

Science Advisory Committee  
May 21, 2004

I. Role and Involvement in Environmental Flow Process

*The TWDB, TPWD, and TCEQ each provided an overview of their roles and responsibilities regarding environmental flows relating to surface waters in the State.*

A. Todd Chenoweth

B. Larry McKinney

C. Barney Austin

Q: Brandes- Specific studies on instream flows; is this part of the program relating to SB2?

A: Barney- SB2 brings the 3 agencies together directing us to work on a Methodology that we can all except; how NAS review came about.

Q: Brandes- Are these specific studies related to SB2?

A: Barney- the three ones mentioned; yes....they are listed in the programmatic workplan that was handed out in the last meeting.

Q: Harris- If the environmental flow studies required under the Water Code, included an economic & social component?

A: Larry- studies completed for the estuarine inflow recommendations only considered the physical, chemical and biological aspects of freshwater inflows.

Q: Harris- Audio not available

A: Larry- I don't disagree with that.

Q: Paul- Audio not available

A: Larry- There are several layers of guidance...Legislative is one...that directs the agencies and defines our roles, Formal agreements between 3 agencies...Memorandum of Agreements...how we move forward....timelines and those types of things and then 3<sup>rd</sup> level which is our day to day staff that have worked together over the years on that level.

Q: Paul- What specific legislation; what bill was directs the 3 agencies?

A: Larry- in notebook...whole list....summary of each.

Q: Harris- One last thing for Todd...that you talked about water rights and I guess at some point today we will hear a discussion how water rights are allocated and the relationship of current use vs. future use and all of those kinds of issues..I assume?

- A: Todd- We'll touch on them very briefly and there will be an opportunity to ask questions...I'll make a few more comments since I know your interested in that as I make my remarks.
- Q: Harris- I think we need to put that into context because if you look at Environmental Flows..that's really a water right.....an allocation of water to a given use and I think that we need to look at it in context of the universe in which the rights are allocated personally. Hopefully we'll see that....so that we're not just looking at Environmental Flows as Paul was talking about....separate entity or separate component, but rather the entire global perspective.....
- Q: Shellman- Has any work been done to inventory the kinds of water marketing techniques in Texas?
- A: Barney- The TWDB has published a "How to Guide" on Water Marketing.
- Q: Mathis- I kind of would like just to reiterate on what Bill said in the permitting process..I would really like to understand the details of how the decisions are made in terms of....how I allocate this water to maximize the social welfare....kind of curious about how those kinds of considerations get built into the permitting process...when you get to that point in the discussion....try to address some of these....I just wanted to let you know that those are the kinds of things that I'm interested in.
- Q: Ward- Question for Todd...with respect to the lower most 200 miles...in which the coastal requirements are on top of the instream requirements, how many permits have been issued?
- A: Todd- Since 1985.....it's a small percentage of the total permits we've issued...more than 10. It is less than 100.....it is only a handful for large projects.
- Q: Harris- Commented there was a need to address conjunctive use, return flows, and desalination as part of the SAC review process.

## II. Information Available on Conditions

*The TWDB and TPWD provided a summary of available hydrological and biological information. Members of the SAC were provided detailed graphics on flows for the major river basins.*

### A. Todd Chenoweth-Hydrological Conditions

- Q: Mathis- Back to the last slide...of those lines...difference between blue line and red line... how much of that difference is due to return flows and how much of that is due to unused portions of the permit?
- A: Todd- Very interesting question and we can answer that by doing an analysis of this particular point and running the model a couple of different ways...setting all the return flow to zero...it varies by location...no way to tell by looking at the slide...it would take some analysis.....

- Q: Brandes- Follow up on that....we've looked at that a little bit in some basins in Texas...I think the majority of that is due to under use, not returned flows....most of it is underutilized water rights.
- Q: Shellman- 2 comments: in terms of the return flows..because I'm from a unappropriated basin, the Cypress basin, one of the questions in play is whether Marshall's return flow is counted in your model or not.....2nd thing is what you call the second line is the regulated flow line....the appropriated being the same as permitted...technically isn't the water permit an authorization to appropriate and the appropriation is what actually taken.
- A: Todd- That is a topic and area that water lawyers won't agree on.....the TCEQ's understanding is that once water is appropriated..it is permitted and permitted means the same as appropriated. TCEQ treats them as the same.
- Q: Landry- Recognizing the limitation of the flood...have there been studies that have looked at the timing of return flows and realize that it does vary site specifically? What is the timing as when you see the return flows coming back in?
- A: Todd- Mostly in terms of agriculture we don't consider return flows from agriculture and part because they are difficult to measure and gage and to quantify; exception is that we have included some return flows in rice farming because there is such a high volume of water and because of the pattern you can get some measurements idea of return flows. Most of the return flows that we're talking about adding to the model are municipal.
- Q: Landry- Audio not available
- A: Todd- The model works on a monthly time step.
- Q: Mathis- What percentage of water permits get turned down based on the criteria of stream flow?
- A: Todd- Combination of the 2....satisfy all existing water rights...particular application then has to satisfy there environmental flow condition first...then there's got to be water left over....we have not denied very many permits in the past, but we're increasing the number of our denials in the last several years with the new water availability model.
- Q: Shellman- Roughly what's below the redline would be probably be available 20% of the time...rough guess....frequency at which those levels occur.
- A: Todd- Frequency at which that amount of water or greater is available..less than that amount it's not available...60% amount of that time we have available naturalized conditions....40% amount we don't have that flow available.
- Q: Shellman- I guess what the graph suggests that there is a requirement for a base flow...you might have to consider storage during the pulses to meet if the base flow exceeded the redline for the other 50% of the time.

A: Todd- Good points....because this is on an annual basis; while pulses may be very important to the aquatic wild life...this graph is not a good tool for illustrating pulses at all...but the other point I would like to make is that water for environmental purposes might be below the redline...could be in other areas of the graph as well.

Q: Brandes- Is this simulated flow?

A: Todd- This is the flow we use in our run for perpetual water rights...so this would correspond to the redline, but it is simply the months that there is some flow.

Q: Harris- Do you allocate it in a specific month; where you have restrictions that the water isn't going to be available during certain periods of the year..so you would have months specific/quantity specific permits?

A: Todd- The flow restrictions that they have to satisfy before they divert typically change for the months. So there is a different flow restriction for January than for July for example.

#### B. Larry McKinney-Biological Conditions

Q: Mathis- Have one broad question....some of the slides that Todd showed on these cumulative inflows to the bays and estuaries...didn't show much change over the last 50 years...the slope of those were generally constant, you'd see some deviations during dry periods or you might see a little effect from a reservoir, but basically the slope was same slope increasing the whole time, but some your slides on some of the species .....shrimp showed a definite decline over the last 20-30 years. Does that suggest that it's not flow or inflow in the estuaries that is the problems with those species or is it something else?

A: Larry- Some of it has to do with habitat...50% of the wetlands are there.....and the fisheries on what they have done.

Q: Brandes- So, we haven't really seen the impact of the reduce flows.....

A: Larry- I think in the Nueces we would definitely see it.....

Q: Landry- Endangered species...particularly interested...have been a regulatory environment that have prompted the Water Marketing activity....trying to get a sense of where the species reside in the hydrologic system.

A: Larry- More toward the west in the dryer spring related areas and those types of things.

Q: Ward- Asked about the biological data base collected by TPWD and how far back it went.

A: Larry- Indicated the current programs dates from the early 80's.

Q: Ward- Suggested that it would be extremely difficult to discern between anthropogenic and naturally occurring events when it came to changes (impacts) to the State's aquatic systems.

### III. Analytical Tools and Procedures Currently Used

*The TPWD provided an overview of analytical tools and procedures presently used by the state resource agencies to assess environmental flows and described the “desk top” (default) methods used when site-specific studies were not available.*

*TPWD and TWDB staff also provided a summary of the B&E studies and the process to have the instream flow study methodology peer reviewed by the National Academy of Sciences.*

#### A. Cindy Loeffler-Default Methods

Q: Landry- What regulatory action is not in compliance?

A: Cindy- There is not really a regulatory requirement to not allow the flow to drop below that.

Q: Shellman- How do you apply the 7Q2 to a segment that’s already listed under 303d as impaired or do you?

A: Cindy- That would come into play as to a water planning question... as to you would want to propose a project, a reservoir, on a water quality impaired segment.

Q: Shellman- Does that ever factor into a decision on a project?

A: Todd- TCEQ considers water quality when issuing all of its permit....I don’t think we would reject a reservoir project since it was on an impaired segment...we would be looking at water quality impacts and special conditions to what we think is appropriate.

Q: The question was asked, since the freshwater inflow studies and optimization model generates a range of solutions from Min Q to Max Q, why did the TPWD only consider flow recommendations between Min Q and Max H?

A: Cindy- Indicated that values above the Max H value showed a decline in productivity, therefore providing additional flows would not result in a benefit to the system.

#### B. Cindy Loeffler-Bay and Estuary

Q: Mathis- How come the Max Q not figured into flow analysis?

A: Cindy- This analysis is considered more of an average type of analysis...long term average approach.

Q: Brandes- How does Max H factor into managing a Bay & Estuary?

A: Cindy- Manage Max H flow during good hydrologic times, but not met all of the time.

Q: Brandes- Any long term simulations imposing these types of flow conditions?

A: Cindy- Hasn’t been done yet.....there are proposals to do work like that.

Q: Brandes- Higher yield or lower yield?

A: Cindy- Model set at median.....recommended Max H flows not set at median every month so could give you a higher yield.

Q: Shellman- One or more Bay & Estuary where historic fisheries have collapsed or disappeared?  
A: Cindy- Nueces Bay oyster fishery collapse due to harvesting substrate, not just freshwater inflow.

Q: Shellman- So this couldn't be used as a recovery tool...is that right?  
A: Cindy- If the data were available..it would depend on if you had the information necessary to start the analysis with setting up the constraints...what the requirements were for the individual organism.

Q: Shellman- What do you see as the gaps or shortcomings in the methodology?  
A: Cindy- Specific mandate not meeting actual informational needs.

Q: Shellman- Application of model....is it successful? Is there a margin-of-error included for a needed flux of water supply?  
A: Cindy- Not a goal at the outset. Margin-of-error inherent in the analysis due to all factors not being included.

Q: Shellman- Project approval based on such a margin-of-error?  
A: Cindy- Having the ability to make changes e.g....LCRA.....Water Management Plan reviewed every 5 years.

Q: Brandes- Mean annual numbers for all the Bays....were those the Max H numbers?  
A: Cindy- Yes. Shows variability of organisms/ecosystems.

Q: Brandes- Why is Sabine Lake so high compared to San Antonio Bay?  
A: Cindy- Recommended flow historically high.

Q: Brandes- Does historical flow drive the number instead of what's needed for maximum harvest?  
A: Cindy- Limit of upper flow set at median. It is an optimum within a range. Both historical and species driven.

Q: Montagna- Definitions used for Health & Productivity?  
A: Cindy- Water Code definitions. Health includes nutrients, sediment load, and species. Productivity concerns commercial fishing harvest. Goal is to maintain characteristic species in each Bay & Estuary.

Q: Montagna- Water Code defines rules and species in this analysis?  
A: Larry- Economically important plus that's what we have data on.

Q: Montagna- Data set us from 1962-1981?  
A: Cindy- Depends on Bay system. Texempt and Parks & Wildlife data.

Q: Montagna- Fish harvest v. Biology....what is the percentage within study?  
A: Cindy- Don't know.

Q: Montagna- What about using fishery data only in the study?

A: Cindy- Can't say.....not mandated.

C. Barney Austin- Instream Flow Studies

Q: Brandes- I'm not sure what the outcome of this program is....who interprets those graphs to establish flow requirements....what's that process envisioned as of now?

A: Barney- Flow recommendations will come from stakeholders and 3 agencies.

Q: Brandes- So, there's some process to bring stakeholders into the decision making?

A: Barney- Authorized in SB2 but underfunded. Stakeholders can provide both funding and valuable participation.

Q: Brandes- Criteria for area of study and extrapolation?

A: Barney- Sub-basins, representative areas, plus other data already being gathered.

Q: Harris- Let me follow up on the same question; is what one of your criterion is that the stream segments have to be east of I35.....lower reaches only?

A: Barney- Priority study sites chosen by #'s in permitting activity. Where water is and where activity will be.

Q: Mathis- Flow recommendations - at intervals along the river? Model ties together disparate habitats?

A: Barney- Adjustments made to flow recommendations from sites selected based on variations of habitat.

Q: Brandes- Trying to optimize something, when selecting a flow level?

A: Kevin- Habitat diversity slide.....current approach is holistic vs. what we've been doing in the past "fish only" approach. Rivers are inherently complex.....

Q: Brandes- Example...Reservoir project will cut off flow.....will develop a program for inflow to accomplish all aspects of the program?

A: Kevin- Incorporate different parts of the flow regime to sustain the ecosystem.

Q: Brandes- Procedures/Programs would evolve for specific needs in specific areas in a few years?

A: Barney- Instream flow studies currently available and used by the TCEQ....not on this scale, but used by TCEQ in issuing permits.

Q: Brandes- When will we understand what this will look like in a permit?

A: Barney- No expectations of releases required.....the need will be for pass through flow.

Q: Mathis- Follow up.....How do you incorporate flow needs into a permit?

A: Kevin- Ecosystem management is a struggle....prediction is too difficult.

Q: Shellman- Legislature's "sound ecological environment" is vague...could change with time and therefore change the model?

A: Barney- Correct.

Q: Shellman- Focus is on riverine.....bank to bank, not off-channel to include wetlands?

A: Barney- Hydromorphic modeling constrained to channel but will be considering frequency of over-banking, i.e., inundation of floodplain.

Q: Shellman- Are there key wetlands, mitigation areas which need to be addressed?

A: Barney- Yes....will be heavily explored in stakeholder's meetings.

Q: Shellman- Best science is a moving target....What action should we take until the model is perfect? What about noncritical areas?

A: Barney- Flow recommendations will be checked for accuracy.

Q: Montagna- Groundwater pumpage issues?

A: Barney- Surface water models do not address increased pumpage. Springs and changes in groundwater pumpage can be addressed by time series analyses.

Q: Ward- Can I find the technical information here? Three methodologies alluded to between your presentations, Cindy's and Todd's this morning.....the Lyons method...what is being used now?

A: Barney- Agencies to provide links to the information. 3 agencies were conducting instream flow studies and using different approaches.....Lyons and conceptual approach.

Q: Ward- How are those documented?

A: Barney- Often haven't been.....Lower Colorado River and Lower Guadalupe reports are well documented plus site specific studies for proposed reservoir projects.

#### IV. Current Implementation Procedures

*TCEQ presented a brief description of the water rights permitting process and environmental review conducted when considering special environmental flow conditions for inclusion in the permit. Summaries of four case studies (LCRA Management Plan, Lake Texana reservoir operating rules, Galveston Bay Freshwater Inflow Group, and the Lake Corpus Christi/Choke Canyon Reservoir Agreed Order), describing environmental flow considerations, was provided.*

*The TWDB presented an overview of the Water Bank and Water Trust*

A. Bruce Moulton - Environmental Considerations in Water Right Permitting

B. Bruce Moulton- Examples of Existing Applications

Q: Mathis- Are these conditional Water Rights with requirements for Water Management Plan in the permits?



A: Bruce- Water Management Plan was a condition from adjudication on the Lower Colorado River, it is not a permit based plan. (Brandes) Water Management Plan now a requirement of the permit.

Q: Ward- Target flows for the Colorado.....Max H?

A: Doyle- Target flows are based on habitat modeling.....instream flows not related at all to Max H.

Q: Ward- Estuary Flow....the only criterion used was the “critical flow”?

A: Doyle- Target flow selective....picked off of performance curve.

Q: Ward- There are two slides: Instream and Target Inflow.....are they the same.....Max H?

A: Doyle- No. Nor Max H. Solution to optimization model.

Q: Ward- How are those target flows used in water management?

A: Doyle- Provide flows by storing inflows...keep account on what is being provided to the Bay....release or store as needed. (Brandes) Includes critical flow requirement.

Q: Landry- Amendment to permit when environmental assessment is required....what action can be taken on permit?

A: Bruce- Permit can be conditioned or denied.

Q: Landry- Are there any permits subject to that condition?

A: Bruce- New permits and amendments with a significant change... nonconsumptive to consumptive type use will trigger an environmental assessment.

Q: Landry- How often are you making these changes?

A: Bruce- Since 1985 we have had to conduct environmental assessments on every permit.

Q: Landry- Environmental benefit created by a transfer? What sorts of policies can be implemented or put in place?

A: Todd- Usually means a change in diversion point...moving the diversion point downstream.

Q: Mathis- Applying for a new permit....is it possible to insert an environmental component as a condition? What form does the condition take...what a condition might look like in an permit?

A: Todd- Yes. Not formulaic and can be very elaborate. Typically they will be a restriction of flow.....varies by month.....very permit specific.

Q: Mathis- Are there a fair number of these permits?

A: Todd- We could get you some examples.

Q: Landry- Enforcement regulation....concerns over costs of enforcement?

A: Todd- Two systems of enforcement: 1. Watermaster, and 2. TCEQ staff responds to complaints.

Q: Landry- Nueces is a good example....period of potential non-compliance?  
A: Bruce- Yes. Started in 1982 and filled in 1987 - five year period.

B. Barney Austin - Water Bank and Water Trust

Q: Harris- Can you lease a water right thru the water bank?  
A: Carolyn- Can not confirm today but will get back to you with an answer.

Q: Mathis- In the Rio Grande, how are those water rights classified if you want to divert the water out of the river to irrigate your habitat or fill your oxbow.....The Texas Parks & Wildlife and U.S. Fish & Wildlife water rights, what are those categories?  
A: Todd- Two classes in the Rio Grande....municipal water rights, class B...is everything else, irrigation water rights. They stand in the same position as an irrigator. Municipal rights have a greater standing than irrigation water.

Q: Mathis- In the rest of the state I can use the water however I want to based on my priority?  
A: Todd- Rest of the state you have to use within your permit and stay with your permit.

V. Discussion and Approval of Work Plan

*The committee discussion turned to the draft outline for the Workplan. The suggestion was made to include a section for "recommendations". Several members also wanted to see a section added to discuss the "economics" of environmental flows. One member asked if there was an environmental flow "problem" and if so, could it be clearly articulated in the final report. The workplan was adopted with minor revisions.*

VI. Planning for Next Meeting

*The next meeting was scheduled for June 11<sup>th</sup> (that date has since been changed to June 18). The tentative agenda would include presentations by SAC members, Paul Montagna, Clay Landry, Mitch Mathias, and George Ward. There was some discussion about inviting other presentations. Bob Brandes and Carolyn Brittin to prepare agenda.*