AMWG Meeting – March 3-4, 2004
Verbatim notes

Upper Basin Perspectives.

Tom Czapla (FWS) - One of the things I want to change on the agenda today is that I'm down as a Service representative rather than to give an upper basin perspective. I have a letter today is a letter (***Attachment 13***) by Regions 2 an 6, and the Arizona Game and Fish Department. One of the things that slipped out of the report although I know Steve mentioned it, I was a participant in the workshop via teleconference for about a half hour from Washington DC. The reason I was in there was to sort of give the Service perspective as to what we're looking for. I'm going to highlight some of the things from the letter that is being passed around now. The whole thing that is at issue here is what the Service considers as a reliable estimate and we wrote into the recovery goals, I was one of the co-authors, along with Bob Muth and Rich Valdez, that the Service would consider a reliable estimate as one that is based on a multiple mark-recapture model and it has the closed population multiple-mark recapture estimators. You folks can read on with that. I guess we still feel that there is that lack of geographic closure for Humpback Chub in the Little Colorado River while they're being sampled during the spring season. Carl Walters himself will admit that there is probably some skipped spawners occurring out there and what we as a group here in the Service and the Department are asking for or are requesting is that the AMWG look at a concurrent estimate to be taken during the fall. This issue has been going on for several years now. I met with Steve in Flagstaff and Rob Simmonds from the Service in Region 2 and I felt we had agreement back about 3 years that we do some sort of concurrent estimate. This is to help to verify the age structure mark-recapture model that Lew and Carl have been working on. I think what we're really trying to get to is if you remember the targets with the bullets that Dave Otis presented, the model down here that had the target but all the shots were over here, I have a feeling that's where we're at and we're looking at doing this concurrent estimate to align the bulls-eye with the marks so that's pretty much what the letter is about. That's where the Service perspective is along with Arizona I believe. Any questions? I know your time is short so I'm not going to try to take up a lot of time.

Mike Gabaldon (USBR) – I don't know if we had a full opportunity to ask questions of both groups so I think both are on the table right now for discussion and/or questions.

Clayton Palmer (WAPA) – Suppose there is a concurrent sample done and you evaluate your results and compare it with the GCRMC counting method, suppose you get different numbers? What does that mean? What do you do about that? Suppose one is higher and one is lower? What number do you use to set for recovery goals as your baseline?

Tom – I guess one thing we mentioned in the letter and Arizona and the Service agreed to do was to put together a small group that would develop criteria to look at what those estimates are doing, how they're being calculated, and how their confidence is being calculated perhaps. They're specifically going to put together a small group to develop the criteria to compare the two methods prior to the concurrent estimate actually being done if it was going to be done this fall. I don't know if that answers your question.

Clayton – I guess what you're saying is somebody is going to develop a criteria to evaluate the results and compare the two models and determine if the two models are comparable or if

they're not comparable, whether there is a way to determine which estimate is the better estimate of the population.

Tom – It's correct to the point where the criteria are developed. In my thinking, there is obviously the potential for the ASMR model to be utilized but the way the current recovery goals are written, that's not what would happen so if it turned out that the ASMR model did a much better job at doing what we're looking for, then in my mind, in 07 when these recovery goals will be revisited, then something to the effect of using that type of methodology should be written into the recovery goals.

Clayton – One last question. I'm a little worried about the possibility of having one model estimate that there are 5,000 adult humpback chub in the model. I think it was 2,000. I don't have enough of a statistical background to be able to as a participant in the AMWG to be able to say one way or the other. I'm just worried that you would have two different estimates and you'd scratch your head about which one you use as the baseline for starting your recovery block.

Tom – I think we're looking at the concurrent estimate to start the clock. The question about a difference in 2,000 and 5,000, I guess I would say we've been within that range with what's been being estimate over the past few years.

Clayton – You mean when you say concurrent estimate, you mean the estimate that comes from the

Tom – the mark-recapture, geographic closure

Clayton – One other thing and that is I appreciate that the State of Arizona has been assisting the Fish and Wildlife Service on answering or addressing this policy question. I think that the development of a criteria for the two models should include some additional scientists and maybe some people who have some stake in the outcome.

Tom – I would agree with that and I think we could expand that group.

John Shields (WY State Engineers Office) – That have a stake or don't have a stake?

Clayton – Oh, that do.

Bruce Taubert (AGFD) – Didn't we have this discussion before Clayton? Just to be clear. The recovery goals or recommended goals indicate that you need to have a multiple-pass population estimate in order to start the clock. The Service is uncomfortable with the existing population model to start the clock. It's the Arizona Game and Fish Department's position that we need to start this ticking clock, that we're doing all this work, handling all these fish, doing a lot of population estimates and we're not in a sense working towards recovery because the methods we're using are not going to be accepted by the Service towards recovery. So the AGFD has a set now in the Service and gone through a statistical analysis of which method is better and that's up to the experts. The experts have had their meeting and they've indicated what their feelings are. We've met with the FWS and we need to get off the dime so we're recommending that we do this concurrent this year. If the concurrence shows that the existing method is appropriate, then we will recommend that the existing method be used in favor of the multi-pass. If the multi-pass shows a different population estimate from the existing methodologies, the mark-recapture methodologies, then I think it's incumbent on the experts to sit down and have a

dialog about why they're different, differ whether confidence intervals around those population estimates and give us advice. I don't see the AGFD sitting down as a statistical expert in leading up to the sampling, the dual sampling, that hopefully is going to happen this fall. That's a place for the experts, I think. It's our position in AMWG that we are willing to fund both estimates to get past the barrier of not having a starting point and get past the barrier of which estimate we're going to use in measuring recovery or lack thereof. Does that help a little?

John Shields – It's very, very helpful.

Clayton – I agree that we need to get off the dime and start the clock but what I wasn't clear about was whether the concurrent estimate starts the clock or based on what Tom said, whether the concurrent estimate, it means we start evaluating the procedures and decide what procedure, what counting method is best. I kind of thought I heard him say that concurrent estimates starts a process of evaluating the models.

Bruce – Two regional FWS directors and the director of the AGFD want this to start and this is their attempt to get off the dime. Once we've completed the work, they have the intent to insure that the experts are involved in helping us select a method that will be used to start the clock. I don't see them saying "no, we need 10 years more work to figure out what starts the clock." That wasn't their intent at all. Their intent is to start the process this year and not haggle about anything in the future hopefully.

Joe Alston (NPS) – Two questions. Is the Upper Basin going to run concurrent models? Or is that not the appropriate question?

Tom – We have attempted to plug in some of the data into the models that were being used down here a couple of years ago particularly from our Black Rocks population data. There wasn't sufficient data apparently in that to get a result in the model that was used down here. We've been continuously trying to refine our estimates and the way we conduct them to improve our design and I guess like Steve said earlier, when you bring a panel of outside experts into an area such as this river, that's very difficult. In fact, the Service did try to go to something like a stratified random design which is what every statistician will tell you to use first if you could. That's not what you can do. So we try to optimize as much as Grand Canyon does. Grand Canyon goes out during spawning season. We go out in the fall but we sample in specific locations where we expect to find the fish. We might not necessarily sample the whole stretch of the river. We're probably got 14 sites that we hit very hard and the rest of we don't do too much with. We tried that in Westwater too. We decided we needed to expand that effort and add more sites so we're continually trying to refine those estimates.

Joe – And the second part of this was. Just so I understand, the AMWG asked that a panel be established of experts to address this question. The experts came back and said our sampling methods are appropriate and now what we're looking at is saying, "no, that's not really correct. We need to spend another $400,000 a year to do concurrent sampling and another $200,000." Is that kind of where we are?

Tom – I think the Service along with Arizona is saying that we need that concurrent estimate. Yes.

Joe – Why did we go through the effort of asking the experts to come up and do the work for us?

Mike – Bruce, were you going to address that?

Bruce – It's not $400,000 a year. In my mind, it's one time to figure out what the heck we're going to do for a population estimate because the Service is set in their recovery goals or whatever that document is called, that they will do a multiple-pass. They've looked at the information from the experts group and they still believe that a multiple-pass is the way to best measure the number of animals in there to look at the trends for recovery. Unless we do a multiple-pass, then we may be sitting years from now still trying to satisfy the Service that the mark-recapture method that we're conducting right now meets their requirements to start the clock on measuring the number of humpback chub in there. The AGFD has decided not to continue to debate the methodologies but to get over the debate and it appears the only way to get over the debate is to have the one-year concurrent sampling so that we can get the Service and AMWG and the GCMRC to agree on one method.

John Shields – If I could add onto that conversely with concurrent sampling, it may be that the recovery goals, as published by the Service, would be revised to say that in the case of the humpback chub population in the Little Colorado River area that the ASMR method is satisfactory. What the expert group has done is looked at the existing data so the proposal on the table is to do it both ways. To do concurrent sampling to try and figure out, as Tom said, whether you've got a precise and unbiased estimate or whether it's biased but relatively precise. Which one of the full bulleyes you're in and that information could then be factored into the recovery goal revision which pursuant to Endangered Species Act and the recovery goals themselves could be revised every 5 years. They were published in 2002 and will be subject to revision in 2007.

Joe Alston– Is there some reason that test can't be done in the upper basin?

Tom – As I said, we tried to use the model with the upper basin data and it did not work.

Joe – Then why would we think it would here? I'm confused.

Tom – The model that we used in the upper basin was the model that Grand Canyon was using a couple of years back. We brought our data down, plugged it into the model, and we didn't get any information. We feel confident in the information that we get with our multiple-mark recapture methodology that we use up there. Given some of that information has some limited confidence to it but it's the best we can do.

John – four species vs. one, too. The humpback in the Little Colorado is the only specie.

Mike – Joe, are you done?

Nikolai Ramsey (GCT) – It seems like there is a couple of issues – the concurrent estimation is a separate issue from the issue of what model to use and I thought we convened this panel in order to be informed to use the best available science. The statement from the report that we got is based on the ASMR - the ASMR model is based on existing and proven methodology of Paul ? 1981 and offers best available science as a source of evidence regarding the status and trends of HBC in the Grand Canyon ecosystem. We just heard in the previous presentation that we get trends in recruitment information that we don't get from the closed population model and that's an important bit of information for tracking HBC recovery. I just want to say that the Grand Canyon Trust's position is that we use best available science. This is an important issue

and the ASMR model, especially in its robust version, is what gives us the best available science and that is what we have to look at.

Jeff Cross (NPS) – There is another way before doing concurrent sampling to test this and this is my question for Dave Otis, is doing the simulations using both models, using one dataset, do a series of simulations and look at the behavior of the two models. My concern with what Bruce said is that we do the concurrent sampling and the ASMR agrees with the upper basin method, then you accept it and if the ASMR model doesn't agree with the upper basin estimate, then you go back to the experts and ask them to figure it out. I suggest that before we put the time, money, logistics, the handling of the fish, which Sam raised concerns about, that I think we ask the statisticians if there is a way to look at these models in simulations and say, okay they behaved similarly or they don't behave similarly, or there are problems before actually going out into the field and putting a lot of effort into capturing a lot more chub. SO my question for Dave Otis is, how do you think we should proceed on this? Do you think simulations are a good first step?

Dave Otis - The short answer to that is yes and that was one of our recommendations. I think there are a lot of analytical tools that could be brought to bear on this issue that are relevant and are going to give you a lot of insight into how these things work and don't work. And so, I don't think even the panel would be comfortable with saying, "well, okay if we go out and do a concurrent sample and we like what we get from the ASMR, that we go with the ASMR into the future. I think there are some things about the ASMR method that still need to be looked at and can be looked at via simulation as I tried to discuss a few minutes ago. I think there is some analytical work that can be done to gain some more insight into this and in a way, the jury is still out. It's logical that you would want to use all the data that you can use and that's what is so appealing about the ASMR but there are still some things to be sort of investigated about how that thing works. My other comment would be sort of the one you raised initially and that is we would wholeheartedly agree that more work needs to be done to sort this out and investigate the relative strengths and weaknesses of these models. My concern about the empirical way of going about that is sort of back to my comment about well we don't know what the right answer is and so we do want to get back to that precise target in the middle but we don't really know what N (true population size) is so if we're trying to compare two point estimates, how do you chose which one and my other fear would be that the variation around those point estimates would be so great that they might not be statistically different, especially in the fall when capture probabilities are relatively lower. So I think that's a real possibility. If you get the statisticians involved, they'll say that 2,000 isn't different from 5,000 and I don't know if it's that bad but there would certainly be a lot of noise in the system and so again, those are the things that further analysis in simulation can tell you. Strictly and sort of politics and the need to move ahead aside but in a perfect world, you could find out a lot more about how these are working before you went to the field.

Tom – Can I just address the best available science comment? I think in the upper basin we are performing the best available science for the populations of HBC. We are doing the very best we can. Year after year we look at the information and we see how we can improve our methodologies. Dave mentioned a four-pass. We did a four-pass in Black Rocks and the principal investigator there was a little bit concerned with regards to the stress on the fish and things like that. One of the reasons this is such an issue is because the estimates down here have been so variable over the past two years and that's why we're looking for something to improve that so I don't know exactly. It may that the ASMR is the best science and that may be true for stock assessments on populations that are commercially fished. I don't know if that is

necessarily true for an endangered fish population that resides in a relatively remote area and is very small in comparison.

Steve Gloss (USGS) – I just wanted to provide a little perspective on the concurrent estimate situation in the fall. We've been doing closed population estimates in the fall in the LCR proper for the last 4 years and those estimates for adult HBC in the LCR in the fall range from about 400 to 900 fish. The only data point we have which would be considered a concurrent estimate was in 2001 when at the same time there were round numbers about 600 or 700 fish in the LCR and the estimate in the mainstem was about 1050 or 1100 so if you combine those two and decide that based on a concurrent estimate that's your number, that's where you start the clock, that starting point, without considering confidence intervals, is somewhere under 2000 fish. My professional judgment would be that if we do this again, we're likely to come up with somewhat similar results. There is nothing in the data, survival rates, or recruitment patterns that we've seen with ASMR that would suggest to me that either of those adult populations have increased over the last several years. At the same the ASMR model over this period of time and many of us and I should reiterate what Dave said, population people are really interested in trends and not in this end even though it's obviously part of the recovery goals so the end for the ASMR model over the last 4 years or so varies between 4000-5000 adult fish just so people have that perspective as they think about this. There are a number of costs and other program effect considerations that probably need to be thought about some time too.

John – Why are we so willing to set aside what the requirements in the current recovery goals are? The bar has been set by the FWS and it happened that the lead was out of Region 6 but that was speaking for the entire FWS and we're willing to sort of ignore the fact that the bar is here. A proposal has been put on the table to see if the methodologies can be compared to one another to assure that we have a sufficient estimate that meets the level of the bar and in fact if the alternate methodology that's being used in the lower basin is found to be acceptable, I hear the Service saying they are willing to change the recovery goals when they're considered for revision in a couple of years. So what really is the objection to this? We say that we're concerned about complying with the GCPA and the ESA, the CRSP Act, and these things, why are we so willing to look the other direction now? Well, you know it could be inconvenient for us to comply with this portion of the ESA but we're ready, willing, and able to jump off to do consultation on an experimental flow or what have you. Here we have a chance to move forward. We think we have enough HBC in the lower basin to start the clock ticking towards downlisting, why wouldn't we want to do that?

Clayton – I have been an advocate for starting the clock and share Bruce's concerns about that. The recovery goals, if I recall them, required 2000 adult fish in the Grand Canyon?

Tom – Let me address that right now. When we developed the recovery goals, we were looking at estimates of the population of Grand Canyon to be about 5,000. The 2100 number was developed for something totally different. We felt we were already there with Grand Canyon. We're not looking at that population to decline to 2100.

Clayton – That's not germane to the point I'm going to make but thanks for clarifying for me. The recovery goals number is 2100 in the Grand Canyon. The estimate that may come out of the concurrent sampling is 1400 according to what Steve just said vs. the ASMR model which may come out with a number of 4-5,000. You know I would like to start the clock as soon as possible but I don't want to start it with the wrong number so I'm conflicted on this a little bit. I think that WAPA is quite willing to support the expenditure of funds for a concurrent estimate. The question that I have is once you've conducted the concurrent estimate, if the numbers from

the concurrent estimate jive well with the numbers from the ASMR model, everybody is happy. If they don't, what do you do? Maybe an answer to this might come from David Otis. The question I have is then if you do a concurrent estimate next year, is that sufficient data to compare your results against the ASMR model or do you need to do concurrent estimates for more than one year in order to make your comparison?

Dave – Speaking from the statistical side of me would say, I would feel very uncomfortable making that decision based on one pair of points.

Clayton – And so that makes my opinion on this matter even more conflicted. As I said, I'm interested in recommending the expenditure of funds for the concurrent estimate. I'm interested in seeing these two models compared and evaluated by the statisticians and the biologists. I just don't know what you do, or what occurs if those numbers don't jive or if you have to continue to do concurrent estimates for several years in order to properly evaluate the differences.

Mike – Do we have an estimate of what those costs would be? Steve or Jeff?

Steve – the current funding level in this project is $250,000 this year and $250,000 next year. About $50,000 of that first year was allocated to spent on this independent review and we've done that so there is roughly $400,000 available in this project that we and TWG have recommended be allocated instead to the implementing of the panel's findings. That aside, these are round numbers. If we do four mainstem trips, if we assume and I'm not sure if Tom has 4 or 2 or 3 in mind, but for planning purposes, these are probably a $100,000 a trip if we count logistics and personnel and contracting costs and so forth. IF we do four trips, that's $400,000. That's the entire remaining amount in the 04 and 05 budget and that could be done because 05 sort of spans the – starts October 1 and it would be included in this fall estimate. In addition, there would be about $100,000 of funds that we wouldn't have identified right now to add two additional trips in the fall in the LCR and we could do that by either finding new money or foregoing spring sampling in the LCR for example and just using all the money in the fall or something like that but that's about another $100,000 that would have to be identified. There are some other issues and I'll be brief about this. GCMRC would undoubtedly have to contract this effort out. There are some significant potential impacts on the mechanical removal effort because it overlaps with the timing of this effort with respect to equipment and personnel would have to be addressed. There is also an issue of permitting with the GCNP because beginning Sept. 15 it's a non-motorized season. These mainstem trips would require motorized rigs and sport boats to be able to move around. They could be started and perhaps a couple of them conducted before the non-motorized season kicked in but I would think that at least a couple of them would have to occur during that period of time.

Dennis Kubly (USBR) – We think there is a realistic and reasonable compromise that might be had if the Service would be somewhat flexible and that would be to conduct the concurrent estimate in the spring and move the fall sampling that's presently done by GCMRC into the spring to make it a four-pass sampling, to have four pass in the mainstem and in the LCR at the same time. The only difference would be time of year. I know the Service has concerns for impacts on fish and I assume they would address those through the permitting process but to do so would relieve the administrative burden that the Park Service has, it would decrease the amount of funding from this program, and some people have questions whether or not this funding could be used for recovery purposes, and it would achieve I think the best estimate that we could likely get in accommodation of methods.

Tom – I had some lunch with some other Service personnel and they've somewhat convinced me. I've always thought there may be a problem with sampling these fish prior to spawning in the spring and that perhaps could be a reason why we're not seeing much recruitment anymore. I've been somewhat convinced by other Service biologists that that doesn't seem to be the case. So I think there is potential there to do that monitoring in the spring. The four-pass, Dave, this is new me. I didn't see the four-pass thing in the report and I guess we have tried several times to again improve our estimate, get the best available science out there with four passes. We've noticed basically that logistically and funding-wise, it's more to do for a little bang for your buck. We'd be okay with three passes and that's where we're at.

Mike – The compromise sounds pretty good to me. That sounds like you're generally okay with it and obviously they would have to put a lot more thinking into it and more details than just two minutes with Dennis bringing something up. Does anybody have any objections with maybe pursuing that compromise on this?

Darryl Beckmann (USBR) – The only concern I would have is until we get into the budget discussions, I think if we preclude those discussions by making the agreement here, the priorities of whether we commissioned this panel to do their job, they've done their job, they've come back, and I guess I'm a little concerned if we rush right off to agreeing to something now without seeing what the tradeoffs may be when we get into the budget exercise. I would be fine with it depending on how things go tomorrow.

Tom – I would also add about the spring monitoring is that you have to recollect that that's the time when the fish are moving the most. We have to think about that a little bit more as to the amount of effort that's going to have to be spent out there again to get the best science that we can.

Nikolai – Two things, need to make sure the handling the fish that's increased by concurrent sampling that the tradeoff there is something that's worthy. We need to look at that more than just the two minutes of thinking about going into the spring rather than the fall. I want clarification, Dennis, when you articulated your compromise, are you thinking the robust version that Dave was talking about with using the open population model but with more sampling? Is that where you're at?

Dennis – I was not but think it's a great idea. It would fall in line with the panel's recommendations.

Norm Henderson (NPS) – This is a question for Dave. The discussion about doing some model simulations, what's your feeling about the information that would be gained from these model simulations which you seem to think is a good idea vs. doing these concurrent population estimates using actually comparable data. Which would yield the best results or are they the same?

Dave – No, they're probably not the same but I can certainly see how those two things could be sort of blended together I guess. We don't know. Presumably from that concurrent sampling, we would learn more about these capture probability issues that we're worried about. We've learned more about movement and we might be able to use that information than to actually improve any sort of analytical simulation stuff that would be done thinking more in terms of sort of a the long-term of again not making a decision just based on one year but using that data to help us, or maybe it has to be used in the first year, but in terms of the long-term using that data that would be available to us together with some simulation techniques to make some

recommendations for tweaking or whatever in the long-term. So you might be able to get the best of both worlds. I still think that there is a lot to be learned with the analytical approach.

Tom – Just a quick point about what we mean by concurrence so that everybody is on board with it. Right now all the sampling is done in the LCR as David showed with two passes. It's usually done in the spring, two passes in the spring, two passes in the fall. What we're asking for is an additional concurrent sampling to occur in the mainstem about 6 miles above and 6 miles below the confluence, about 12 miles of river, so that we have truly achieved geographic closure that Dave again talked about earlier on in this discussion. That's what we're talking about with concurrent sampling.

John – I mean ____ the fish twice but making twice as many passes.

Clayton - This item on our agenda is for information and discussion. There is no decision here. On the other hand, we didn't have this letter until today. I think either at this time or when the budget is discussed, I would like to make a recommendation to support the proposal in this letter. I want to add to it so either now or tomorrow in the budget discussion, I want to add to it that I would like to have the Service come back to the AMWG and say this is how we will compare these estimates, this is how many years we need concurrent estimates in order to make statistically adequate comparison, and this is what we will do with what we've learned.

Mike – I would suggest that we do that tomorrow. Everybody take it home tonight and think about it and then come back tomorrow and be prepared to discuss during the budget presentation. We'll start off with this issue first thing tomorrow morning.

Bruce – I suggest you also ask AGFD and FWS to come back tomorrow and be prepared to modify the letter because the second page of the letter talks about fall of 2004 and I don't want there to be inconsistent action from this group that is inconsistent with the letter. I would rather have both actions be consistent so the Service and AGFD need to come back to you tomorrow and say whether or not it's appropriate to insert spring in that letter rather than the fall.

Sam Spiller (USFWS) – Tom, please correct me. This letter Clayton involved the Director of AGFD and two regional directors and gaining concurrence in all three levels and I just don't think you're going to see much change. I think the agencies will certainly take advice and clearly review that advice but I don't think you're going to see us be able to make any changes with regard to this letter. Do you agree?

Tom – With the exception of what Bruce said, I think we need to maybe reconsider some spring sampling recognizing that you're handling those fish prior to spawning or at spawning time and may be an additional stressor. I've been assured that that's not the case. I'm not sure that you necessarily need changes to the letter. I think we're okay there. I hope you're not asking for us to develop the criteria by tomorrow. I think what you're asking is that we would commit to doing that prior to the sampling and involving more entities that have a stake involved.

Clayton – That's right Sam, I wasn't asking that this letter be changed. I was asking for followup and in fact, I support the recommendation from the letter.

Mike – are we done with this one? We'll pick it up first thing in the morning.