation may be destroying bank vegetation (impacting fish and herp high-water foraging habitat) and/or eliminating burrowing opportunities for animals. Comparison of the Roanoke with a reference river is seen as a plausible first test to determine if any of these impacts exists. The Hatchie River in TN and the Altamaha in GA are possibilities.
Pocosin communities at the river's mouth	Altered hydro-regime (variables?)	Salt deposition in peat soils	C2, P1	Not clear if the altered hydro-regime is producing salt-related impacts in peat soils. It was considered by the CIA workshop as a possibility to be evaluated.
Bottomland hardwood forests above cypress- tupelo and pocosin types and currently subject to flooding	Frequency and duration of growing season floods	Distribution and abundance	C1, P1	Growing season is being defined as the period between 2 weeks before bud-burst to the end of chlorophyll increase as determined from several years of AVHRR data (Townsend in prep). Rooting depth (the lower edge of flood definition) is semi- arbitrarily set at 2 feet below surface.

PHYSICAL INPUTS

Background: Vegetation has been mapped. 25 cm DEM in production. Baseline inventories completed for neotropical migrant birds. Preliminary inventories developed for herps, leps, and bats. River and swamp stage data is now available for ? months.

Flow Model: Reservoir Operations Model in Beta version. Corrected and accepted version required for License and §216 Study.

Erosion Evaluation: NCP and USFWS will measure bank erosion due to peaking. Required for license.

Flood Models: Static model (TNC) will be available in stages between August 31, 2000 and December 31, 2001. Minimum requirement for License negotiations and §216 Study.

Dynamic model (USGS and NCP) will be complete as 1D to Scotland Neck by August 15, 2000. No plans as yet for 2D to the Sound (Corps and USGS?). Highly desirable for License negotiations and §216 Study.

NCP needs to determine if peaking is contributing to flooding at Coniott Creek as soon as possible. Jerry Holloman believes that it did during the 6/19-29/2000 flows. The Terrestrial Committee needs to evaluate Jerry's evidence, and a stage-gage may be needed for that location ASAP.

Water Quality: NCP will determine the approximate rate at which growing season floods contribute to water quality degradation in the swamps (main channel effects are already documented).

A water quality model for the entire system below Roanoke Rapids Dam is essential for the §216 Study.

Sediments: Townsend et al. continue to pursue funding for research on sediment deposition and movement in the floodplain. Impacts on terrestrial communities, if any, are not yet hypothesized.

Compiled: Sam Pearsall and John Cannon / July - August 2000