

## **Sedimentation and Erosion Workgroup Meeting**

**August 22, 2006**

**12:30 pm**

### Participants:

Laura Bullard – Friends of Claytor Lake and land owner

Darla Jennings – Friends of Claytor Lake

Beth Cade – U.S. Army Corps of Engineers

Terry Noble – U.S. Army Corps of Engineers

John Copeland – Virginia Department of Game and Inland Fisheries

Jack Hannula – Federal Energy Regulatory Commission

Bill Kittrell – Virginia Department of Game and Inland Fisheries

Wayne Alexander – Appalachian Power Company

Matthew Chan – Normandeau Association

Mike McLeod – Virginia Department of Environmental Quality

Fran Rooker – Friends of Claytor Lake

Mary Rhodes – Land Owner

Alex Brunton – Baird

Mark Riedel – Baird

David Falcinelli – Kleinschmidt Associates

Frank Simms – American Electric Power

John Massey-Norton – American Electric Power

John Smith – FERC (conference call)

Teresa Rogers – Appalachian Power Company

### Sedimentation

The Sedimentation Study's project relevance and objectives were reviewed. The tasks under each objective as outlined in proposed study plan were reviewed.

Sources of Existing mapping: COE performed soundings in specific areas in 2003. They have some old mapping from Appalachian but it doesn't show contouring. Lacking historic mapping, the original contours can be seen in high-resolution bathymetric mapping.

Hydrodynamic reservoir sedimentation model will look at watershed sediment, shoreline processes, climatic variability, redistribution of sediments, wave climate, boat traffic, etc. Modeling will be coordinated with the erosion study to also document reservoir erosion. Sedimentation

simulations will be conducted that look at existing conditions and future scenarios.

For climatic variability, North Atlantic Oscillation information will be obtained. Historical and current trends in climatic variability will be included in the sedimentation modeling.

Objective 4: Methods – standard federal methods (USGS, USFS, COE) will be used. Field survey of river conditions will be conducted: Geomorphic river survey, river habitat survey – pool, riffles, etc., hydraulic and sediment transport survey.

It was noted that there is a lot of overlap between sedimentation and erosion studies.

A watershed sedimentation model will be developed: Future development scenarios, impervious surfaces, climate change / variability, and upstream dams will be taken into consideration.

Upland sources of erosion will be characterized and quantified. A watershed sediment budget will be developed. Sources by type, frequency, and magnitude will be summarized. “Hot-spots” of erosion and sediment yield will be identified within project area (entire watershed.)

Sedimentation Budget: Model will be developed and run over a period of record based on existing information and summarized on an annual basis. The “budget” will determine sediment coming in, sediment going out and sediment depositing in the lake.

Presettlement conditions will be simulated with the watershed sedimentation model. While there are presettlement maps for portions of the southern Appalachians, these may not include the project area. What will this information provide us? For relicensing, the baseline is current conditions. Running presettlement mapping gives you an absolute zero base – what was sediment yield before Europeans arrived. Provides another timeframe in which to compare current and future scenarios. It will provide information on the amount of natural sedimentation. Even presettlement times could have areas of high yield.

Sediment redistribution downstream of the dam: Look at sediment fluxes, filling of pools, and riffles downstream. Field work includes multiple surveys downstream, mapping of features – bar formation, channel aggradation and avulsion, changes in sediment grain size. Sediment transport capacity will be integrated and analyzed over a range of flow regimes. Mapping downstream will involve identifying similar reaches by canoe.

The study plan methods will be modified to include more details as discussed in today's powerpoint presentation.

### Erosion

The Erosion Study's purpose, relicensing relevance and objectives were reviewed.

Field work includes the surveying of the different reaches around the lake to determine existing conditions. The shoreline will be divided into homogenous reaches, GPS data will be taken and conditions will be photographed. Natural (unprotected) shoreline will also be noted.

Shoreline protection: An inventory of shoreline line protection activities will be developed, including type, condition and effectiveness. There will be a GIS layer identifying areas of shoreline conditions.

Erosion profiles will be developed. Profile information comes from bathymetric data and contour data that are being collected as part of relicensing.

It was asked whether aquatic vegetation would be included when the shoreline area is mapped. Areas protected by vegetation will be noted in field survey findings. Detailed information on aquatic vegetation will be obtained from the Aquatic Vegetation Study.

It was asked how property owners would get information on how to address the areas of significant erosion. The connection between types of control and shoreline erosion will come together during the Shoreline Management Guideline development process.

Islands will be included in the shoreline erosion survey. It was noted that there are two islands eroding in front of the dam. In regards to the islands, it was asked what is important (significant) about the islands, who owns the islands, what is causing the erosion, do they need to be stabilized, what is the significance about retaining the islands, and do they need to be marked?

Wave modeling will be performed: Define wave climate on the lake (wind speed and direction.) This information, along with inputs of water levels, wind and bathymetry, is used to construct wave model. This is used to identify key areas of waves on the lake.

It was commented that the wind doesn't blow straight down the lake. There are wind deflections. How significant this is will have to be looked at in relation to dominant wind direction. Where the lake turns will be taken into consideration.

Fetch is the length of water over which the wind blows.

Wind direction and speed will be obtained from the closest station with the most accurate information (airports, NOAA, etc.)

Boat waves: This is difficult to model. This study is proposing to use an ACDP, which measures current and waves. The boat waves can be isolated. Data from days of high recreational use (from Recreation Study) will be reviewed. The recreation study will provide information on how boating traffic is distributed throughout the lake.

The ACDP will log data and at the end of the season the ACDP is removed and the information downloaded. Peak recreation season is between Memorial and Labor Day.

Clarification: ACDP deployment will involve 5 instruments for a period of one month during the time the other shoreline fieldwork is done. The instruments measure currents. One will also have a pressure transducer that will measure waves. The location is to be determined. From this information, we can infer what is happening in other areas of the lake. The data from the ACDP will be used to calibrate the model, which will be run over various periods of time outside of the period where data is being collected.

Is there a limit on the depth where these ACDPs can operate? There is a trade-off between depth and resolution.

The ACDP will sit on the bed and won't interfere with boat traffic.

Would you want it in a high boat traffic area? It is better out in the middle of the lake. State Park would be a good location – wind and boat wakes.

The boat waves are very dispersed. The one instrument will capture the range of boat wakes. We can then take the worst case boat wakes in conjunction with worst case of wind, apply this across the lake to give us the worst case erosion scenario.

Hydrodynamic model: Determine alongshore currents (erosion), determine areas of slow flow (sedimentation). This will be very valuable to future scenario modeling. Model will show circulation in the lake. This will allow us to do shoreline modeling that incorporates shoreline characteristics, current modeling, fluctuating water levels, wind and boat wave information.

Can't do this type of modeling over the entire shoreline. Study is proposing to choose representative areas of the lake shoreline to model based on type of wind climate, wave energy, population/development, shoreline geology, specific needs. Water level fluctuations also considered.

Number of sites is not identified at this time – will need to determine the number after we gather additional information. This number will have input from the workgroup.

Bedrock areas will not be modeled.

River Erosion Survey: Survey of downstream channel reaches using the geomorphological baseline survey methodology. Photographs will be taken.

Data collected from dam to 460 Bridge: Catchment morphology, land use; mean channel dimensions, cross-sectional form; river bank types, materials, erosion mechanisms; riparian characteristics; bed and bank grain size characteristics; potential for enhancement and maintenance.

Deliverables: Data of river features: state of overview of state of river system: identification of extent of existing bed and bank stability issues:

estimation of likely future channel instability; tool to move from reactive to proactive watershed management.

Will there be a more focused look at certain sections of the river? How do you quantify sediment deposition areas? On the river survey, for sedimentation, there will be an inventory of the areas as you see changes in regime. In areas where there are more changes, more sampling will be done.

Deliverables:

Literature review; GIS and mapping; model results – wind and waves, boat wake predictions; conceptual management alternatives – reservoir and erosion; and Reports.

Will reports correlate changes in flow regimes between dam and Radford? Sedimentation study will look at range of flows experienced below the dam.

It was noted that the Instream Flow Study might be able to use some of the same information generated from these two studies.

What are the legalities of when water action erodes away on private property outside of project boundary? Who is responsible? Information regarding the laws in Virginia for avulsion and accretion should be reviewed. Information in the original deed or flowage deed should be reviewed.

It was noted that there are overlaps between studies and data should be shared with the other groups. There will be meetings with all workgroups together and information will be shared.

The revised plan plus the Study Plan determination from FERC will be what will form the final study that will be completed.

A red-lined revised study plan will be provided to the workgroup participants by September 11<sup>th</sup>, prior to the September 18<sup>th</sup> deadline for comments to FERC.

Meeting adjourned.