



## **Adaptive Management Stakeholder Board Meeting Minutes 4 August 2003**

The Adaptive Management Stakeholder Board met on August 4, 2003. Notes from this session are captured in black. Discussion notes from the 6/12 presentation on the model appear are also included in blue italics.

The following recommendations were made and adopted.

**Recommendation 1: Data will be collected for one year, shooting for weekly targets using the Heflin gauge. This will be adjusted/tweaked daily as required**

- This will enable identification of what's working, especially during periods of low water
- Additional adjustments for spring/lake summer spawn requirements will be considered
- Maximizing the number of boatable days will be a goal
- This should revolve around compliance; not the methods of achieving it
- Elise Irwin will recommend where a gauge will be most advantageously positioned
- **Recommendation Unanimously Passed**

**Recommendation 2: APC will examine and recommend 2 to 3 additional locations for geotubes above Cornhouse Creek**

- Additionally, APC will evaluate if geotubes above Cornhouse can be reduced in size.
- A complete evaluation will be made in 2 months.
- Elise Irwin will establish the location of "sacred creeks" that will not be impacted
- The team will consider spreading additional geotubes downstream
- It is understood that information is not perfect
- Pre-install monitoring of any geotubes will need to be planned defining what will be monitored and when
- **Recommendation Adopted with 1 opposed**

**Recommendation 3: A public meeting was proposed to offer the public an opportunity to learn about the recommended model and its development**

- Present a draft set of recommendations to the public prior to making final decisions on it. The model should represent a consensus-based recommendation from the AM Stakeholder Board using the best available information and stressing that changes will be to the model as new insight becomes available.
- Board members will meet in mid-October to reach consensus on a plan that can be supported by the entire group.
- An early-November public meeting was recommended. It is essential that this meeting is sponsored by the Adaptive Management Stakeholder Board, not any particular member group and that the general public have an opportunity to comment on the plan before it is adopted
- **Recommendation Adopted by the group**



- Additionally Gleason recommended the Board immediately assemble a “state of the project” update to the public identifying the alternatives being discussed and the progress that has been made. This would not have to be a formal press release (Gleason)

### **Next Meeting(s)**

- AM Stakeholder Board: Date to be determined, Mid October. Katie Mickett will circulate a list of potential dates to Board Members
- Public Meeting: Date to be determined, Mid November

### **Discussion Notes**

The following discussion themes were captured from the 8/4 meeting. Italicized comments from the 6/12 session are included for reference and updates on the model.

#### **1. Sensitivity/Compliance**

This will model a natural flow with specific parameters that enable “reasonableness” both for power generation and for biological benefits. Both thresholds must be realistic and achievable. All parties need some certainty that the agreed-to targets are attainable and that targets will not become lowest common denominator solutions.

Variability around weekly flows will need to be defined. There are many unknowns about the relative benefits and impacts of average flow rates at this stage (i.e. a 5% average variances vs. 25%) Cost/benefits of average variances need to be established. Variances defining how much of the time APC may be out of spec using the daily flow model will need to be determined. If a larger variances don’t show any ill effects this should be taken into account. Some appreciation for these variances should be incorporated.

Averages might be acceptable, but the outcomes can’t be. The biological perspective, again with reasonableness of performance standards, must be considered. As an example: It would be unacceptable to operate for 50 weeks in spec; 2 out of spec and eliminate an entire fish generation.

#### **The model must include a logical make-up strategy for addressing out of compliance situations. Target ranges for credits will need to be established**

- Min/max tolerance ranges will be need to be established
- If APC gets outside the tolerance they will be expected to make it up
- We will begin with basic numbers and ranges; the model adapts as we learn
- Establish tweaks. Identify what’s achievable and what tolerances are realistic
- Figuring this out will take some time
- Building in a period of time for evaluating compliance will offer the best chance for success. This will help pass the “reasonableness test”

#### **What might be appropriate for bankable credits?**

- Potential examples include water and fish; there may be others
- High/low limits should be established for any credits
- Can they be saved for a year and released in one day?
- Can they be borrowed and traded?
- These are issues the team will need to tackle
- Clean Air Act Credits have been very unsatisfactory to APC. They are a poor blueprint.



***Recognize we aren't going to get this right the first time! We need a starting point to manage to***

## **2. Geotubes**

Limiting consideration to 3 geotubes upstream from Cornhouse Creek may not be the best approach. Additional geotubes may tempter flows downstream even better, improving continuous flows

Geotube installation time has to be considered: It won't happen this fall. The permitting process must be completed first. Then access and logistical issues will have to be addressed. Pre-installation monitoring must also be planned. APC may be able to install sometime 2004.

### **Is there benefit to adding more of them above/below Cornhouse?**

- Past discussions on Geotubes BELOW CH Creek have been avoided due to concerns about backing water up into the creeks and cost/land acquisition concerns

### **Have cost estimates been prepared for geotube installation?**

- No—there are too many undefined variables
- The final costs will be a factor of water damping/erosion and temperature increase
- Bigger geotubes may gets closer to steady state

### **Where have geotubes been installed?**

- The Corps of Engineers has installed them as beach protection in Panama City, FL
- High strength nylon/polyester/polypropylene are typical construction materials
- They haven't yet be used as rereg structures

### **Can we assume they can be removed if they are not successful?**

- Yes

### **Not all present are fully convinced geotubes are appropriate**

- Concerns were raised about long-term durability and ability to withstand the effects of debris and vandalism. Additional concerns were raised about long-range siltation and diminished capacity

### **At what flow do geotubes no longer become effective?**

- Page 15 of the handout covers this

Stan asked for an advance copy of the presentation before our next meeting.

Predata will be available based on the surveys. Bill will speak to the implications

## **3. Review of the Model Discussion**



Elise Irwin reviewed the models with the most recent edits. She has spent the greatest portion of time incorporating new info/data into the model.

- Zero monthly duration flows have not been modified: no data available for how much to increase “fringy” months (200 fall/300 winter)
- The 500/1200 modeling exercise was removed in favor of the new scenario
- Reevaluated what inflows mean to the model
- All numbers are provisional; all can be changed

**Are there any remaining scenarios that need to be examined?**

- Everything Elise has seen so far indicates that use of the Heflin gauge could be very promising
- Willard: Proposal for compliance would include a 5% variance. Would this model tell us the differences between 5% compliance and 25% compliance? Elise can work these up quickly (within 2 days). Specifics are important: are we assuming compliance 80% of the whole season or 80% of any given day?
- A sensitivity index should be added to the model spelling out how critical compliance will be. The benefits and risks of achieving specific tolerances should be clarified.
- A scenario showing the minimum impact to power 888560 would be beneficial . Elise has stuck with the Heflin gauge figures for this, as they were most consistent with Stan’s original proposal.
- Hourly data are being used. They are massive amounts of data, but provide the best insight. They are only available from the 1995 water year to present.
- What if we changed degree days from 33.3s across the board? What differences would it make to the model (Willard)?
  - Let’s try it out. How do degree days impact the model?
  - Degree days tie directly to the biology in the model
  - So many cumulative hours at a specific temperature are required for an egg to hatch?
  - Thermal models don’t exist; we need to match flow to days to temperature during the same period of time to predict changes

**If storage gets backed up in the geotubes the river can be expected to warmer?**

- The fish spawn a month later in the Coosa than the Tallapoosa because of variances in water temperature
- If flows are kept constant the water will warm
- Defining the window of opportunity is needed: Whatever the Heflin gauge is
- If we want it to be constant, it can’t be indexed to Heflin

**Do we tie this to a 7-day average, or do we need more constancy?**

- Operating one unit needs more consideration
- The potential impact on fish should be monitored
- A spawning window may not be a necessity if the weekly average targets are met (Stan)
- There is no chance to the measure magnitude/duration of the new flows imposed on the Wadley gauge by Elise.



- If the Spring of the year was analyzed on a weekly average we might find the weekly average conditions might be conducive to spawning while the reservoir is being filled
- It's not the average condition; it's the magnitude that is critical
- There may be several periods when the opportunity to provide a spawning window AND fill the reservoir occur simultaneously. This should be explored

We are at the point where we have much of the data and now need to begin running the model. There are probably 3-4 decisions to be made before we can determine if we have an acceptable monitoring tool

**A continuous release from the dam is not one of the scenarios being measured.**

- Stan's proposal didn't contain a 50 cfs release from the dam
- What about a weekly average with 50 cfs/100 cfs guaranteed?
- There is no data on fish or biota directly below the dam. We have no biology to support any conclusions
- All current data was derived from the Wadley gauge. Some hypothesis COULD be generated directly below the dam
- Is there a cross-section below the dam?
- Yes. First is half a mile below the dam
- How far is the zero flow when there is no power generation?
- What do we want to do with this?
- Bill can tell us how high the river will go with a continuous 50 cfs
- **April wants us to not lose this**

Clarification: The target at Wadley should never go under the Heflin gauge. This decision has to be made AFTER a choice is made on where Geotubes are placed. Precisely where the gauge will be placed has to be determined. The key criteria for choosing a location include:

- Easy access to electrical power
- Accessibility
- Security from vandalism, especially battery theft

**Prime Location Candidates include:**

- Wadley
- Malone Bridge 7 miles below Harris (halfway between the dam and Wadley)
- Dam

Malone Bridge is probably the most preferable good alternative

#### **4. Reviewing the Model: Box by Box**

This section reproduces italicized discussion notes from the 6/12 Netica model presentation for reference. Update notes from 8/4 are noted.

##### **Base Flow Discussion**

###### ***1. Status quo***

###### ***2. Seasonal variable base flow (from Base 500)***

- *High spring flow, lower summer, even lower fall*
- *Evaluating a constant flow rate doesn't work*
- *Fish don't like it; nobody else does*
- *Constants don't work*

###### ***3. Daily/weekly flow from the Heflin gauge (simplest)***

- *3 variations on the AL DNR proposal from the Heflin Gauge*



- *Heflin gauge including variable affects of a constant (+/- 25%) to enable an easy change of the factor and view impacts on the model*

#### **4. Base variable (0% flows) with alternative variation**

- *Not a pure 0% monthly flow*
- *Accommodates peaking months in summer*
- *Accommodates filling months in spring*
- *June/July/August: peaking demand months for APC*
- *March/April lake fill has to be considered*
- *Nick/Stan will have some data on this—will get to Katie*
- *Determine if it's OK to Model this one*

#### **Windows of Opportunity**

- *10 windows are a theory. Different species have different windows. AL DNR defines this as an assigned 2-week period in April/May.*
- *Different groups/guilds of fish may affect this*
- *May offer a window for specific species based on conditions and inflow available*
- *No generation for multiple weeks during August need to be considered. Sometimes there isn't power generation available*
- ***Elise will review/model what's in Stan's proposal***
- *Assume there will be some sort of re-reg structure providing flow via baffles*
  - *1. Status quo*
  - *2. Spring/Summer*
    - *2 of 3 years*
    - *Define summer: Late August*
  - *3. Spring only*
  - *4. Summer only*
  - *4 a. What about a specific October flow dedicated to rec. float fishing?*
    - *Window of opportunity or a base flow issue?*
    - *Could be Sept/October, permit a couple weekends of good float fishing opportunities*
    - *Data available for Sept? Elise will review this to determine*
    - ***Avoid adding August to prevent unnecessary constraints on generation needs to the greatest degree possible***
    - *Typically Harris is down by the end of August, so there are longer periods of no generation in Sept/Oct.*

#### **Reservoir Inflow**

##### *Discussion*

- *This is such a big driver we may want to expand it*
- *This is the mother of all variables...everything links to this*
- *Could this be done in an equation format? (i.e. a recorded high or a recorded low, or break the water year into fractional segments in some fashion?)*
- ***This is the most important driver. It must be understood thoroughly***
- *Monthly precision is probably the best we can do here*
- *We could accommodate monthly discharges for periods of record*
- *We need something better than "average/normal"*
  
- *More granularity is needed for decision making*
  - *Wet*
  - *Normal*



- *Dry*
- **8/4 Updates**
  - The Heflin gauge numbers were reviewed using 25/75<sup>th</sup> percentiles
  - The average percentage of the Wadley gauge used to scale for a longer period of record
  - This affected the power impact box

#### *Degree Days*

- *High*
- *Moderate*
- *Low*

#### **Power Production**

##### *Discussion*

- **8/4 Updates: No breakout has yet been done on weekend/weekdays**
- ***Is more work needed? YES***
- *This is not a currency/dollar box. This is a decision function box for APC...how much are the turbines on?*
- *Regardless of what is chosen, APC will be trying to maximize power production under any of the scenarios. Is this a driver, or is this an indicator?*
- *PP could be set as a constraint: not to be run at less than X% and work backwards*
- *Some of this has been provided by APC, but not under varying scenarios of wet/dry/moderate seasons*
- *We all need to open up the boxes to review the assumptions that are behind each one. The Technical Working Group the team has chartered might be one way to accomplish this.*
- *Individual assignments to plug holes?*
- *Erosion: should this be measured as a parameter?*
- *Elise added to the model*
- ***Staging Changes: should this be a separate box?***
- *3 ft to 10 ft vs. 5 ft to 8 ft*
- *May not get at biological impacts*
  - *Linking power generation to power needs*
  - *This could be very complex*
  - *With/without downstream structures*

#### ***Impact of Downstream structures?***

- *Status quo*
- *Structural Options*
- *Cost*
- *Benefits*
- *Potential impacts*
- *Geotubes*
- ***Structures True: Yes/No?***
- ***Rereg dam at crooked creek as proposed in Stan's proposal***
- ***Where is this box?***
  - *High: 81.1*
  - *Medium: 0*



- Low: 0

### **Boatable Days**

#### **8/4 Updates:**

- This took Wadley flow; greater than Heflin – left alone
- Less than Heflin? Increased to equalize
- The review eliminated all nighttime hours from the study
- In day light hours on Sat/Sun—how may consecutive hours were boatable in wet/dry/normal years?
  - High number: 12 or more daylight boatable hours
  - Low; 1-5 daylight boatable hours per boatable day
- Boatable means 500 to 2,000 cfs (this can be altered)
  - 22 days in a dry year (April through Sept weekends)
  - 18 days in a dry year
  - 24-25 weekend years in a wet year
- Willard: how were these derived? Did this only consider a 450 cfs?
- Could these be reconciled with a 24-hour day?
  - The number of hours would increase
  - The amount of water would decrease
  - Calculations do not take Monday holidays into account
- *The team has to define what's meant here: We can establish any criteria*
- *Weekends/Holidays greater than 500 cfs and less than 1200 cfs based on historical data.*
- *Enough to float a boat, not enough to get swept away in a canoe*
- *Hourly flow rates were examined during daylight hours*
- *How are daylight hours defined*
- *Multiple criteria are possible*
- *Civil, nautical, sunup/sundown,*
- *Sunup/sundown was chosen*



- *Generate—no boating; Don't generate---boatable: This has to be defined*
- *A Boatable day subcommittee might be a way to go*
- *The 500 cfs figure originated here*
- *Average daily flows prior to dam construction can be cross-checked*
- *A boatable day is 500 cfs at Wadley*
- *Upper limits for canoeists has to be established*
- *Boatable days may not be the same as fishable days*
- *Daylight hours/weekends at Wadley gauge*
- *Further up the river you go, the less water there will be*
- *Only gauge available to make judgements from*
- *All depends on what the tribes are doing*
- *River Rec. subcommittee?*
- ***We need more definitions on this to move ahead***
- *Top end of flow is most important*
- ***A definitional review group is needed***
  
- *High: > 8 days/month*
- *Could this be expanded to 10 days for local residents*
- *Shift to weekends/holidays for high?*
- *Model is only examining weekend days*
- *Medium 4-7 days/month*
- *Low > days/month*

#### Lake Levels

- **8/4 Updates: 33.3% was plugged in here if lake levels will be unchanged**
- **Bill's presentation covered the rule curve**

#### *Discussion*

- *Number of days lake levels dip below rule curve above 10 days in any year causing lake levels to drop*
- *In any year...not consecutive days*
- ***It may be more intuitive to invert this scale***
- ***Low is good!***
- ***Do a better job of defining the metadata descriptors***
- *Bill will provide the powerpoint slide to nail this*
- *Better reflects rule curve and reality*
- *What is the rule curve? Lake levels determined by the Corps*
- *Spawning levels (esp. crappie is important to consider) Make certain this is a component. Different reservoirs behave different ways...there is no one size fits all solutions to all of these.*
  
- *APC stabilizes Harris levels during the crappie spawn. Does this coincide with other spawns downstream?*
- *We're less concerned about the rise than the fall*
- *Do the Harris windows affect other spawns adversely downstream?*
- *Can you model downstream spawns, below the dam?*
- *We will use small fish abundance to address all fish monitoring*
  
- *High: 61.2*
- *Moderate: 15*
- *Low: 23.8*



## Flow Through Pools

### **8/4 Updates**

- At 20 meters/sec some believe there will be significant benefits for benthic insects and mussels
- The review examined the number of cells having a velocity of greater than 200 cfs but less than 1000 cfs
- Quick calculations were performed with the hourly data
- April/Sept Hourly data
  
- *Discussion*
  - *An increase in base flow should diminish temperature fluctuations...good hypothesis*
  - *How happy is your river?*
  - *Is there a correlation to elevation/gradient?*
  - *Will we ever get a flow rate that gets us to high?*
  - *Where is the threshold for the pool flow to register "high" at the Heflin gauge?*
  - *The superconglutinate number!*
- *High: over ½ pool cells flowing 20 cm/s (will verify this figure)*
- *Medium: over 26-50% Pool cells*
- *Low: lower than 26%*

## Degree Days

### 8/4 Updates

- There is equal probability that anything will happen. There is no way to tell without getting out there and measuring
- Look at 1988 and 1989 for temp issues (dry vs. wet for past 2 years)
- We'll need to get the logger and figure this out

### *Discussion*

- *Addresses cold water discharge at the dam*
- *Can the baffle be adjusted?*
- *There are many unknowns here---reregs may help this*
- *More flow may have a big effect*
- *Does this include hot rocks?*
- *All set at 30/30/30 due to incomplete data*
- *We don't know what will happen if we increase the base flow yet*
- *High*
- *Moderate*
- *Low*

### **8/4 Updates**

- Less than 500 cfs (high shallow/fast habitat) riffle habitat
- We have a lot of this at Wadley; just doesn't last very long
  
- Slow/Cover (bass may nest here) depth not a concern; velocity less than 20 cm/sec
  
- Magnitude/timing/duration are the critical variables for spawning windows
- Spawning windows in the model are still there; they make a big difference
- How many consecutive hours are shallow/fast habitat available for spawns?
- Understanding the tradeoffs of weekend power generation will be important



- *Shallow Fast Amounts*
  - *High*
  - *Moderate*
  - *Low*
- *Slow Cover Amounts*
  - *High*
  - *Moderate*
  - *Low*

### **Small Fish Abundance**

#### **8/4 Updates**

#### **These boxes are linked to the status quo and windows of opportunity**

- They were not linked back to a decision on Heflin gauge
- The Heflin gauge is putting in base flow and some variability

#### **Spring/summer windows of opportunity will continue to be very important**

- This shows a high correlation to abundance of all fish species
- Just spring? Bass will be OK; small fish/sunfish won't prosper
- Just summer? Probably the reverse; all species don't need the same windows
- How much variability can they stand? We don't know yet
- Redbreast sunfish spawning is affected by 1 unit of power generation (OK)
- Operating a 2<sup>nd</sup> unit wipes them out
- Once a year? Once every 3 years? We don't know yet. More study is needed
- Each of these are hypotheses of how we think the system will work
- Once implemented, we monitor and base future changes on the results

#### **Do geotubes improve anything here?**

- Elise believes damping the oscillation will help (hypothesis)
- Lipstick darter is one example

#### **How does a large flow (May flood) affect the model?**

- 96 water year was a VERY high water year; it's included in the assumptions
- Does the river restore itself after events like this?
- Absolutely!
- In many ways a flood event is beneficial to fisheries

#### *Discussion*

- *Catfish growth could be a potential addition*
- *Sucker guild*
- *Spring spawning of nesting centrarchids*
- *Shoal Lilly box for biology*
- *Other criteria/boxes?*
- *Fishable days....*
- *Data is available on catch rates prior to dam construction*
- *Could engage the public to assist on data collection*
- *Fishable days could be a potential mgmt objective measure*
  
- *High: >50 per 100 grid units of young*
- *Moderate: 20-50 per 100 units*
- *Low less than 20 per 100 grid units*



*Bass Recruitment*

- *High*
- *Moderate*
- *Low*

*Redbreast sunfish spawn*

- *High*
- *Moderate*
- *Low*