

**JOHN H. KERR RESERVOIR SECTION 216 STUDY  
NOTES FROM 8/13/03 MEETING  
RIPARIAN ECOSYSTEM TECHNICAL WORK GROUP**

Jim Mead distributed RFP's for tasks 1A through 1C and referred to the Project Management Plan (PMP) for study element #1 (distributed prior to meeting). Task 1D is likely to be included partly in task 1C and partly in study element #2 – Water Quality.

Our technical work group (TWG) should feel free to make suggested revisions to the PMP. It is a living document. The RFP's are drafts and are intended to get us thinking about what questions to answer, how to answer them, and who should do the work. Whether or not the work should be put out for contract is not the issue we should focus on at this point.

Jim Mead described study element #1 – Downstream Flow Regime and Effects on Riparian Ecosystem – as a sequence of studies. Items 1, 2, and 3 are included under task 1A. Item 4 is covered by task 1B, and items 5 and 6 are task 1C.

1. Effect of reservoir operations on downstream flow
2. Effect of flow (magnitude, duration, frequency) on downstream water levels
3. Effect of water level on inundation
4. Effect of inundation on forestry, agriculture and access for hunting
5. Effect of inundation on plant and animal communities
6. Effect of inundation on water quality (study element #2) and then how does this water quality affect plant and animal communities (study element #1)

Existing models with potential application to task 1A were discussed, including the Roanoke River Basin Reservoir Operations Model (RRBROM) and The Nature Conservancy's (TNC) flood model. John Morris mentioned the possibility of sub-committees to examine each model.

Jared Bales and others stressed that before moving too far ahead with model development/review, we should carefully consider what questions the model analyses are expected to answer. This can influence aspects of modeling such as time and spatial resolution. For example, will the resolution and daily time-step of the existing flow and inundation models be suitable to mesh with a water quality model?

Sam Pearsall noted that the resolution of the existing models is based on available technology and cost. He also expressed the desire to avoid deterministic models and focus on relativistic models - i.e. it is more important to be able to compare outcomes of different operating scenarios than to be able to model and precisely quantify the relationships between variables and results.

The TWG devoted time to outlining the key resource questions that need to be addressed under this study element.

### Silviculture

1. Operations – Effect of flooding on access for timber management, use of equipment, etc. Information is needed on layout and elevations of roads, and duration of flooding with respect to drying time.
2. Productivity/Tree Growth – Flooding can adversely affect forest productivity by mortality or inhibiting growth. Potential studies include: dendrochronology studies (Cliff Hupp is one source of info); biomass studies (difficult to conduct); or a literature based, relativistic study augmented with adaptive management.
3. Ecological effects – Effects on species diversity and wildlife are also a concern for timber managers.

### Agriculture

1. We need to identify a representative for this interest. Possibilities include: Wayne Short (NRCS); Matt Flint (NRCS, Raleigh); or DENR Division of Soil and Water. Also, Bob Lindsay will consider whether RRBA could act as an interface with downstream farmers. Note that Terry Brown has a list of farmers.

### Recreation

1. How does flooding impact road access for hunting etc.?
2. What recreational facilities are impacted by flooding – for example camping platforms and boat ramps?
3. How might the timing and duration of flooding affect use by waterfowl – a desirable game species for sportsmen?
4. Does flooding affect productivity of ground nesting birds – and thus impact hunting and nature observation?

### Ecosystem

1. Refer to the lists of key indicator species developed during Dominion relicensing. See relicensing settlement article FL4 and lists from the relicensing terrestrial work group. Bob Graham and Sam Pearsall will locate lists for Jim Mead to provide to rest of our TWG.
2. This task also will need to mesh with the water quality study element of the 216 study to evaluate the effect of water quality changes on plants/animals in flooded areas.
3. When evaluating flood effects on vegetation consider: the sensitivity of different plant communities to inundation; whether recruitment is drought related; and the relative importance of different plant communities because of differing use by various animal communities.
4. How can flooding affect the spread of invasive species – both terrestrial and aquatic? The dissemination of seeds and organisms or the suppression of competitors or predators can cause this effect.
5. How does flooding affect ground and near-ground nesting and foraging?

The team then returned to discussion of models to characterize the downstream flow regime and inundation (task 1A). Terry Brown described the wide range of issues related to the reservoir and downstream, and mentioned the need to integrate this study with the Philpott 216 study that is gearing up. He also noted that a daily, not weekly, time-step is needed, and that weather forecasting plays an important role in operational decisions.

Roanoke River Basin Reservoir Operations Model – used in Dominion relicensing; funded by NCDENR, TNC, Dominion, and Virginia Beach. All parties except the USACE have accepted RRBROM as an appropriate tool to simulate reservoir operations and downstream releases. The consensus was that the only remaining review needed to complete this work element is the responsibility of the USACE. Dan Emerson tentatively agreed to review by mid-October. However, he has since had to suspend this commitment. There was a concern that this expenditure of 216 staff time/funds should not be made without approval by the 216 Executive Committee. This issue of interaction between the TWG's and the Executive Committee will be discussed at a meeting of the TWG team leaders and Exec. Comm. on 9/17/03. Another issue to be discussed at this meeting will be the coordination of efforts between different TWG's.

TNC Flood Model - The flood model uses regression equations to link operations to water elevation (based on floodplain gages) and then a digital elevation map (based on low level satellite imagery) to determine areas submerged. Sam Pearsall noted that the flood model has a resolution of 25 cm vertical and 30m x 30m horizontal. Half of the available data was used in model development, and half to test the model – both for the initial model and for updates. The flood model needs to be reviewed. The TWG was interested in seeing a confidence interval map showing the difference for a standard deviation of plus or minus 25 cm vertical. In particular, the difference in inundation of sensitive vegetation types should be examined. Sam Pearsall will work on this and will make a presentation of the flood model at the next TWG meeting. The goal is for the TWG to develop a statement of work for flood model needs by Thanksgiving, 2003.

Ecosystem Response Models – will be affected by nature of output from flood model; to be discussed at future TWG meetings

Next Meeting – scheduled for 9/24/03 from 10:00 AM to 3:00 PM, 11<sup>th</sup> floor Archdale Building conference room

1. Other TWG team leaders will be invited
2. RRBROM and flood models will be demonstrated
3. USACE will give update on RRBROM review
4. Continue work on “statements of work”

### Action Items

1. Dan Emerson, USACE – review of RBROM
2. Sam Pearsall and Bob Graham, Dominion – provide Jim Mead with list of key species developed during relicensing to evaluate ecosystem effects. Mead will forward to rest of TWG
3. Sam Pearsall, TNC – work on confidence interval map for flood model, prepare RRBROM and flood model presentations for next meeting.
4. Bob Lindsay, RRBA – consider whether RRBA can interface with downstream agricultural interests.

This draft prepared by Jim Mead, 9/10/03