



SOUHEGAN TECHNICAL REVIEW COMMITTEE
NH Rivers Management and Protection Program
New Hampshire Department of Environmental Services
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Souhegan TRC Committee Meeting Minutes
Wednesday, January 3, 2007
NH Fish & Game
11 Hazen Drive, Concord, NH

Members Present:

Ralph W. Abele
Douglas Bechtel
Alden T. Greenwood
Dr. Kenneth D. Kimball, Chair
Vernon B. Lang
John Magee
John R. Nelson
Carl Paulsen
Donald L. Ware

Technical Representatives

US EPA, Manager of NH State Program Unit
Conservation Interests, The Nature Conservancy
Business Interests, Alden Engineering
Conservation Interests, AMC Research Dept
US Fish & Wildlife Service, NE Field Office
NH Fish & Game Department
Business Interests, Geological Society of NH
Conservation Interests, NH Rivers Council
Business Interests, Pennichuck Water Works

Members Absent:

Representative Richard T. Cooney
Jeff Deacon
James MacCartney
Thomas Roy, Vice Chair

House of Representatives, RR&D Committee
USGS, District Chief, NH-Vermont District
Conservation Interests, Trout Unlimited
Business Interests, Aries Engineering, Inc.

Others Present:

Affiliation

Al Larson	Normandeau Associates
Lee Carbonneau	Normandeau Associates
Tom Ballestero	University of New Hampshire
Tom Seager	University of New Hampshire
Piotr Parasiewicz	NEIHP UMASS
Spencer Brookes	Souhegan LAC
George May	Souhegan LAC

DES Staff Present:

Wayne Ives, Instream Flow Coordinator
Lisa Fortier, Executive Secretary, Watershed Management Bureau
Steve Couture, DES, Rivers Coordinator
Rick Chormann, DES, NH Geological Survey
Paul Currier, DES, Administrator Watershed Management Bureau

Wayne – We’ve been going through all sorts of gyrations that relate to DES’ need to revise the budgeting and with the G&C process to approve contract extensions and to add a task to the Lamprey project. We are seeing some delays in the Lamprey project. We hope to complete Lamprey Task 5 over the winter and into the next summer. Our goal is to be done with our Water Management Plan by October 1st 2007, with a year of implementation before we have a public hearing again in 2008. If we are late in meeting the October 1st deadline, we will not have a complete year by the time the December 2008 report is due to the legislature.

1:45 – 1:45 Acceptance of the June 6, 2006 minutes

Chair Ken Kimball opened the meeting and requested a motion to accept the meeting minutes of the June 6, 2006 meeting.

- *A motion was made and seconded to accept the meeting minutes of the June 6, 2006 meeting as presented, seconded the motion, there was no discussion and the vote was unanimous to accept the minutes of June 6, 2006.*

1:45 – 2:14 UNH – Final Draft Proposed Souhegan PISF – Presentation on the revised sections of the PISF Report Tom Ballestero

Drafts are at <http://www.unh.edu/erg/souhegan/> and <http://www.des.state.nh.us/rivers/instream/souhegan.asp?link=study>

This should be on the website by Monday. Wayne Ives passed around handouts for fish flows. We will go over the modifications since the last meeting and then move on approving what the recommendations are because we cannot move any further on the Water Management until we know what the final flows are. For example, from the fish flows, we did have recommendations. What has changed since last summer? As far as primary changes, we revised the fish in the synthesized PISF. I will identify where those were. Nothing was considered an incredibly significant change, unless you were the fish that was affected by it. We revised some of the probabilities of not meeting the desired PISF. We addressed all public comments. We had sixteen written public comments whether they were letters or e-mails. Wayne sent out a long tome on how we would reply to all of those and then we added a detailed example for the fish PISF and that is a new Appendix 17. So in a nutshell, those are the types of changes. If you want to go into more detail on what we would consider a factual change, a number that changed. There are about six of those. We hadn't prescribed flows, some of the synthesized flows, on some of the low ends. For example: Some times in the year, like over wintering, we just didn't prescribe flows. Then someone commented, "Does that mean someone can dry up the river then every year?" So we prescribed some low flows in some places and also GRAF season, and also associated there were some factual changes on the flow capabilities of some of the dams, so there was a handful of what I considered factual changes. There were a number of clarifications that were requested from the original review and the comments. That was the degree of the changes. So, for example, when I say that there was a factual change in the multi-colored handout that you have in your hands, in the lower right-hand corner is this GRAF spawning period, and then there is the Upper and Lower Souhegan and I just copied this portion. Before, what we had done was just specify flows that should not be exceeded and we didn't specify a low flow end. So for example, this would be considered a factual change, it isn't some new miracle change to the system. Now there is a low end to that and if you look at this graphically these now are just synthesized. These are all of the PISF put together and remember these are the low end of the high numbers. By and large, what we did was look at three different categories, the common flow range and these categories really mesh with the bio-periods of fish, primarily, but also some of the other fauna that are out of the river. And they also meshed with what you might consider habitat suitability, so what would be considered common habitat is, more or less, the close to optimum conditions. The critical habitat would be a habitat level that you don't want to see, maybe only on the average of once of every three years and then the rare habitat is the habitat that you only want to see on the average of every five to ten years. These are habitats that can be associated with flows and then as you move through the years, you have flow as cubic feet per second per square mile. That is the yardstick that we can use up and down the river no matter where we are. The total watershed area is about 183 square miles and that is with the USGS gauge. What has happened in the last slide I have just showed within the factual change we had prescribed the high flow end, so we really didn't have optimal habitat on the hydrograph that was above that. We didn't prescribe anything on the low end so that is where you would see a factual change and on the Upper Souhegan and, that change was only on the Lower Souhegan. On the Upper Souhegan there was no change to be synthesized, Instream Flow that is. When you look at over the year, which are the IPOCR that control this instream flow recommendation, again you have three levels of flow recommendation: there is the rare, which is at the lowest; the critical, which is intermediate; and the common, which is the optimum level that we would like to see in the

system. For the common flow levels, those are all dictated by fish. For the critical and rare, there are Wood Turtle and Fowler's Toad periods of the year where they actual control. When we say control when we look at all of these instream flow needs, each one of these IPOCR's has a different instream flow need. The one with the highest of all of those will beat all the rest. If a certain fish species need 2cfs at this location and the Fowler's Toad needed 10cfs, if you have 10cfs in the river you met the needs of both. That is how we come up with those synthesized, or controlling, instream flows. The next three slides is just one table from the executive summary that identifies the critical and the rare since the common flows are all dictated by fish, what was dictating that instream flow. Through the Julian year, January 1 all the way through to (on the next slide) December 31st in the Upper and Lower Souhegan, what was controlling, and there was no change between this time and last time. This is the same and so basically in a nutshell, that is what we have done since the last time. We have modified some of the flows to address comments and those factual changes basically had to do with prescribing a kind of, if you want to use the state terminology, an eventful flow, a very low flow, a low end, just to recognize that there should be some element where we don't allow the river to go completely dry.

2:15 – 3:15 Interactive discussion and decision on finalizing PISF report

George May – Where do you differentiate between Upper and Lower Souhegan?

Tom Ballestero – The upper and lower demarcation is near Stoney Brook and basically there is an ecological differentiation from there westward and there eastward. We had originally over 100 different pieces that we divided the river into and then aggregated them into alternately, seven and when we looked at the characteristics of the seven, this was from upstream and downstream. It was kind of apparent that there were a lot of similarities in the upstream and downstream ones, and therefore, by using this flow per unit area (cfs/m) we can use that yardstick anywhere in the upstream reach and ignore the downstream reach, but there were dramatic differences in the flora and fauna from upstream and downstream. We couldn't push them any further and say it was just one river system. Key members can feel free to correct me.

Wayne Ives – I had two e-mails today, one was from Jeff Deacon from USGS. He said he had an opportunity to read the executive summary and he saw a marked improvement over the previous summary. It is much more readable and he thought that was a significant improvement. Peter de Bruyn Kops, who is the vice-chair of the WMPAC, said that there is a public water supply in Amherst that may not have been identified. He has a comment about the agricultural uses as far as not being part of the assessment but I think that is related to being a non-flow dependent entity, so I can address that to him directly. I'll check on the public water supply location but basically all the reported registered water users have been included in this and we have not known of any others that are not included in this. We'll look into this.

Tom – There are two on the books that don't exist yet.

Ken Kimball – Tom, on those catastrophic duration days, how are those numbers derived? Can you refresh my memory?

Tom – I'll let Piotr reply.

Piotr – It was done using the CUT curves. Basically, when you remember what I was showing before on the CUT curves they have this very stiff beginning.

Tom – That was six or seven months ago that is why I am struggling.

Piotr – To make a long story short, these are the habitat occurrences that were not more often than maybe three or four times in a period.

Tom – So that based on frequency?

Piotr – It is the duration and historic frequency, the historic frequency of this type of duration.

Paul Currier – That historic frequency is based on the synthesized records without any withdrawals?

Piotr – That is correct.

Wayne – I guess the issue that we are trying to resolve here is do you have any things not up to snuff in this report that you would like to see corrected? Is there anything along those lines?

Ken Kimball – I would follow up on the e-mail. I thought this summary was greatly improved as far as its usability.

Tom – Wayne revised it.

Doug Bechtel – I would just offer that I agree. I think that a lot of my comments were included in the executive summary and I think they have been addressed. There are a few minor typos in the executive summary.

Wayne – We have been marking those ourselves. Send me everything like that so we can correct them, especially those things.

Doug – One thing that might be helpful and this is also somewhat minor, but your year-end table captions, just a brief description not just a title and some descriptions under each figure and table in the executive summary. That would have helped me a little bit just to refresh my memory.

Ken – It reads like National Geographic.

Wayne – Just have the whole story right there. I am trying to think of specific items that need to be addressed, if anything.

Ken Kimball – I thought the question that I was going to ask both you and Paul is the science here is probably as advanced as any instream flow policies around here. The challenging question, I know when we came up with the last draft of an instream flow for NH it got shot down. Not so much that it was wrong as it was extremely complicated to implement and understand and this one has elements of that. My question would really be as much to DES as the team who put this together is: How hard do you think it will be to implement this?

Wayne – That is one of the challenges that we would like to address during public hearing. We discussed this morning, in some depth, the concept of how to operate with this protected instream flow dataset to generate a response to someone asking to add a water use. I think that is something that we want to generate for the public hearing. I don't know if you want to expand on our discussion this morning?

Tom – It's a great question. What we wrestle with internal is we don't want to make this table, the colored table that is in front of you, it is only the fish., its not being synthesized, but if you just add numbers during the year, that is something that people might be able to understand and it would start the management. Once you dive into management then the question is, "How you actually implement this thing?" We wrestle a lot with that I guess the specific answer to your question in my mind, our course I'm not speaking for DES but in my mind, I think if you have this criteria that is your yardstick, then this is criteria is not only flow but it is the duration. This is something you can implement without having to rerun this whole MesoHABSIM, IFIM, or anything else. You can just apply the yardstick. If you know of flows that come into the system at a certain location it shouldn't be affecting what happens upstream unless you are using some unmeasured flows. If you are taking out water from this location, from there downstream, that is where you would have to provide water assessment. Obviously there is some externalities in this and also embedded in the legislation itself because it is only looking at flow. Then there are these externalities which certainly confound management.

Donald Ware – From our perspective, being a water industry, affected water user, the science behind this is light years ahead of the original proposal of instream flow rule which just had figure for flows based on square miles, no consideration of habitat or stream reaches or anything else so it actually gives more defined background to what the flows are that we are concerned about. I think the biggest challenge is the next step, the water management plan. What happens when you hit those levels? That is where the water industry is obviously most concerned. This is a case in that there is good science behind the numbers so now what happens when you hit those numbers. What do we, as affected water users, or dam users, or whatever need to do in order to manage the instream flow rule? The other part of the original rule was there were cut-offs, or just stop using water. Well, that wasn't practical. So I think ultimately start off with good science to define what the flows are, what the durations are so we know when we really need to rally and do something. You can go after your users and say, "We have to make these changes because we are at these critical flows." There is good science behind it instead of broad numbers. That is an important thing, but equally important, or more important once we get these is, "What is the water management plan that goes with this?" When you want to talk about acceptability and where the previous rule ran up against the wall because it wasn't practical to implement.

Paul Currier – We need to think about that some more as we go into water management plan phase of this but I think the advantage here, the drawback to communicating is that we are not just talking about set point flows but we are talking about set point flows, durations under those thresholds. The question

is: The management of water use and dams, in order to maintain within the statistical variability that is in the natural hydrograph, those same characteristics, as best we get. It was suggested this morning in discussions that we really need to come up with an example of how a management scenario might work. We have got a lot more flexibility and I think that is something that I think we need to communicate. Because we are not just talking about just set point flows and durations under the threshold and we are talking about accommodating the natural variability in the management plan. Stay tuned on exactly how we communicate that.

Wayne – That management plan includes three variables so you can weigh those variables in different ways to generate similar results. The complications of understanding the process, I don't know how we get around that because it is a very, very complicated process. Every step of the way you have a hugely complicated component and then you further complicate things by combining them together. I'm not sure when we present this in the public hearing that we are going to present this in a great deal of detail. It will be presented in a fairly finite form I guess. It is very direct in a far as this is what we have generated developing from the basis, not going from the minutia of how we generated each bolt and each nut in the process. Essentially, here is a car. Does it work well enough for you? It's got this kind of mile per gallon.

Donald Ware – I think another point is there these are two fairly small watersheds. I think one of the questions that is logically going to fall out of this is: What did it cost you to complete this detailed bio-reach analysis and now lets project is out to the protected areas along the Merrimack River. It becomes a huge effort. In terms of implementability, good science, that is step number one, just overlaying the science to get the base for durations of times and days of the year and flows. The bigger the water basin the more difficult, the more complex that becomes.

Wayne Ives – That is part of this process too. The Lamprey has already been approved by knowing what we have done on the Souhegan already. In the Lamprey, part of that process includes methods to short-circuit some of the things that don't need to be done on a more labor intensive basis. It includes a lot of that aerial photography, remote sensing type processes where you can do something the size of the Merrimack with data collected more or less in a single day so you don't generate data that is spread across a large number of days and increasing inherent risks of error in trying to measure things with slightly different flows or different conditions. You actually can generate this information on a snapshot basis. Get the information and evaluate it all as one single set of events with similar parameters.

Donald Ware – Obviously you have to have science and you have to have repeatability because when it reaches a point that you tell an affected water user or dam user that they have got to do something that is going to affect their end user, their customer. The science has got to be there. It has to be provable, otherwise you are going to your customers and saying, "Industrial users, commercial users, you have to cut back because this is where we are and you they are all going to be at different times, scratching their heads and saying, "What?" You need that good science and if it can be projected up in a fairly easy fashion and shown to have integrity from a repeatability standpoint, then again as an affected water user that is going to make my job easier. First of all, when I go to a board and say, "We can expect to get these flows every so many years and here is the science behind it. During these events this is the type of reaction we have to put into play to get our water users to cut back.

Paul – And just a follow-up, when we were going to the legislature with the proposal for money we actually costed-out, not only these two but the rest of the designated rivers. I don't remember the numbers off of the top of my head but we are doing these two studies for the cost estimates that we came up with and the general reaction to those cost estimates where while they were costly, they were not outrageous. If anything, things will get cheaper because we are learning how to do it all the time.

Wayne – The original cost estimates didn't include the work effort that we have actually included in this scope of work. The cost estimates that we had originally were very basic. Simple number of meetings, things on a river times a multiplier, they really didn't take into account the level of effort we have actually expended and put into these two programs.

Ralph Abele – Vern & I spent some time this morning going over some technical issues we have, questions we've had, the report and any flipping around issues. I agree on implementability or how this gets implemented that is really key. I guess my suggestion is that as part of this report there some kind of transition almost between the science, the recommendations that are made and the science beforehand, to give some guidance to the people working on the water management end of things. I

would add that there is a lot of really sophisticated work underway in southern New England right now, especially in Connecticut. It is part of their stream flow regulation development. They are looking at ways of operating reservoirs. I think they are going to bring a lot more analytical techniques to the fore that can then be used to try to figure out ways that the water users as well as the fish can get closer to where they need to be. I guess as I looked through a lot of these studies, I still am making the point that this needs to be stepped down so people understand how we gone from this mass of data that was collected out there to the actual prescriptions for the particular fish. We spent a lot of time talking about what those steps. I think that for future readers, or current readers, that is a really important thing. It is a way that a lot people aren't as accustomed to looking at this Instream Flow Report. There is a lot more sophistication here, statistical analysis here than normal yet I think it will better the process to get some clarification on that and try to be as explicit as possible.

Ken Kimball – I would just add to that, it might be worth taking a little bit of time, like we have allowable duration versus catastrophic duration. I think we have work what the differences are in those as far as somebody is going to be managed. Is allowable where something kicks in? Those things, I felt, were still a little bit ambiguous as I read through it.

Wayne – This process is encumbered because we all want to know what the final answer is based on what this means. By necessity we have had to divide this to say here's what the science is and eventually we are going to use that to give you the final answers, but we don't have those final answers until we know what those original numbers are and everybody would like to see. If we approve those numbers, what does that really mean to me? Nobody really knows yet and they are trying to work that out but I think that to improve the definition on what those mean might help.

Paul – The way I interpret those is an allowable duration can be under the threshold for up to that duration and it is ok. It is not a "quote" violation.

Ken Kimball – When I read this document I'm not going to have you in the room and I don't want to have to call up DES and ask, "What does this really mean?" It should be clear when I am reading the document.

Piotr – It is the shortest persistent duration. It is the minimum persistent duration. Whatever is longer than longer than that is already persistent conditions

Wayne – So what does that mean?

Ken Kimball – We don't want to have to hire Normandeau's to figure out each case?

Paul – If have an event, and it is under the critical or under the threshold flow for longer than the allowable duration then it counts, then that is bad.

Piotr – If it is for longer than allowable duration then it counts as a persistent drought, for example. It is already reason for action.

Paul – You don't want many of those so might want to consider taking action to avoid that.

Piotr – That is why I call it allowable because as long as this is below this duration you don't need to do anything. Once it's longer than that is a reason for action.

Ken – The same question will come up, and again I am just looking for clarity here. You have your allowable duration, let's just take the rearing and growth flows in the upper left hand for the Upper Souhegan. The allowable duration is listed as 30 days. I am reading this to mean that if for 30 days it is below .3cfs, on 31st day some action kicks in.

Paul – If your weather forecast says no rain in the next 30 days and you have opportunity to keep it above the threshold going into a projected event, you can also manage that. It is not necessarily that you don't take any action until you get to the end of something and realize, "Oh, my goodness we are going to have one of these if we don't do something. You can do it at front end."

Piotr – In reality it will probably be so that once you get critical and rare events will kick in much earlier than the common durations. That is what I have seen until now.

Ken Kimball – There are two types of users out there. There is the user that understands that we have to manage this properly because if we continue to go into a drought, like Pennichuck. You can use it all up on day 1, but on day 29 you have no water for your customer which is worse than trying to spread it out. But then you have other users that say I am just going to run it as hard as I can which could impact other downstream users. I think once this becomes the law of the land for a lack of better terms, there needs to be more clarity on this otherwise I think we will spend a lot of time in the first couple of years just trying to interpret how these numbers are actually being applied. I think it is necessary up front to

describe in a public meeting how you intend on using these things. Both the people who are interested in protecting the river and the people who are going to be regulating it and there I am still confused as to how that will happen. The other question I would have is if it is thirty days but you are sitting there on September 15th and you have gone fifteen days straight and now, and this is a lousy example because when you move over to the next time period the time blocks are the same. Some of these you are going to be crossing for one regulatory period to another. We are calling it bio-periods but in reality they are going to become regulatory periods as well. What are you going to do when you move over when some of these transitions cross? If the next number is supposed to be higher and you are already going in lower then you are in a real tough predicament. There ought to be some clarity about what happens when you cross these boundaries.

Piotr – The clocks are always reset at the boundaries? Once you move from one season to another everything starts over.

Carl Paulson – So you could have sixty-five day duration of flows under the critical level. That suggests that you can have extremely long periods of extremely low weather and is that factored into these numbers?

Wayne – Yes.

Tom – Wayne, let me just say something first. The first step that we did was to generate 70 years of record from the USGS gauge without the influence of humans so all these statistics come from the natural flow paradigm. You are going to get these flows. This is what is going to happen. Your questions are so on the mark, but they are management questions. The next phase is we have to look at: How does this system react? How do all these statistics change with the existing water use structure? How does the run length of these deficits go? The magnitude of the deficit, the cumulative volume of deficit, that is the existing system as we know it and we would have compare to the natural flow paradigm to see what the shift has been. They didn't notice a lot of shift in these statistics. In the future implementation there is some new water use, and now you have to look at how that is going to change all these statistics and the real measure you are after is what is considered measurable and a detriment to the system. You have credited these fully, you don't need an event to protect what we have out there now and it is the common flows, once you get down to the rare you are. This is what happens now; humans aren't even in these statistics yet.

Alden Greenwood – Maybe you need a system of credits, green credits or something, that would make this thing work because that is used in other things right now, for air pollution. You could very well do it for the water perhaps.

Tom – We discussed it. Obviously it is water management stuff.

Alden Greenwood – It is water management stuff. There might be way some of this. For instance Mothers day this year was incredible. Two years of credits for that.

Paul – More water than you can use.

Alden Greenwood – I could give a lot to Wilton. They didn't want it. In fact what happens when you get extremely high flows like that is that all this goes out the window. It is called an emergency and do what you can, but don't flood the town. You ought to get some green credits for this one. That is my opinion.

Tom – That is true at the other end of the spectrum too, although it has never happened. Probabilistically it is possible the river could dry because we have an extended dry period and then you are automatically shut off.

Alden – We did in 2000 just about. We had two years there that was very dry and a lot of wells dried up because of that.

Doug- What is the next step of the WMPAC? My general sense is that this is delivered to that body. There is a lot of hand holding to make sure they understand what we are talking about right now. What happens with that process, what is the timeline?

Wayne – The WMPAC is going to have to be involved in a large degree in the water management planning as the process goes through and says here are things that we are presenting and these are the one that the affected water users and affected dam owners we are working with have indicated in some way are more or less something that would be useful for them to implement. They prefer conservation over storage tanks or something like this and that fits in with both being effective and agreeable to them.

That is sort of the first step. What you said is perfectly valid as they need to be clear on what the protected instream flow is, what these numbers represent to the level that they understand how they include both duration, timing, they incorporate frequency in getting to those points and they have certain magnitudes. They have to understand that in a technical sense but their real role in to give feedback loop to a public hearing. “How does this play out to you? How do you feel when we present these as being the responses of the affected water users and affected dam users should be taking? Do you think this is adequate? Not enough? Where do they stand?” That is largely the role of the WMPAC I believe is to give us that kind of feedback. Is it excessive that certain water users have to do certain things in order to meet these protected flows?

Doug – Will they be thinking of various scenarios, for example, given some of the things that Ken was starting to talk about, given the number of days under certain conditions, then Pennichuck might have to react this way or are these regulatory issues going to be operated in a coordinated way over multiple water users? I sort of putting myself in the chair of a WMPAC member and sort of thinking, “Oh god, how are we really going to get a handle around this?”

Wayne – I think a lot depends on the water management plan but the water management plan will be a specific one for each affected water users but it will it will not be the same plan for each water user. Each will have their own activities. Some of them may focus largely on conservation and others may use storage and coordinate with some other water user and so until we know what we are talking about we need to defer on that. Largely each affected user is not going to have the same level of effort because of their location within the watershed and their water needs themselves. This is going to be tailored to their use. If conservation works and they can effectively manage their impact on the river through conservation then clearly that is the direction to go but if they need to have water when flows just are not available and conservation isn’t enough then something else has to be generated, either some kind of cooperative effort with another water user or storage. Releases from dams are still out there. It is not the ideal response but it is a possibility.

Paul – I think from discussions this morning here, we are going to need a scenario or two as to how the numbers will be used at the public hearing when we ask for feedback on the protected instream flows or people won’t have any basis to comment on whether or not they think the flows are an appropriate basis for regulation.

Ken – I would strongly encourage you to do that because I think can’t ask the public to look at that and come back with the application. DES has to describe to the public how you think you are going to apply it, then they comment and you may improve it based on the based on the comments you see. That roadmap was partly there but not completely. The other question, some of these boxes on the upper right, you have common flows, 1.1 cfsm’s, and it is not translated into cfs. Is there are reason for that?

Tom Ballestero – That is over wintering and no real data was taken then. They were suggested flows based probabilistically.

Ken – But I am not sure how you get a cfsm without getting a cfs in a gauge.

Piotr – There is no constant gauge out there where the measurements are happening continuously. That entire calculation has been based on the USGS gauge data. This is only based on flow analysis. The cfsm number is the number that corresponds with the cfs.

Tom Ballestero – What we did was concurrent so we had eight different staff gauges throughout the system and we measured stream at these sites when there was a minimum of three days since the last precipitation event so we have a nice system steady state. We have the USGS gauge and we have the measured data. We converted those to cfsm because we knew watershed varied at each site. We performed regressions and then we could predict a complete hydrograph at each site. From the data we could come up with a 70 year hydrograph for each site. There was no over wintering data taken on the water flow needs for fish.

Ken – Yet from a regulatory point of view this is saying for the Upper it should be 1.1 cfsm, which from a regulatory point of view, you are going to need to convert. Divide that 1.1 into 102 to get the cfs values.

Tom – The beauty of using cfsm is in the future you don’t know where new proposals are going to occur. Once you know where it occurs, then you can apply the yardstick. I understand exactly what you are saying. You want so many cfs and if you identify one station, like station 25, I’ll give you the number, since there was very little data that went into those numbers.

Ken – I just seemed odd because all the other boxes actually had that filled in. I would think that the normal trigger that DES is going to use is taking a look at the gauges to see where they are. If I was the public looking at this I would ask, because the public at the end is just going to use this without having a public hearing either. They are just going to be looking at this.

Paul – I think practically speaking when we get to the water management plan we will use existing gauge network to estimate flow.

Ken – Maybe I am missing something here but if I am correct you have two things going on. One is with each public withdrawal that is happening at different points; you have to do something extrapolation to that point and that would be based on the cfsm value that is there. The other side to this that DES is sitting here asking themselves, “Am I sliding into this timeframe or not?” I am assuming when you are doing that you are actually using the gauges as your monitor from Concord as to not you have to start calling up people and doing x, y, and z. That is why I was confused as to why the gauge data wasn’t there because I was assuming that the gauges was what you were going to be using for triggers to say we are getting deep into duration days.

Tom – It would be convenient to have real time stream gauges throughout the system. We are lucky to have the USGS stream gauges. If we have certain gauges at some places, for example there is a staff gauge upstream of the handicap access location, where people go and frequent, they can actually be the best monitors if they are tuned in to this process.

Alden Greenwood – We are supposed to send in reports on cfs or kilowatts, whatever you want. What happens to this data? There should be data on stream flow.

Wayne – That information is generated only for monthly values so it doesn’t give us the detail that we need for a daily assessment like this.

Alden Greenwood – You could get daily values. PSNH gets daily values.

Wayne Ives – We get daily information for some things but it is not data that is required under the reporting rules at this point.

Alden Greenwood – I understand but there are other ways that this data is available.

Paul Currier – The best scenario is exactly that everybody is recording and sharing with each other daily values. We did a pilot study on the Contoocook and it turned out that the daily values were available, for instance public water supplies, or could be estimated. I think we will be moving in that direction.

Alden Greenwood – PSNH doesn’t read the water but they read the kilowatts very frequently during the day by modem. At the end of the month they get an enormous amount of readings and data. It is available and not hard to do.

Tom Ballestero – When you say kilowatts that is what goes through the turbine, not necessarily what goes over the dam?

Alden Greenwood – What went over the dam or what didn’t build up in the ponds. You don’t know that unless you know the water level all the time.

Wayne Ives – One of the things that the Dam Bureau has implemented water level recordings behind dams with a known weir configuration so that they can generate stream flows for places that have a dam and a weir configuration that can be measured. In a lot of cases they adjust and they rerun that calculation with a different set of values and they generate stream flow data with that. We are working with them to develop some standard operating procedures so we can use that data. We don’t have confidence in the process yet because we haven’t developed the quality control mechanisms to make that viable this point.

Alden Greenwood – There is a system out that gives you the information automatically.

Wayne Ives – **You have that reporting that comes in on the phone lines. We are trying to get** a few types of instrumentation going on so we can work all this stuff under one program. That is something that might make sense as to generate information through or above one of your dams related to the daily stream flow locations so we have information coming from the upper part of the watershed.

Alden – I’m not volunteering, just suggesting. If you are going to implement ways of controlling the stream flow you have to know what it is doing at the location.

Ken – Are there other comments or suggestions? If I’ve summarized the general tone I think I am hearing the question isn’t the numbers but how to present them in an understandable format to the

public. There is a major step forward from last version but there is still another step that might be needed.

Wayne – Let's summarize that as best we can or at least discuss that so at least everyone is on the same page. It sounds to me like a process oriented road map that says how we would use these numbers when we actually go forward on the water management plan, which would sort of be a straw man implementation strategy. The other was to simplify or clarify a process of how we got to these numbers. Was that the two major issues?

Ken – Yes, probably a little less of the later point. I think we sort have been giving instructions. The detail of how you got there is in the main body of the text and you don't want to start fill out the summary with a long explanation. Others may have a different opinions but I think a one or two pages on how you actually take these and use them. The instream flow has two major parts to it. One is the numbers and the science behind it and the second they are going to be applied. I think we are part way on that second element but not fully. If I was asked to sit down and tell my neighbor how they were going to be applied I don't think I could do it right now.

Paul – We may want to do that not as part of the protected instream flow but as a companion to it.

Ken – I disagree. I think that you don't want multiple documents. I think that it should be with this document because the water management plan was to be built off of this. To get into another document is counterproductive.

Wayne Ives – Any other feedback on that?

Donald Ware – My sense is that when you read this and you look at these numbers. They breed the question when does the water management go into effect? At certain levels you should only have a graph, the water management plan isn't in effect and you do have those periods where you have these defined upper and lower limits and when the flows are outside of these areas there is no water management plan in effect. With historical data you could probably say that 75% of the time there is no management based on current users but when you hit these windows of time, either under or over in flow the water management plan is going to kick into effect. What that is the next step of this process. But understanding that we have these flows is indicated that show that something is going on. At what point does somebody raise a flag up a pole and say it is time to start managing your use, it is time to start managing what you pass over your dam.

Wayne Ives – Part of this is not only describing those specific triggers that make the water management plan kick in but also defining what percentage of the time do these show up in the historical record.

Paul Currier – My conception of the plan, which coincides with our rules, is that the plan is always in effect. It has three parts. It has a conservation aspect which for water users is all the time. There may be some additional things during low flows or something. For dam owners it is the same thing. The dam owners are going to have an operating curve and a release prescription, which is going to be an all the time thing. The plan will always be operable. It is not going to be, "Everybody can do what you want unless we get these conditions."

Alden Greenwood– You are saying that if you have a big storm coming in the forecast you are not allowed to draw-down?

Paul Currier– That would be in the plan.

Wayne Ives – You are involved in making this plan you remember. It is not going to be us saying you are going to do this. It is you saying this is the things that I need to have happen too.

Alden Greenwood– It has to work for everybody. It can't just work for some people.

Wayne Ives – Yes, and you just can't just release willy-nilly because of the situation you had this spring.

Alden Greenwood – It isn't a question of release. It is a question of running longer to draw it down, which is a standard practice.

Wayne Ives – You don't want to be stuck holding a whole reservoir.

Paul Currier – Don't waste any water you can run through the turbines.

Alden Greenwood – If you have the space and you have the time when the heavy rains occur because otherwise you are over the top, and then you are dumping it.

Wayne Ives – No one is happy downstream.

Presentation 2 2:40

Tom Seager – I want to ask for Ken and Don’s advice on the graph. I was thinking of the same problem. This is looking a little bit ahead past the PISF so I can show you what I am thinking about now. In order to represent it graphically I’m thinking about driving past the fire department and the fire hazard is coded out front and you use a traffic light metaphor. We can do the same thing with the cut curve if we represent the two critical variables, flow and the number of days below that flow in a two dimensional graph. Since the number of days is going up on the Y axis, the longer you have had low flows, the worse off you are. Down at the bottom of the graph you have the green zone. This is below the allowable. It might be dry but that is just part of the natural variability. When you head into the yellow zone you need to think about averting a catastrophe. A catastrophe is when you have these dry flows for long periods of time. Most of the time the river isn’t even on this chart and this chart is just one protected entity (Lower American Shad) during this one bio-period. You can imagine these for all the protected entities. Sometimes you have these low flow durations so we can represent the same information that is in the table in a different kind of color-coded way. The advantage to this is that it organizes the multiple dimensions and it gives you a color-coded interpretation of how it relates to action. It doesn’t say what kind of action you are going to take. How would that look in the scenario building process in an actual dry year? Looking back over the records 1964 was a pretty dry year. In May that wasn’t necessarily apparent. In May it is still spring-time flows and you haven’t had any days under which the flow is below these significant flow Zones. I’ve marked out 60, 80, 100, and on up. As the year progressed and there was no rain we see that there have been several days when the flow was below 120 and several more when the flow was below 200 and this in the Lower Souhegan. I can step forward another week and we see that flows are getting really low and they haven’t been low in a long time. This is about a week that they have been below 80 cfs. As you go higher, well they have been below 200 cfs for two weeks. That is ok because 200 is a lot of flow but some of this low flow condition is beginning to be alarming. At this point the water management plan might say that we need to take some action and identify the alternatives that will bring us down below the allowable threshold again. In 1964 none of that was available. So what happened, it still didn’t rain. In this case there was by and large a minimum flow in the Lower Souhegan of about 50 cfs but you can see that for Shad spawning that you need more than 50cfs. I’ve colored these up here in red. That tells you that you have catastrophe and you have failed to take action and it failed to rain and now we have just lost a Shad spawning season. This is June 10th. We are about to the end of the bio-period. What happens if we go another week forward? It looks like this on June 17th. This came up in the discussion too. What happens when you swap a bio-period? Technically on the 15th, all these go back to zero. Sure enough, the minimum flows for the summer period are a lot lower. It is too late for the Shad to spawn. If we had extended the bio-period for another week it would look like a disaster but we have already had the disaster. There is no Shad spawning this season. They don’t spawn in the second half of June so as far as implementing and interpreting it stops short of a water management plan. It doesn’t say what to do but it does say how you track the data and how you say something has got to happen. What are the alternatives that are available to us? The PISF report is only on these lines here. The rest of these go beyond the scope of the PISF and asks, “Where is our particular year?” Today’ report is saying where should these lines be? There could be some argument about the process about where you draw these lines. Who is to say that when we connect the dots that Piotr has given us in that table it should look exactly like this. This is a representation of the information that we have in the report that will allow people to see where we stand. I am putting this out there for you, not because I think it belongs in this table, but this is where I kind of see the report heading when it goes to WMP and your advice on how you think the public would interpret this. Any kind of advice would be good.

Carl Paulson- That is helpful to me. It helps to visualize it.

Ken – The acid test that I would is if my neighbor came to me and asked me, “Explain to me when I have to do something?” I would want to be able to pick this up and explain it to them because they are not going to care about the reams and reams of data but they will care about when you reach the point when they have to do something. They will want the rationale behind it, which is in the report. If I can’t even explain to them at what point it changes and they are doing to have to take action, I need to be able to explain to my neighbor if they came to me.

Lee Carboneau – There are two different things. If you go to neighbor and say you have to do something the first response will be, “How do you know I have to do something, those fish are fine. The Shad are spawning all the time.” You could have an argument on where the line goes and the next part of the argument is, “How do you know that this is what I am supposed to do?” People will only interpret it in terms that are important to them and that they can grasp and that is not necessarily the tadpoles.

Ralph Abele – I just wanted to be clear on one thing you said. I wasn’t suggesting we move stuff from the detailed stuff to the summary and turn it into a phone book. When we look carefully at what was in the detailed stuff we still feel there needs to be a better explanation. One of the places could be in this new appendix that was created. For example, how did you come up with the curves for one particular species? It lays out the raw data and the bottom line.

Spenser Brooks – I am looking at the frog has its season and the shad has its season, shouldn’t it be commingled together from the public’s point of view.

Lee Carbonneau – Significant overlapping bio-periods? Nobody tells a shad it is too late.

Wayne – Each of these bio-periods is defined by single entity it doesn’t include only that entity. It is really representing the needier. We are labeling them by the controlling entity. By creating these protected flows we are really trying to protect all the species. In this case Shad need certain levels of flow to meet their biological functions and the other species are also satisfied and protected. We should make that clear. We are protecting the ecosystem as a whole rather than one particular species.

Paul Currier – I think what we are going to need is a passes technical muster vote from the TRC. It is sounding to me that the consensus is that there should be an appendix added which explains as clearly as we can on how we are going to use the data with some scenarios.

Carl Paulson - It has been a while since I read the full report and all I did for this meeting was to read the comments and the responses. Following up on Don’s comment on how often we can expect these events to occur. Is it possible to include an indication of the likelihood and frequency of this happening?

Lee Carbonneau – We have statistics on what is the typical first date that these things happen and each of the bio-periods, typical run life, average deficit, probability of distribution of the deficit, and the volume of the deficit or excess. That is for the natural system because this is off of the hydrograph, seven years of flow without humans. Then you throw on the system as we know it today with almost 2cfs and see if this changes the scenario then a little bit in the future, what Tom Seager just demonstrated was there are some color-coded simple schemes you can use to identify what should be done. What do you do first for the common flows when you are looking down at the gauge of 200cfs, cutting off all the withdrawals that are only 2cfs? These are going to bring the common flows back up. All these statistics have been developed with 70 years of natural flow without human influence. Keying in on when we have adversely affected the system is not a simple thing to do.

Carl Paulson– The reason I mentioned that is if I was on planning committee and I saw these protected flow targets and I know how often this would happen, it might influence I put on conservation planning versus dam management or something else, depending on the frequencies. An indication of that would be helpful. There are at least four dimensions that I can think of that we are trying to represent here. This adds another piece of information. I still think how often managers will face these decisions might help.

Piotr – I don’t think that it is included here because of the water management plan. The intention of the whatever the allowable event, violating the persistent flows or these allowable durations should not happen more often than three years in a row and a catastrophic duration once every ten years.

Carl Paulson – So those are built into the definition?

Piotr – We can modify the experiment.

Carl Paulson - At the very least to be very clear with people that is what you expect because it didn’t jump out at me that way.

Piotr – I agree that is what is needed. My vision for this would be a system of penalties so sometimes you will have a situation where all this is violated and all Shad are killed. So what, are you going to throw people in jail? You have time to think that you don’t want it to happen next year. What measures do I have to introduce so that this isn’t happening next year and for sure not for the next ten years. It is the same with the allowable things. It happened once and then again in the second year. If it happens the third year I will be penalized and, for example, and remove all the dams on the river.

Ken Kimball – I want to go back and not lose Paul’s question to committee, which was twofold, when he was trying to summarize what he thought were the next steps before it went to the public hearing. One was this committee’s approval of technical components and the second was adding on a few pages, either a description or method, on how this will be applied and used.

Ken Kimball brought forward a motion for an informal vote for “marching orders” to DES so they can then move this to the public meeting.

Steve Couture – I have a question about the report and adding other appendices, which seems to be recommendation number 2.

Ken Kimball – Actually I heard two recommendations. That is what I want to clarify because I think Ralph’s recommendation is different from the recommendation that came from Paul. Ralph is asking for more description in the appendix on how you jump from the data to the numbers.

Ralph Abele – What Paul said was something that I tried to allude to earlier on I just didn’t in and I support it.

Paul Currier – They are two different things.

Ken Kimball - Basically what we are doing is approving the technical rational and we are asking for two additional pieces, one that would be in the executive summary, and not lengthy as to how this is being applied as a method that can be done by example. The second is either an addition to the existing appendix or another short appendix that helps understand how the jump is made.

Steve Couture – The second point is where you are adding to the executive summary the implementation example. Basically, the presentation we just had in one page with one slide. Would it suffice?

Ken Kimball – I think this was a good visual but I think you want some text. I look at it as a manual.

Paul Currier – It has an example water user and dam owner and says when you see a yellow dot dam owner A should do the following.

Ken Kimball – If my neighbor came to me and said I have this and I need to figure out if I am approaching the point where I have to do xyz I would like be able to say yes or no if it continues on. I should be able to figure it out and my neighbor should be able to figure it out.

Donald Ware – What we are looking for something that says when you reach this point aspects of the water management plan are going to kick in because the water management plan is in effect at all times but there are certain thresholds where you do nothing. Then we reach a point in time where we kick in to another level water management plan where I may ban outside irrigation or if I see coming I may attempt to fill a reservoir and get some additional storage.

Tom Seager – It sounds like what you are saying is you want to understand how this report shakes hands with water management plan. I would be very reluctant to pull out a hypothetical example about what the dam owner would do.

Ken Kimball – The purpose here was to have science first and the water management plan built upon the science, not the water management plan driving the science. When you hit day 29 and it looks like you are going to go from voluntary to mandatory things, people know what will be expected. The water management plan will write out the details of what the expectation is and how to deal with it.

Wayne Ives – We are not describing any specific water management plan.

Donald Ware – If you come up with specific water management plans you come be sure that will be an outcry from the business industry saying that is what they really care about. This is the science so that we know at what point and we can explain to the customer, when something will take effect. What takes effect is the next step in this process.

Wayne Ives – The additional part here is the demonstration of the exact point where something take place in the water management plan that is undefined at this point.

Donald Ware – So we are not negotiating the water management plan takes effect. There may be different thresholds. There is going to have to be some combined action because this is a team now. We don’t want to let more water out so we can put it on the lawns.

Wayne Ives - I think this is a good process and I think we can handle that kind of development. I think that we need to get to that next step of what are the actual results of the water management plan. I think

if we can bring that together does that bring this to the point where we present the protected flows so that we can actually get to that water management plan.

Ken – When I look at the chart up here. If you are in the green you probably don't have to worry. If you are in the yellow you are probably in the voluntary stage and when you trip into the red side you are doing something.

Wayne – At certain level of flows you have 2cfs water use without taking out the things that are returned. There is only a certain amount of water use in the watershed to begin with. Certain things are naturally going to occur that may push us into these levels that aren't related to our water use. We need to be considerate of the magnitude of what we are actually working with. This watershed has a fairly low level of water use where as some of the flows we are talking about are.....

Ken Kimball – I think that you are thinking of a de minimus concept which could be built into this.

Wayne – I would like to get to water management plan eventually so we can see what we have got, what we have done, whether we have done it right or wrong. If we can hammer out something that makes sense to you as far as defining that interface point.

Ken – We have three pieces on the table. We are accepting the technical, asking for a methodology of where the kick-in points are and that would be in the executive summary. In one of the appendices a little bit more explanation on how you went from the raw data to here. Is there further discussion?

Rick Chormann – I just have a comment on the kick in point. Where does it do kick out?

Tom Seager – That is a great question.

Rick – You are dealing with natural variability and you can't see into the future because day to day your hydrograph is fluctuating. How do you know when you have reached a stage where you which you are back into the green zone out of the yellow or the red?

Piotr – Two days in the green.

Wayne – Two days in the green has been described in the executive summary. The executive summary says that when you get back into the green or yellow zone for two days you have reset to those conditions at least.

Ken – I think the pieces are here but people are having trouble putting it together.

Tom Seager – These happen to be continuous, that is an uninterrupted 24-day period. If you were to interrupt it by getting the flows up over a hundred, you could wipe out all those red dots. If you didn't get up over a hundred or could only get over a hundred, you still may have some red dots. The catastrophic and allowable go up higher as the flows go higher. If you somehow got your flows up for those two days then you start the whole graph again, depending upon how high the flows went.

Rich Chormann - Are the days on the Y axis consecutive days?

Tom Seager – Exactly.

Ken – That is part of the methodology that needs to be described.

Carl – How does it reset if you get out of the red into the yellow?

Tom – Piotr, correct me if I am wrong, but there is no way to go from twenty-five down to ten. You can go from 25 to 26 in the next day or down to zero because they have to be consecutive days. You only build up to twenty-five, then you get to rain season, right back to zero and you have to build back up again.

Carl – I see what you are saying. I am thinking in terms of different management measures that are in play in the yellow versus red zones and how it will affect how we will manage. If it resets that is fine, I just want to understand it.

Tom – Or a bio-period to end.

Ken asked for a motion to move forward for the public review period. John Nelson seconded.

Ralph – I have just one question. In the statute that sets up this whole thing the possibility exists that this will be submitted as water quality criteria. If my vote on this isn't equivalent to EPA approval, that is a two day process. Let me try to clarify it, this committee is approving it to move forward to the public review period.

Ken – Any further discussion or clarification?

John Nelson – If these are approved, where do we go from here before the thirty day clock starts ticking? Do we need another meeting or do we approve via e-mail? Is there something we are going to have to review if the vote is positive? It affects the schedule.

Ken – I would suggest, because we do have another schedule we are trying to stay within, because what we are approving is the clarification in the method section and the component that Ralph is talking about. I suggest that we approve that sight unseen but we would want to get a draft before the public hearing. We could bring it to public hearing. Obviously, there is going to be information coming back at the public hearing and each of us would have that to be able to look at and comment as well and then we could merge all of those as opposed to trying to make it another step before the public hearing. What we are not doing is approving it officially because it still has to go to the public. What we are trying to do is get enough here so we are comfortable moving it to the public hearing.

Vernon Lang – Ken, we have three motions here.

Ken – No, we have one right now.

Wayne – One of the floor, but several things being discussed.

Ken - Yes, three parts to one motion right now.

Vernon Lang – Are you asking to have a vote combining three items or is it combined?

Ken – Right now it is combined. We are approving to move forward to the public the science that is presented here. We are asking that what be appended to this is a description of how this is going to be used in regulatory world. The third would be the expansion and the appendix as to how we went through the raw data to some of these numbers right here.

Vernon Lang – The question I am getting to is what if an individual is agreeable to two of these, but not the third option. We are voting for the whole package and that is a complication.

Ken – That is true but if someone wanted to change that in the discussion phase so that they could vote. I am open to proposals of how to change those three points.

Vernon Lang – I would suggest that we vote on each one separately.

Carl Paulson – Is that what everyone wants to do? I am happy to change the motion.

Ken – You need to withdraw your motion just to keep it clear here.

Carl Paulson withdrew motion. Ken Kimball requested a motion on approving the technical data and moving it to the public phase. Carl Paulson brought forward the motion, John Nelson seconded, all except Vernon Lang and Ralph Abele were in favor.

Ken requested a second motion for clarification on the jump from the raw data from the appendix to the table. The motion was brought forward by Carl Paulson and Alden Greenwood seconded the motion. All were in favor.

Ken requested a third motion to include in the executive summary a methodology on how DES would apply it. Carl Paulson brought forward the motion and Donald Ware seconded it. All were in favor.

Ken – Committee members should comment as quickly as they can after they receive it because it may affect the way DES does their presentation at the public hearing, they may have some modifications.

3:15 – 3:25 Other Business

No other Business. The next meeting will probably be the public meeting. This may be the final meeting.

3:25 Meeting adjourns

Ken Kimball requested a motion to adjourn. It was brought forward by Carl Paulson. Alden Greenwood seconded the motion. All were in favor.