Philpott Lake, VA (Section 216) Feasibility Study
NATURAL (AQUATIC) RESOURCES WORK GROUP MEETING
PHILPOTT LAKE VISITOR'S CENTER, AUGUST 16, 2007

MEETING NOTES

Attendees: Bud LaRoche (VDGIF)
Scott Smith (VDGIF)
Dr. Don Orth (VA Tech)
George Devlin (VDEQ)
Wayne Kirkpatrick (DRBA and Trout Unlimited)
Al Kittredge (Trout Unlimited)
Phil Payonk (USACE – Wilmington)
Ben Lane (USACE – Wilmington)
Richard Lewis (USACE - Wilmington)
Penny Schmitt (USACE – Wilmington)
Mary Lawson (USACE – Philpott)
Jessica Craven (Philpott)

Agenda – See Attached

The meeting opened with a short welcome to all and introductions around the table. Bud LaRoche gave a brief recap of the last Natural Resources Work Group Meeting on December 8, 2006 for the benefit of those who were not in attendance. Bud LaRoche then explained that the purpose of the current meeting was to begin to craft study points to be included in the Scopes of Work (SOW's) to address each of the tasks in the Project Management Plan (PMP) during Phase II of the study. Some general discussion then followed on the topics listed below.

- Ben Lane urged the group to remain open minded during plan formulation.
- Phil Payonk stated that there are several Natural Resource tasks that will be meshing with Water Quality tasks and that the two groups will be working together on these areas.
- Mary Lawson asked the question of how the Philpott 216 study is related to the Kerr 216 Study. Ben Lane explained the relationship and stated that we would like to see Phase III of each study completed in concert.
- Richard Lewis then provided clarification on the different phases (I,II,III) of the study.
- Wayne Kirkpatrick asked the question of whether just stocking a forage fish in Philpott lake would take care of the trout issues in the Smith River? There was a general discussion about this suggestion and it was explained that there are a lot of other aquatic issues that additional forage in the river would not solve such as endangered species restoration.

- George Devlin then briefly discussed the Benthic TMDL Study being conducted on the Smith River as a result of the river being benthic impaired.

The work group then began to discuss study points to be incorporated into the Scopes of Work for each task in the PMP. Listed below is each Natural Resources task, the issues identified at the December 8, 2006 meeting and items to be included in the Scopes of Work as identified at the August 16, 2007 meeting.

PHILPOTT 216 STUDY
NATURAL AND CULTURAL RESOURCES

Phase 1 – Task 2: Natural and Cultural Resources

> **Phase 1 – Task 2A.** Determine how potential changes in reservoir operation could affect the existing natural resources of Philpott Lake and the Smith River. Philpott Lake and the Smith River are significant natural resource assets. Any permanent change in reservoir operation must be considered in light of its potential effects upon natural resources of the lake and downstream waters.

Phase 1 – Task 2.A.1 – Endangered Species Restoration. Evaluate potential changes in reservoir operations including flow and temperature management options for Philpott Dam and channel restoration activities below the dam specifically for the federally listed endangered Roanoke logperch (*Percina rex*) in the Smith River below Philpott Dam. A survey is currently underway to determine the presence of Roanoke logperch and/or logperch habitat on portions of the Smith River and other tributaries to Philpott Lake above the normal pool elevation, within the USACE property boundary. I fish or suitable habitat is found; evaluate how any changes in operation of the dam may impact habitat for and/or occurrence of the Roanoke logperch in the Smith River or other tributaries upstream of Philpott Lake.

> **METHODS:** The Smith River below Philpott Dam supports a population of the federally listed, endangered Roanoke logperch. Logperch are present at low abundance. The normal population abundance levels are not known. Results of the survey for presence of Roanoke logperch and potential habitat upstream of the lake will be incorporated into this process. The effects of the operation of Philpott Dam and potential management actions including adjustments to operation of Philpott Dam will be assessed. Potential management actions for Roanoke logperch in the Smith River below Philpott Dam include channel restoration and flow and temperature management of releases from the dam. Potential actions for possible upstream populations on Government property would be determined. These actions will require Section 7 consultation between the U. S. Fish and Wildlife Service, Department of Game and Inland Fisheries, and the U. S. Army Corps of Engineers.

Issues Identified at the 12/8/2006 Meeting

- Status of the mainstem Roanoke logperch population?
- Status of the Towne Creek Roanoke logperch population and is it the source of all logperch in the mainstem?
- How can habitat be improved to improve Roanoke logperch reproduction and recovery in the mainstem?
- What is the appropriate discharge protocol for Roanoke logperch?

Items to be included in the Scope of Work (SOW to be written by VDGIF)

- Determine the status of the Roanoke logperch population in the Smith River below Philpott Dam to Martinsville Dam, the North Carolina state line or confluence with the Dan River in Eden, NC as appropriate. (Distribution, abundance, trends)
- Determine the status of the Towne Creek Roanoke logperch population.
- Determine the source of the Roanoke logperch in the Smith River below Philpott Dam. Are they spawning in the mainstem or tributaries or both?
- Determine the preferred habitat requirements related to flow, temperature and substrate (depth, velocity, flow, substrate types) for Roanoke logperch in the Smith River below Philpott Dam. (Literature review?) Is this data available from the upper Smith River Study? (Some habitat data is available in the study)
- Is a population viability model needed that can project into the future that a population will persist (survival, recruitment rate, population density). Is Roanoke River research applicable to the Smith River? (Angermeir).Can a surrogate resident species such as the bluehead chub, fantail darters, etc. be used in a predictive viability model for the logperch? (USFWS?)

Task 2.A.2 – Habitat Management. Assess opportunities for channel restoration, using natural channel design principals in the Smith River below Philpott Dam. While suitability of habitat management actions under Section 216 will be assessed, opportunities for adjacent, aquatic ecosystem habitat management activities suitable for other funding authorities such as Section 206 will also be noted. Channel design could include sinuosity, and adding near stream woody vegetation to shade the channel and protect stream banks from erosion. Channel design immediately below the dam could include addition of gravel and cobble materials to improve the conditions for invertebrate production if peaking flows were reduced. Channel restoration may require modifications in the timing and magnitude of the releases from Philpott Dam.

The current stream channel in the Smith River below Philpott Dam is affected by highly regulated releases from Philpott Dam. Flood management has eliminated flood flows in the Smith River. The highest flow is the peak generation flow, which usually occurs daily. Between generation releases, the water surface is shallow and slow moving; this

causes more rapid warming of the water. Channel restoration, using natural channel design principles, will be used in the Smith River below Philpott Dam to enhance bed load transport, stabilize banks and floodplains, and increase habitat suitability.

METHODS. Contact subject matter experts and other appropriate parties to develop an inventory of available data by type, including; hydrologic, channel geometric, hydraulic, sediment, land use, and bank erosion. Critical aquatic habitat will be identified. Data will be consolidated and evaluated for its usefulness in the Philpott Dam and Lake Section 216 Study. Data will be provided within a GIS.

Collaborate with subject experts for natural river design using data on channel morphology measurements, discharge and stage data, river critical aquatic habitats, and GIS database information. Determine river restoration options and locations appropriate to this Section 26 study. Evaluate potential benefits for each alternative. Develop a benefit to costs decision matrix.

Influences of Fluctuating Releases on Stream Fishes in the Smith River below Philpott Dam, Report to Virginia Department of Game and Inland Fisheries by Donald J. Orth et al., December 2004 contains a significant amount of information on the non-native brown trout fishery, invertebrates and other species downstream of the Philpott Dam. It is thought that the data maybe sufficient for phase III evaluations of impacts on the brown trout fishery and habitat and that no additional work will be required. Hydrodynamic models could be used in the channel design process to assess habitat management opportunities during generation flows and non-generation flows.

Issues Identified at the 12/8/2006 Meeting

- How do we restore the river channel to move sediment? (Water Quality crossover)
- How does the Martinsville Dam influence habitat recovery?
- Flow issues need to be figured out before designing a channel to move sediment.

Items to be included in the Scope of Work (SOW to be written by the USACE)

- Can this SOW be developed before we know what flows are needed?
- Determine sources of sediment in the Smith River. Is it riverbanks, tributaries, etc. (Water Quality crossover)
- Determine impacts of current operating regime on sediment loading in the Smith River (Water Quality crossover)
- Design channel improvements for several different peak flow options in including the current peak of 1400 cfs to improve the sediment transport capacity and stabilize the bank (vegetation, large rocks (big as a car!), channel shaping, substrate material). What do we need? Hydrodynamic model, erosion

model from Kerr 216? Sediment model (source, sizes, fate and transport). Sustainable stream. New Work Group Members – Frank Yelverton and Tony Young, Virginia Rynk? Stream improvements should be matched to the needs of P. Rex and Brown Trout and other aquatic species in the Smith River.

- Feasibility of doing gravel augmentation in the first 6-8 km of the river below Philpott Dam. (3 dimensional model is available at VT (Dr. Diplas) from Smith River Study)

Task 2.A.3.a- Temperature Management: Assess opportunities for habitat improvement for natural resources including brown trout and native fishes and invertebrates in the Smith River below Philpott Dam by managing the temperature regime in the Smith River below Philpott Dam.

METHODS: The temperature regime in the Smith River could be managed to increase the length of tailwater with suitable temperature for brown trout and native fishes and invertebrates. Currently the average release temperature (8 C) is below the optimal brown trout growth range (12-19 C). Warmer releases could benefit the brown trout habitat and increase the area of suitable habitat for warm water species, including the Roanoke logperch. Achieving warmer releases could be accomplished by several means, including structural modifications to the intakes or nonstructural modifications such as changes in magnitude and schedule of releases from Philpott Dam. Each potential scenario would be evaluated for habitat effects and for costs. Evaluate the bioenergetics constraints on brown trout, native fishes, and invertebrates under proposed temperature regimes.

Issues Identified at the 12/8/2006 Meeting

- How are temperature fluctuations impacting species?
- How can we get the appropriate temperatures from the dam and still maintain generation and not impact the reservoir?
- Is there enough volume in the reservoir with the right summer temperatures for logperch?
- Can weekend generation improve the temperature regime in the Smith River?

Items to be included in the Scope of Work (Determine who will do SOW with Water Quality Group)

- Determine the impacts of temperature fluctuations in the Smith River on aquatic life through a literature review. The data is already available.
- Develop a flow/temperature model that can predict temperatures throughout the river at different flows. (Orth Model will do)
- Determine the potential options and costs for withdrawing water from Philpott Reservoir at preferred temperatures for aquatic species in the Smith River (Engineering study). Water Quality crossover.

- Determine if there is a sufficient volume of water in Philpott Reservoir at the preferred target temperatures and if mixing of different water levels will be required. (Water Quality crossover)
- Evaluate weekend generation options in terms of duration and amount to reduce temperature fluctuations. Short-term options for improving conditions until permanent solutions are implemented. Tools available without further field data collection. (Take out)
- Identify different flow options to minimize daily temperature fluctuations to include weekend generation among others. (Phase 3)

Task 2.A.3.b. – Flow Management: Assess opportunities for habitat improvement for natural resources including brown trout and native fish and invertebrates in the Smith River below Philpott Dam by managing the flows from Philpott Dam.

METHODS: Current base flow appears to be below the optimal reservoir release range (9-15 cubic meters per second), while the peak flow is too high to support suitable brown trout spawning environment. A 12 cms reservoir release scenario predicted the best suitable habitat availability in our study site. The highly fluctuating flow causes temporal changes in the locations of suitable habitat.

Management of flows for habitat improvement could vary with seasonal life cycle requirements for various species. For example brown trout spawning is predictable based on daily temperatures. Peaking flows could be restricted during the time of peak spawning, incubation, and emergence to maximize recruitment success.

Another potential flow management technique which could be evaluated is stepped releases. The rapid increase in flows during generation causes substantial in crease in the shear stresses on the channel bed. A two-step flow release may reduce the shear stress acting on gravel and drag force exerted o fish without affecting power generation requirements.

Achieving flows that are beneficial to habitat for trout, native fishes and invertebrates could be accomplished by several means including structural modifications to the water intakes or nonstructural modifications such as changes in magnitude and schedule of releases from Philpott Dam. Each potential scenario would be evaluated for habitat effects and for costs.

Issues Identified at the 12/8/2006 Meeting

- Is there a better ramping scenario then the one being used currently?
- Review of new turbine technology; let’s be ready when the old ones go.

Items to be included in the Scope of Work (SOW to be written by VDGIF)

- Identify impacts of current ramping scenario on aquatic life in the Smith River. (Being done by VDGIF through annual samples, but include in SOW for 216). VDGIF will develop SOW.
- Identify a potentially improved ramping technique that further reduces the bottom shear stress on the Smith River. No potential given current equipment?
- Develop flow regime alternatives based on water availability that would benefit aquatic life and still satisfy other users.(Phase 3)

PHILPOTT 216 STUDY
AQUATIC RESOURCES WORK GROUP MEETING
PHILPOTT LAKE, August 16, 2007

AGENDA

1. Welcome and Introductions

2. Brief explanation of what was decided at the December 8, 2006 meeting and the purpose of today's meeting.

3. Brief general discussion on study logistics and overlap with the Water Quality Group.

4. Review of task issues identified at the December 8, 2006 meeting and development of items to be included in Scopes of Work to be developed for each task in the PMP.

    - Task 2.A.1 – Endangered Species Restoration
    - Task 2.A.2 – Habitat Management
    - Task 2.A.3.a – Temperature Management
    - Task 2.A.3.b – Flow Management

5. Discussion of timeline for developing SOW's.

7. Adjourn