STATE WATER RESOURCES CONTROL BOARD

PUBLIC HEARING

CALIFORNIA DEPARTMENT OF FISH AND GAME'S
LOWER YUBA RIVER FISHERIES MANAGEMENT PLAN
AND A COMPLAINT BY
THE UNITED GROUP AGAINST YUBA COUNTY WATER AGENCY
AND OTHER DIVERTERS OF WATER FROM THE LOWER YUBA RIVER
IN YUBA COUNTY

MONDAY, MAY 1, 2000
PAUL R. BONDERSON BUILDING
SACRAMENTO, CALIFORNIA
9:00 A.M.

Reported by: MARY R. GALLAGHER, CSR #10749

A P P E A R A N C E S

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MONDAY, MAY 1, 2000, 9:00 A.M.

SACRAMENTO, CALIFORNIA

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H.O. BROWN: Good morning. Are the mics on? Can you hear all right? All right. This is the continuation of the supplemental water right hearing regarding the Lower Yuba River. We're about to start rebuttal. Let's see a show of hands of those who have rebuttal testimony. All right.

Mr. Gallery, you had a comment.

MR. GALLERY: Thank you, Mr. Brown. I just wanted to check, I presented some evidence for Brophy Water District. It had to do with its riparian usage out on Reeds Creek and also some problems with Brophy having to go back to part-time pumping.

And I was just wondering if anybody had any rebuttal against Brophy's evidence. I had some other commitments and I wasn't going to stay if they didn't. I

see Mr. Cook and Mr. Baiocchi are not here. So probably it wouldn't -- and Mr. Sanders indicated that he did not.

So what was indicated, I don't think any of these other parties that are here have anything to rebut the evidence presented by Brophy. I guess I'll have to wait and check with Mr. Cook and Mr. Baiocchi if they show up.

Thank you.

H.O. BROWN: Does anyone here have any rebuttal against the evidence presented by Mr. Gallery for Brophy? It sounds like until Mr. Baiocchi gets here, Mr. Gallery, you might find other things to do with your time today.

MR. GALLERY: Thank you, Mr. Brown.

H.O. BROWN: Not that you would not be missed, Mr. Gallery.

All right. The order of presentation, you may recall from our last meeting that we did move Fish and Game to number three. Number one is National Marine Fisheries, but I don't see anyone here from there.

So, Mr. Gee, it looks like you're up with your rebuttal.

MR. GEE: Thank you, Mr. Brown. My name is Edmond Gee. And I'm an attorney with the U.S. Department of the Interior. And I'm here today to present evidence in rebuttal. And to support the Interior's position I'm

calling two witnesses: Mr. Craig Fleming and Mr. Roger Guinee.

H.O. BROWN: All right. These gentlemen have taken the oath, right, Mr. Gee?

MR. GEE: They have.

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REBUTTAL TESTIMONY BY THE DEPARTMENT OF THE INTERIOR

BY MR. GEE

MR. GEE: I'll start with Mr. Fleming.

Mr. Fleming, if you could state your name for the record.

MR. FLEMING: Craig Fleming.

MR. GEE: Mr. Fleming, to refresh the Board's recollection, what is your occupation?

MR. FLEMING: I'm a fisheries biologist for the Anadromous Fish Restoration Program. The actual title is a habitat restoration coordinator.

MR. GEE: And you provided testimony and evidence in the Interior's case in chief. Is that correct?

MR. FLEMING: Yes.

MR. GEE: And were you present during the presentation of the Yuba County Water Agency's case in chief?

MR. FLEMING: Most of it, yes.

MR. GEE: Referring specifically Exhibit 19, Page 24 -- 2-4 --

MR. FLEMING: Excuse me, I didn't bring that up. Okay.

MR. GEE: Page 2-4, Section 2.2.3. It's my understanding that is a description of how the water

budget was developed. Is that your understanding as well?

MR. FLEMING: Yes.

MR. GEE: And isn't it true, that the budget is merely a reflection of water that remains available for instream flows after -- well, before the development demand and the water has been satisfied?

MR. LILLY: And I'm going to object on the ground that these are leading questions of his own witness. It's not appropriate for him to be asking questions and suggesting the answer when he's questioning his own witness.

H.O. BROWN: Thank you, Mr. Lilly.

Mr. Gee?

MR. GEE: I'll rephrase the question. What is your

understanding of this particular section of YCWA Exhibit 19 that I just referred you to?

MR. FLEMING: That it's the water budget for their -- the model that they used to present the water budget.

MR. GEE: And do you agree with Yuba County Water Agency's approach to determining its water budget?

MR. FLEMING: I just had one comment. And that would be that Yuba County Water Agency is not fully developed at this time. And, therefore, using full diversions based on future development values portrays

less water available seemingly -- which, seemingly, increases the burden on Yuba County Water Agency.

An accurate water budget, in my opinion, would be one that reflects present day actual consumption and water availability in the present day.

MR. GEE: Thank you. I want to turn to Page 2-9, Yuba County Water Agency Exhibit Number 19. Mr. Fleming, are you familiar with this portion of Exhibit 19?

MR. FLEMING: Yes.

MR. GEE: And there is a discussion as to reductions in deliveries and priorities for reductions of those flows; is that correct?

MR. FLEMING: Yes.

MR. GEE: Do you agree with these flow reduction priorities?

MR. FLEMING: Well, the justification for these priorities was consistent with the focus of the 1992 hearing, but I think it's important to point out that there are now two federally listed species and one state listed species in the watershed which would impact those priorities.

MR. GEE: What are those priorities?

MR. FLEMING: The priorities that -- well, the species that would impact those priorities now would be the spring-run and the steelhead. They're both listed

species. The priorities are whatever they used to determine their decisions. At that time I wasn't around. I don't know what the priorities were.

MR. GEE: Okay. And these priorities call for reductions in deliveries; is that right?

MR. FLEMING: Yes.

MR. GEE: And these reductions, were they across the board?

MR. FLEMING: Not that I could determine. It seemed like only biological issues were -- only instream and biological flows are reduced. Ag users, it seems, always

got their full allocations. And fisheries, in my opinion, should not be the first to be hit by water reductions, nor should it be the only component of the water allocation that is hit.

MR. GEE: If you could turn to Page 3-7 of Exhibit 19. And there's a section there 3.2.2. And that section is, "Fish Species of Primary Management Concern." Could you read that section of this exhibit?

MR. FLEMING: Yes.

MR. GEE: My question here is: Population numbers are presented as evidence of population, size, and health and whether you agree with this evidence in the data?

MR. FLEMING: No, I don't. The numbers referred to in this section are biologists were asked in numbers of

1,000 spring-run as a population number was given. And it was stated that in that transcript that they have no data.

And so that number is just -- when you read this document, it seems like that number is a valid number. And when you go back and read the transcripts, they say, "We have no data to support that. We got it from a report." No body could really come up with the report. And I just wanted to point that out.

MR. GEE: What transcript are you referring to?

MR. FLEMING: The transcript from the 1992 hearings. And it's Page 111, Volume III, Page 111 -- I think the way we wrote this down is wrong. But I have copy of that transcript right here.

MR. GEE: Do you want to read the relevant portion of that transcript?

MR. FLEMING: Sure. It says,

(Reading):

"I am sorry. The sentence I am reading says a small run of about a 1,000 fish of spring-run chinook salmon also spawn in the river.

My question is where that 1,000 estimate came? That 1,000 estimate came, to my knowledge, from interviews with biologists primarily from the Department of Fish and Game and from past literature. So do you have any idea of

specific data to support that number? We have no data. We have observed spring-run in the Narrows. We only have secondhand information. We don't have any counts or other information."

MR. GEE: Thank you, Mr. Fleming. I want to turn now to Page 3-15 of Yuba County Water Agency Exhibit 19 and also Page 3-16.

Are you there, Mr. Fleming?

MR. FLEMING: Yes, I am.

MR. GEE: Did you review this portion of the exhibit?

MR. FLEMING: Yes.

MR. GEE: And what is your understanding of this portion of the exhibit?

MR. FLEMING: It's a study done by Yuba County Water Agency's biologists to determine health -- general health of the populations of salmonids in the Yuba River.

MR. GEE: Okay.

MR. FLEMING: It specifically deals with the temperatures and growth of fish while they're in the river and compares '92 and -- well, it talks about 92, '93, and '94 sampling that was done on the Yuba River.

MR. GEE: And what is your understanding of Yuba County Water Agency's main argument here?

MR. FLEMING: In my mind in reading this, it says

that lower flows, warmer water is better for fish than high flows and cooler water.

MR. GEE: Do you agree with this?

MR. FLEMING: No, I don't,

MR. GEE: Can you explain why you do not?

MR. FLEMING: Yes. Many conclusions are drawn in

this couple of pages that are misleading. In my mind, while there's some information here -- and certainly some data that makes statements that are true -- the literature documenting temperatures affects on emigration exists, but none of this information has been shown to provide a direct correlation to overall escapement.

The temperature is a queue, a stimulus that stimulates movement, beginning of emigration. But the important point here -- let me go to my notes here.

Emigration is a complex behavior that we only understand partially and temperature is one stimulus that acts on that behavior. Those comments on line four is one of many in the fishery testimony that, in a sense, misleads people in the conclusion.

The point is not how -- I need to read this to make sure I say it right. The point is not how large or how soon -- how large the fish are or how soon they migrate, those are points of interest along the road.

The point is how successful are the fish overall

in successfully migrating all the way out, growing in the ocean, and coming back as adults. That's how you should quantify success. And we shouldn't look at the environmental variables that stimulate the behavior. We should look at the overall result of that.

For example, '92 conditions flow and temperatures says low flows increase temperature. And Bill states that -- I'm sorry, I say "Bill." The document here says that those were favorable conditions for rearing. And that in '93, which was a high-flow year, cooler temperature was unfavorable. Fish stayed in the water in the river until August.

And could I put up an overhead to kind of make a point? Okay. The point that I'd like to make here is that the document says that in 1992 low flows and warmer temperatures had the fish grow quickly. And then in '93 the fish did not grow quickly and they stayed in the water until August, it states.

This is a graph of the flows. This is the 1992 flow here. And this is 1993. You can see it was a low-flow year and temperatures were probably considerably warmer than in 1993. And that, in itself, is not important. And I didn't do any analysis on this. I'm just trying to make a point that we don't want to look at one small section of the life history, we want to look at

the whole life history. This is 1992.

MR. FRINK: Excuse me, Mr. Fleming --

MR. FLEMING: Yes.

MR. FRINK: -- and Mr. Gee, are the overheads that you're referring to out of exhibits, or are they new documents that you'd like to give exhibit numbers to?

MR. FLEMING: This is out of a different document, new document. So we would like to give this a number.

MR. GEE: What is that from, Mr. Fleming?

MR. FLEMING: This is a from a document that's yet to be published. It's just flow data, but I got this out of the Daguerre Point Dam feasibility study report. And this right here is out of the Yuba County Water Agency document, right here.

MR. FRINK: Okay. The overhead then on flows for '92 and '93 would be given the Exhibit Number of SNMFS 14, that's S-NMFS 14 --

MR. FLEMING: No. It's not a National Marine Fishery --

MR. FRINK: I'm sorry, we have the wrong -- both the exhibit number and the party were wrong. We were looking at the wrong -- excuse me.

MR. GEE: If I may we have a number of exhibits. We can call this S-DOI-18.

MR. FRINK: Okay. Great, S-DOI-18. Excuse me.

MR. FLEMING: Okay. So then as I mentioned, I didn't do an analysis on this. I just want to make an

overall point.

H.O. BROWN: Will this be 19?

MR. FLEMING: This is in this report right here.

MR. FRINK: Okay. I wonder if you can give a page number of the report?

MR. FLEMING: 3-10.

MR. FRINK: And that's Yuba County Water Agency Exhibit --

MR. FLEMING: Yeah, S-YCWA-19.

MR. FRINK: Okay. Thank you.

MR. FLEMING: You're welcome. Sorry. This year in the report is referred to as a good year for salmon, in 1992. And '93 was referred to as a bad year for salmon. As you can see here, a good year produced 14,000; and a bad year produced 27,000.

So you could -- just by looking at this here you could say, well, while this may have been a good year for salmon to grow quickly, it was not a good year for overall numbers, for overall survival. Whereas, with this year with high flows throughout this spring period produced higher overall escapement.

And that is what's important to me as a biologist, is that the returning numbers, not how many --

or not the stimulus of those fish to move, but how many have moved successfully all the way through the basin and return as adults.

MR. GEE: Thank you, Mr. Fleming. If we can turn to Page 3-28 of Yuba County Water Agency Exhibit Number 19. This section deals with fry rearing. Okay.

MR. FLEMING: Okay.

MR. GEE: There is reference made to weighted usable areas. And what is your understanding of the use of this, of these values?

MR. FLEMING: It's part of the instream flow incremental methodology that the U.S. Fish and Wildlife Service uses to characterize streams and flows.

MR. GEE: And are there certain limitations to using these weighted usable areas values?

MR. FLEMING: Yes. And one of the documents that we're going to submit as an exhibit is by Castleberry, et al.

MR. GEE: I have that exhibit.

MR. FLEMING: Okay. And Castleberry, et al., discusses the uncertainty that exists in the use of instream flow incremental methodology to determine standards for salmonids. In the paper it discusses three problems with the IFIM, which --

MR. GEE: Mr. Fleming, if you could hold on a

second.

MR. FLEMING: Yeah.

MR. GEE: I have the exhibits here and I would give copies to the Board and to the audience.

MR. LILLY: Excuse me, Mr. Brown, while we're distributing those, I would appreciate it if you could ask Mr. Gee if he is going to distribute copies of the other exhibits, including the flow graph which has already been discussed and has been numbered, we have not received that yet.

H.O. BROWN: Okay.

Mr. Gee.

MR. GEE: Okay. The flow graph we will provide copies. I do have copies of all the other evidence that I intend to introduce. And I also have a list of the exhibits I intend to introduce and ask that they be accepted into the record.

H.O. BROWN: Thank you.

MR. GEE: And I have copies of the exhibit list for the audience.

Mr. Fleming, we were talking about S-DOI-10. What is S-DOI-10?

MR. FLEMING: It's a report by Castleberry and a bunch of other academic and agency biologists and professors that critique the instream flow incremental

methodology. They have determined that there are three issues with that methodology.

Number one, is sampling and measurement problems associated with representing one entire river reach with a selected transect along that reach with hydraulic and substraight data collected at specific transects.

Sampling and measurement problems associated with developing the suitability curves. And, third, problems with assigning biological meaning to the weighted usable area, the statistic of the PHABSIM. And one quote I just wanted to share with the group from that paper is estimates of the weighted usable area should not be given without confidence intervals which can be developed by the bootstrap method; nor should any analytical method become a substitute for common sense, critical thinking about stream ecology, or careful evaluation of the consequences of flow modification as has sometimes happened with the implementation of the IFIM.

MR. GEE: Thank you, Mr. Fleming. If you could turn to Page 3-32 of Yuba County Water Agency's Exhibit Number 19. Did you review this portion of the exhibit?

MR. FLEMING: Yes.

MR. GEE: And if I could draw your attention to the last two sentences of this page. If you could read it for the record. I believe beginning with "Smith and Elwell."

MR. FLEMING: "That most steelhead smolts move downstream," I think --

THE COURT REPORTER: Can you say that again, louder.

MR. GEE: If you could read that for the record, Mr. Fleming.

MR. FLEMING: Sure.

(Reading):

> "Smith and Elwell," E-l-w-e-l-l, "state that most steelhead smolts move downstream in the early spring on declining flows increasing photo period and increasing water temperature. With regard to the juvenile chinook emigration in the Eel River suggests that water temperature appears to be a primary factor in influencing salmonid emigration."

MR. GEE: Mr. Fleming, what argument is being made here?

MR. FLEMING: The argument being made is that temperatures queue emigration.

MR. GEE: And do you agree with this argument?

MR. FLEMING: I do agree that temperature does stimulate migration, yes. But, again, with the second part of this statement is that high spring flows are not necessary. We just need to increase temperatures and

stimulate the fish to move.

And that's only, again, one component of the overall picture. And I have another graph here. The statements made in the document that high spring temperatures will increase growth and move the fish out earlier and that the extended spring flows are not necessary for successful emigration.

MR. GEE: And for the record this is from S-DOI-9. And I have copies of this for the Board as well as for the audience.

MR. FLEMING: Temperature affects migration. It stimulates migration. Higher temperatures equate to earlier emigration; and lower temperatures equate to later migration. That's an observation of the variation in the juvenile life history.

Neither early migration or late migration are good or bad. They are both components or parts of the variation that exists in the life history. Environmental conditions exist that stimulate a behavior in the fish and the fish act on those stimulations.

The variation in the juvenile chinook life history has evolved to spread the risk of mortality across years and across habitats. The variation is the reason that we still have salmon here in the Central Valley. If

it wasn't for this variation in their chinook life history that, you know, they can deal with higher temperatures,

grow quicker and emigrate; lower temperatures, grow slower and emigrate later, if they did not have that variation we would have probably extricated chinook salmon out of the Central Valley a long time ago.

The point here is that we cannot limit and we should not limit that variation by focusing on one life history aspect like low flows, increased temperatures as a management for dealing with these fish.

We're observing a lack of fitness already in all of the salmonid populations that exist in the Central Valley. And by focusing on a narrow section of the life history characteristics would continue to exacerbate the problem with fitness in the population.

And just to take it one step further, increasing the temperature is fine, but as was noted in the previous graph where the high spring outflows produced pretty good numbers in '93, this is a graph that shows the relationship between fall-run chinook salmon escapement and May Delta outflow over a two-and-a-half year period. And this is out of Kjelson and Brandes. And you can see that there is a trend where high spring outflows

definitely benefits the outmigration of the chinook salmon.

MR. GEE: Mr. Fleming, aside from the study of Kjelson and Brandes, are there any other studies that

support your statements?

MR. FLEMING: Yes. In the Kjelson and Brandes report, which is also part of the report, there is also a relationship like this one, the first one I showed for the San Joaquin Valley. And this here is just some data that we put together. This is not out of a report, it's just Sacramento River data.

The survival index of Coleman fall-run juveniles released in Battle Creek versus mean flow at Freeport 30 days after the release, and you can see that there is a direct relationship between flow and survival all the way out through the Delta.

These fish were captured at Chipps Island. And the reason I show these -- and the reason that we don't have a lot of data like this on the Yuba is because this is hatchery fish provided by Coleman Natural Fish Hatchery and part of a larger scientific experiment.

MR. GEE: And turn now to S-DOI-Exhibit 17. And I have copies here as well for the Board.

Mr. Fleming, could you turn to 3-35 of Yuba

County Water Agency's Exhibit Number 19.

MR. FLEMING: I'm there.

MR. MINASIAN: May I suggest, Mr. Brown, that we do this to avoid the shuffling around: If we can get all the S-DOI-exhibits up and then distribute them among the

parties, I think it would go smoother for both the witnesses and Mr. Gee and all of us.

H.O. BROWN: Do you have more, Mr. Gee?

MR. GEE: I do have more.

H.O. BROWN: Why don't you pass them out now and we'll take Mr. Minasian's suggestion.

MR. GEE: Thank you, Mr. Brown.

MR. MINASIAN: Why don't we put them in a pile next to Larry and we'll all go in line and pick them up in order.

H.O. BROWN:: We'll go off the record for a moment.

(Off the record from 9:34 a.m. to 9:38 a.m.)

H.O. BROWN: Back on the record.

MR. GEE: Thank you, Mr. Brown. And thank you, Mr. Minasian, for your suggestion.

Mr. Fleming, I believe we left off -- and my reference was to Page 3-35 of Yuba County Water Agency's Exhibit Number 19. And do you see a statement which

reads,

(Reading):

"There is no compelling evidence to demonstrate that the high spring flows included in the State Water Resources Control Board's 1996 Draft Decision will provide a biological benefit to the Lower Yuba River anadromous

fish."

Do you see that statement?

MR. FLEMING: Yes.

MR. GEE: Do you agree with that statement?

MR. FLEMING: No.

MR. GEE: Can you, please, tell me why?

MR. FLEMING: Yes. To say that high spring flows provide no biological benefit is ludicrous in my mind. I put together this graph right here to illustrate the relationship between outmigrating chinook and the Sac River flow at Freeport.

While high extended spring flows don't explain all of the variation that exists in outmigration, it does have a significant impact on the overall success of the outmigrating chinook in returning as an adult, which is what important is, again, is not what stimulates the fish to move, but what helps them to succeed in the entire life

history and return as adults and spawn and carry on life history.

MR. GEE: And for the record the graph that Mr. Fleming is referring to is S-DOI-9.

MR. FLEMING: Yes.

MR. GEE: Mr. Fleming, could you turn to Page 5-3?

MR. FLEMING: Yes.

MR. GEE: Did you review this portion of the

exhibit?

MR. FLEMING: Yes.

MR. GEE: And if you can look to the second full paragraph, the last sentence beginning with "Hence."

MR. FLEMING: Yes.

MR. LILLY: Excuse me, Mr. Brown, I hate to interrupt, but I can't find this graph in S-DOI-9. Can we get the record clear? Maybe I just can't read the figure number, but --

H.O. BROWN: Do you have a page number, Mr. Fleming?

MR. FLEMING: Is 9 -- no, we labeled it wrong. This is not --

MR. CUNNINGHAM: It's 17.

MR. LILLY: Thank you for the clarification.

MR. GEE: Thank you, Mr. Lilly.

Mr. Fleming, if you could look to the last sentence on this second full paragraph of 5-3 of Yuba County Water Agency's Exhibit Number 19.

MR. FLEMING: Yes.

MR. GEE: What is that? Can you read that sentence for the record?

MR. FLEMING: "Hence, the operation of the project has contributed to the recovery of Lower Yuba River steelhead population."

MR. GEE: Do you agree with this conclusion?

MR. FLEMING: No.

MR. GEE: And can you explain why?

MR. FLEMING: There's no present data to backup such a statement. Their operations -- Yuba County Water Agency contends that their operations do not directly influence other factors influencing fish conditions that are external to the lower river basin like the Sacramento River, the Delta, and Delta conditions. On the contrary, Yuba County Water Agency's operations directly influence the conditions downstream as a piece to a larger system.

Specifically, you know, higher spring flows would -- as fish go down -- and it's been pointed out that -- in Cramer's testimony, actually, he calls it, "synchrony." There's a synchrony that needs to continue

from the Yuba River to the Feather River to the Sacramento River to the Delta and on out to the bay.

Fish experience increasing temperatures as they move down in any system, that's just a natural phenomenon. And so if Yuba County provides decent flows for the fish during the spring, that water will influence the success of the migration all the way out through the Delta and into the bay.

MR. GEE: Thank you, Mr. Fleming.

H.O. BROWN: Mr. Minasian?

MR. MINASIAN: Mr. Brown, if I might politely with

the greatest respect for what Mr. Gee and Mr. Fleming are doing, I think it's very, very important to make an objection which may crystallize what scope you wish us to take in this hearing.

My understanding is that the 1992 notice was we started with a fish study with regard to the Yuba River, and we were not noticed in the '92 hearing that there was any interest in examining the issues of whether or not the Yuba County Water Agency should, alone, make releases to better conditions in the Sacramento River, the Feather, between the Sacramento and the mouth of the Yuba and downstream Delta conditions.

So we started with the '92 notice that didn't raise the issues that Mr. Fleming and Mr. Gee are properly pointing out, are pretty critical when you start looking at what you're trying to do on the Yuba.

We then got a notice that said give us more data that may have been developed for evidence, that may have been developed between '92 and today, in regard to the issues that were present in the first hearing.

Now, if we're going to expand this issue to the question of whether the Yuba County Water Agency and the contractors member unit should give up water to maintain some sort of conditions within the Sacramento and the Delta, and rightfully they're pointing out that those

issues are intrinsic to the question of what you're trying to manage on the Yuba River, then we're expanding the scope of this hearing.

And I think that it's a good thing to expand the scope of this hearing in that regard, but I'd have to object if we're going to try to do it at this particular point through rebuttal evidence.

Now, we tried to skirt that issue by talking about the impacts of management strategies in the Yuba River in terms of what it may mean in terms of escapement. Now we're getting into the question of Yuba County Water

Agency making some releases for temperature or flow at Vernalis -- excuse me, at Freeport. And that's going to go beyond, I think, what your notice states. So I'd object on that basis.

H.O. BROWN: Thank you, Mr. Minasian.

Mr. Gee, where are you heading with this?

MR. GEE: Mr. Brown, I merely referred to a specific sentence in Yuba County Water Agency's Exhibit 19. And I'm merely asking Mr. Fleming to provide his testimony in rebuttal to that statement. And while I understand Mr. Minasian's concern, it's not my intent to broaden the scope of this hearing to those points that he raises, but merely to limit that testimony merely to rebuttal. I think that would make more sense.

H.O. BROWN: Thank you. Mr. Gee.

Mr. Minasian?

MR. MINASIAN: Would it be appropriate to treat this as a continuing objection, so perhaps we can get the overall picture? Because if the Board based its decision on the basis that we need to improve conditions in the Sacramento or the Delta per the Yuba County Water Agency, that would be totally impermissible, but you do need to get the full picture in regard to the fish. So, perhaps,

you can consider it a continuing objection on the part of South Yuba, Brophy, and Cordua.

H.O. BROWN: I'll do that, Mr. Minasian. I don't get the scope that you do on this, Mr. Minasian. I do see this as rebuttal of Mr. Gee of the prior testimony that was given. On that basis, you may proceed.

MR. GEE: Mr. Fleming, do you have any further comments?

MR. FLEMING: Not on that, no.

MR. GEE: Okay. Mr. Guinee, could you state your name for the record.

MR. GUINEE: Yes. Roger Guinee.

MR. GEE: And to refresh the Board's recollection, what is your occupation?

MR. GUINEE: I'm a fisheries biologist with the U.S. Fish and Wildlife Service here in the Sacramento office.

MR. GEE: And did you provide testimony evidence in the Department of the Interior's case in chief?

MR. GUINEE: Yes, I did.

MR. GEE: And were you present during the presentation of Yuba County Water Agency's and South Yuba Water District's case in chief in this hearing?

MR. GUINEE: I think I heard most of their direct testimony.

MR. GEE: Mr. Guinee, if you could turn to -- I'm going to refer to Yuba County Water Agency's Exhibit Number 21. Page -- do you have that, Mr. Guinee?

MR. GUINEE: Yes, I do.

MR. GEE: And what does this exhibit describe?

MR. GUINEE: Actually, I made an overhead of it. Going back to the point that Mr. Fleming made that Yuba County testified that they were restricting the water available for fishery purposes based on a water budget that they developed. And so this Page 21 from their Exhibit 21, as I understand it, describes their proposed minimum instream requirements for the Lower Yuba River.

MR. GEE: And you mentioned the approach that Yuba County Water Agency took to holding these flow requirements. Could you describe that approach, your understanding of that approach?

MR. GUINEE: The way it was characterized in the

testimony is that rather than determining flow recommendation based on what the needs of the fish are, Yuba County Water Agency determined a water budget and limited its flow recommendations by that quantity in the water budget.

MR. GEE: And do you agree with this approach?

MR. GUINEE: No, I don't.

MR. GEE: Can you explain why?

MR. GUINEE: Yes. I've been involved in other instream flow studies and the development of instream flow recommendations on other Central Valley streams and it makes a lot more sense for purposes of fishery habitat to make a flow recommendation based on what the needs of the fish are.

And, then, if you find that in some years you have water supply limitations, such as drought years, you modify the flow recommendations for the fish based on those limitations.

MR. GEE: You mentioned that you were involved in the development of instream flow recommendations on -- what rivers were those?

MR. GUINEE: Stanislaus River, Tuolumne River, Mokelumne River. And then through the Anadromous Fish Restoration Program, I was part of the technical team that developed flow recommendations for the Feather, Yuba, the

American River, and the Mokelumne River as well.

MR. GEE: And what groups -- how were you involved in developing these flow recommendations?

MR. GUINEE: Well, in some of those situations I actually collected field data and worked on the river to

develop the weighted usable area and habitat use curves. And then developed instream flow recommendations. Through the Anadromous Fish Restoration Program, the technical teams didn't develop any separate field data. We reviewed existing data and then made recommendations as to what flows were needed to restore anadromous fish.

And then we worked with groups on the American River, for example, like the Sacramento Area Water Forum, and in some cases, developed consensus-based flow recommendations.

MR. GEE: You mentioned the American River. Is the American River's average runoff approximately the same quantity as the runoff for the Yuba River?

MR. GUINEE: Yes, it is. One of the things I wanted to do, and I brought some overheads to characterize it, is to kind of compare how the instream flow recommendations for the American compare or contrast to the flow recommendation for the Yuba.

MR. GEE: For the record, these are Department of Interior's Exhibits 13-A and 13-B.

MR. GUINEE: 13-A has a lot of numbers on it. The one I want to call your attention to is this number down here in the right-hand corner. This pen isn't working,

sorry, about that. This number here, the 2245. That's the average annual unimpaired flow for the Yuba River at Smartville. And then comparing that to the average annual unimpaired flow for the American River --

H.O. BROWN: Do these have a number, Mr. Frink?

MR. GUINEE: Yes, these are numbered. I'm sorry.

MR. GEE: 13-A and 13-B.

MR. GUINEE: Thank you. The Yuba River is 13-A and the American River is 13-B. And, again, looking at the unimpaired flow for the American River at Fair Oaks, this number in the right-hand corner is 2,554,000 acre-feet for the American River. You can see that the watersheds are essentially comparable in the amount of unimpaired flows.

MR. GEE: And is the capacity for Folsom Reservoir, is it approximately the same as New Bullards Bar Reservoir?

MR. GUINEE: Yes, it is. In fact, I brought an overhead to show that comparison as well. This comes from CDEC data that's available on the Internet.

MR. GEE: Mr. Guinee, before you continue, this is Department of Interior's Exhibit Number 14.

MR. GUINEE: Thank you. And you can see here the

Bullards Bar Reservoir capacity is about 966,000 acre-feet. And the Folsom capacity, which is Folsom on

the American River is 977,000 acre-feet. So we have comparable size reservoirs, watersheds of comparable unimpaired flow sizes.

MR. GEE: And does the American River provide habitat for salmon and steelhead?

MR. GUINEE: Yes, it does, as does the Yuba River.

MR. GEE: So making these comparisons between the American River and the Lower Yuba River, what conclusions do you draw?

MR. GUINEE: Well, making these comparisons the conclusion I draw is that the instream flow recommendations to keep the fish in good condition in the Lower American River provides about four times to five times the amount of water that Yuba County Water Agency is recommending for the Yuba River. My conclusion is that their flow recommendation is inadequate.

I said that in my direct testimony based on what the fish in the Yuba River need, but the purpose of this comparison, Mr. Brown, is just to show you that on a river of a similar size, with similar size reservoirs, similar habitat such as the American, and then when you put that in the perspective of what is being recommended for the Yuba, it also, I think, can lead you to the conclusion

that the Board's Draft Decision flows as well as the AFRP flows that are being recommended -- and when I say the "AFRP flows," those are the same flows as what Fish and Game recommended in its '91 report, those flows are not unreasonable.

MR. GEE: Mr. Guinee, can you describe what the AFRP flow recommendations are for the American River, how they differ from the Yuba County Water Agency's proposed flows?

MR. LILLY: Excuse me, Mr. Brown. At this point I'm going to object on the grounds of relevance. The AFRP flows on the American River were set according to the -- in response to a very different legal standard than the standard that the Board is going to apply in this proceeding on the Yuba River.

And, also, we have no evidence that the habitat flow relationships between the two rivers are the same, or in -- even sufficiently comparable to make this question relevant to the present proceeding.

H.O. BROWN: Mr. Gee?

MR. GEE: Mr. Brown, I'm merely -- as Mr. Guinee has testified, he has drawn a comparison between the American River and the Yuba River in rebuttal to the flow requirements proposed by Yuba County Water Agency. And that is the limit of his testimony.

As far as the comments -- the other comments that

Mr. Lilly is making, he can raise that in cross-examination of these witnesses.

H.O. BROWN: I agree with Mr. Gee. The place to address this is when you cross-examine. And there are different legal standards that I'm sure you will bring out, Mr. Lilly.

Proceed, Mr. Gee.

MR. GEE: Thank you.

Mr. Guinee, do you have those comparisons that I just referred to?

MR. GUINEE: Yes, I do. I put up on the overhead projector the American River flow table, which is from the document which we submitted during our direct testimony. I don't remember the exhibit number, but it was the Anadromous Fish Restoration Program, Revised Draft, dated May 30th, 1997.

And what you can see here is that in wet years you have fall-spawning flows during -- and rearing from October through February of 2500 cfs. You have spring flows at 4500 cfs. And this compares to what I showed you earlier, Yuba County Water Agency's budget of about 500 cfs in the fall spawning period. And then I think they had 15 -- up to 1500 cfs in the April, May, June period.

MR. GEE: Mr. Guinee, in your opinion, which flow recommendations are better for Fish and Game under

those -- the AFRP flow conditions in the American River, or those suggested by Yuba County Water Agency?

MR. GUINEE: I guess to clarify, the reason I did this simple comparison was not to suggest that the Yuba County -- or the Yuba River flow should be based on American River flows.

It's merely to point out to the Board that in terms of a reasonable amount of water dedicated to fishery purposes in the Yuba, the Yuba County Water Agency's flow recommendation is about 18 percent of the average annual unimpaired runoff.

What you see in the American River are flow amounts ranging from 47 percent to 90 percent of the average annual unimpaired and on whether you're looking at a below normal or wet year flow type recommendation. Again, not to suggest that you implement American River flows in the Yuba, but to point out that the quantity dedicated in Yuba is much lower than the Yuba.

MR. GEE: Mr. Guinee, have you read Yuba County Water Agency's Exhibit 15 and Exhibit 15-A?

MR. GUINEE: Yes, I have.

MR. GEE: And what do those exhibits refer to?

MR. GUINEE: Are you referring to the valuation -- yes, the valuation of historical deliveries in the Yuba County Water Agency from 1987 to 1999. And I actually

made a slide of that, too. Is now the time you want to put that up?

MR. GEE: Not at this moment.

MR. GUINEE: Okay.

MR. GEE: My question is: Has Fish and Wildlife Service done any analysis as to the water supply impacts of improved flow requirements for fish are impacted?

MR. GUINEE: Yes, we have.

MR. GEE: Can you describe what these affects are?

MR. GUINEE: Okay. Let me walk through this with a couple of overheads to try to make it simpler. The first thing we did was we took a look at what are the base flows in the Yuba River. And this goes back to the 1965 Agreement. And this is also in the record. It's also in Fish and Game's 1991 Yuba River Management Report, which was put in the record in 1992.

And you can see, for example, spawning flows around 400 cfs. And then winter and spring flows are 245 cfs. The summer flow is at 7 csf. So this is what I will refer to as the base case when I show you the comparison in a minute.

Then I took the State Water Resources Control Board's Draft Decision flows, April 28, 1996, document Page 162 and compared the base flows to the flows

identified here in the Board's Draft Decision.

About 700 cfs at Smartville during the fall spawning period through the winter, and then spring flows of 1,000 csf for ten days in April; 2,000 for the month of May; and 800 for June; and then 250 during the summer.

And so that will be the first comparison. And then the second comparison was taking the flows from the Anadromous Fish Restoration Program -- and if you remember this working paper Volume III we entered into the record during our direct testimony -- I didn't have a good table from that working paper.

So I, actually, took the table from the Department of Fish and Game's 1991 Management Plan. So, again, to make the point the AFRP in that plan are recommending the same flow levels of 700 cubic feet per second during the fall through the end of March; a 1,000 csf during April; 2,000 in May; and 1500 in June; with 450 cfs flows during the summer.

I didn't really have time to do the next evaluation, which would have added in some of the recommendations that Fish and Game and NMFS made during their direct testimony to improve flows, temperatures particularly, based on, you know, providing temperature protection, but I think they will provide some more

information on that, I'm hoping.

And, then, before I show you the comparison, this

is that table that Mr. Gee asked me about from South Yuba County Water Agency's Exhibit 15-A, Page 11. And so what I did was I took this column of historical diversions and I did not include the groundwater pumping.

So rather than use this average over here, which included the groundwater pumping, I took this column and averaged it and called this the historical demand that we were looking at, what effects implementing these flows regimes would have on that historical demand of 251,000 acre-feet.

Did I go through that too fast?

MR. GEE: That's fine. If you can show the comparison.

MR. GUINEE: So to give you -- and, Mr. Gee, refresh my memory, which exhibit this is?

MR. GEE: This is 15-A.

MR. GUINEE: Okay. And I went through those other ones pretty quick. They were exhibits, what, 13-A through 14-B, the ones I just showed, Mr. Gee?

MR. GEE: 13-A, 13-B, and 14.

THE COURT REPORTER: What were they?

MR. GEE: S-DOI-13-A, S-DOI-13-B, and S-DOI-14.

MR. GUINEE: Okay. So now I've moved on to Exhibit 15-A -- you said -- and what this shows again is Yuba County Water Agency's historical diversions of 251,000

acre-feet over a 70-year period of record, 1922 to 1992, comparing the base case, i.e., the '65 level of fish flows to the State Board's Draft flows.

And what you see is that in the base case you have 100-percent deliveries to Yuba County Water Agency. In other words, every year they could get 250,000 -- 251,000 acre-feet.

Whereas, when you ran the model and did the analysis for the State Board's Draft flows, it found that in one year, 1977, Yuba County was not able to get 100 percent of its deliveries. So in 69 out of the 70 years they were still able to get 100-percent deliveries. And I put it -- I had it also displayed this way. Let's see, where did I put that overhead? There we go. So this shows --

MR. GEE: This is S-DOI-15-B.

MR. GUINEE: 15-B.

MR. LILLY: Excuse me, Mr. Brown. I have an objection.

H.O. BROWN: Okay. Mr. Lilly.

MR. LILLY: I object on the grounds of lack of foundation. We have no information whatsoever as to who ran what model runs. We're having output here with absolutely no foundation to indicate where this came from.

H.O. BROWN: Mr. Gee, Mr. Lilly has an excellent

point and a concern that you may be going beyond rebuttal here.

Do you have a response?

MR. GEE: Yes, I do. As I stated earlier, these questions go to Yuba County Water Agency's Exhibit Number 15, 15-A and also to Yuba County Water Agency's Exhibit 27. And I believe Mr. Guinee provided the basis for these graphs, the information which they were based upon.

Correct me if I'm wrong, Mr. Guinee.

H.O. BROWN: Mr. Lilly?

MR. LILLY: I haven't heard it. He said what the different scenarios were, but there's been no testimony whatsoever regarding the critical issue of what quantitative analysis was done to get from the different assumptions to these results. Normally that requires a detailed hydrological analysis and we've heard nothing about that.

H.O. BROWN: Mr. Gee?

MR. GEE: Mr. Guinee, could you provide an explanation?

MR. GUINEE: Yes. Mr. Brown, the Fish and Wildlife Service does have a staff hydrologist, Mr. Derek Hilts. And we also have a contract with a consulting firm, CH2MHill, who has a hydrologist on staff. So between the two of them they actually did the hydrological modeling

that I am presenting to you.

I think it's important to note that in a way we're trying to be responsive to the question that you asked, Mr. Brown, at the end of the direct session where you asked about: Who will look at impacts to Yuba County Water Agency if you implement these fish flows?

And so the consultant for CH2MHill, Ben Everett, had developed a model for the Fish and Wildlife Service for our Water Acquisition Program. And this model included the Yuba River in addition to other rivers that we were interested in applying water for fishery purposes.

And so using that model, which had already been developed, he was able to run some hydrological analysis for us, which Mr. Derek Hilts, our staff hydrologist, reviewed and confirmed were accurate. And he would likely be here today, except that he had other priority commitments.

His boss has him working on the 800,000 acre-feet and the linkage to the CalFed environmental water account and things like that, which they considered a higher priority than this, unfortunately.

And so he provided me with the summary documents to present to the Board for basically a simple comparison to show the Board that implementing the Board's Draft Decision flows, the effect on Yuba County's historical

diversion is only once in 70 years.

And as you'll see in the next overhead, if you were to implement the Fish and Game AFRP flows, it only effects their ability to get the 251,000 acre-feet in 7 out of 70 years.

H.O. BROWN: Okay. Mr. Gee, I'm going to overrule the objection. Proceed.

MR. LILLY: Excuse me, Mr. Brown. May I be heard further on this before you proceed?

H.O. BROWN: All right. Mr. Lilly, go ahead.

MR. LILLY: I understand that the Board has very liberal rules of evidence, but this is stretching beyond reasonableness. For him to testify as to the results of what, apparently, was a detailed-hydrological modeling, without presenting any of the details of the modeling, and

most importantly without presenting the witnesses to give us a chance to question whether they did the modeling correctly is improper.

And this gets beyond the point of even evidence that the Board should consider under its liberal rules of evidence. This evidence simply is not reliable in the way it is being presented and in the manner that it is being presented today.

H.O. BROWN: Thank you, Mr. Lilly.

Mr. Minasian?

MR. MINASIAN: May I join in the objections without consuming the Board Member's time? My understanding is that we are ordered in direct to produce evidence generated from 1992 beyond. Looking -- getting the explanation from Mr. Guinee and looking at the Yuba County Water Agency's demand records, they have not used the actual demand from 1992 through the time of this hearing.

It seems to me that we ought to have an opportunity to examine the hydrologists who have done this work in regard to the reasonableness of their inputs. So I would ask the Board to order an appearance of the CH2MHill staff hydrologist.

H.O. BROWN: Mr. Morris?

MR. MORRIS: I want to join in the objection of both

Mr. Lilly and Mr. Minasian. As an engineer and hydrologist myself, I'm having a bit of trouble jumping to the conclusions that Mr. Guinee seems to be able to do, and not allowing, particularly, Mr. Lilly the opportunity to directly examine to see if it's even done correctly, I think is improper. And it should have been done direct evidence.

H.O. BROWN: Thank you, Mr. Morris.

Mr. Cunningham?

MR. CUNNINGHAM: Mr. Brown, thank you. On behalf of Fish and Wildlife Service, I do think that this testimony

is relevant. I think this does respond to direct statements made by Yuba County Water Agency in its presentation about the impacts of proposed flows on its own abilities to operate and deliver water.

I do think that to the extent that they are now being challenged that there's a lack of foundation, I would point out to you that Yuba County Water Agency's own model has never been provided to all the other parties in this proceeding. And we never did get a chance to examine the actual model and what the base data of each of those models provided. What we got were summations. We've never seen the actual models.

So I think that this is a red-herring objection. And I think all these issues go to the weight this testimony should be given, not necessarily whether or not it should be given at all. They always have the right to cross-examine and to establish to you that at least you should give this, perhaps, less weight or more weight based on the foundation or lack of ability to establish foundation.

This clearly is relevant. This clearly does rebut statements made by the water agency. And I think this is, at least, fair testimony based upon what we've already seen from the other parties in this proceeding.

MR. LILLY: Excuse me, Mr. Brown --

H.O. BROWN: Thank you Mr. Cunningham.

MR. LILLY: -- but I have to respond to that. It's flat out incorrect to say that we did not provide the model for the other parties. We had a detailed workshop. Mr. Frink and other members of the staff were present. All parties to this proceeding received notice of that and had an opportunity to participate.

And as Mr. Frink has previously stated, the model is in the record. And, of course, Dr. Auroa had the model to testify to. So to say that it -- and, furthermore, our modelers Mr. Grinnell and Dr. Yung-Hsin Sun were available

and were subject to extensive examination. So Mr. Cunningham is just incorrect on that.

As far as the issue as to whether or not this is rebuttal or not, I note that these comparisons aren't regarding the Yuba County Water Agency's proposal. These are comparing a so-called base case to a case involving the AFRP.

And both of those flows were presented as part of Fish and Wildlife's direct case. So if they want to present evidence of the hydrological impacts of the AFRP flows, that was something that they should have been done as part of their direct case. I don't see it's rebutting anything, because it's not rebutting Yuba's proposal.

H.O. BROWN: Thank you, Mr. Lilly.

Mr. Frink.

MR. FRINK: Yes, Mr. Brown, there were a number of issues brought up beginning with the status of the model. The model was introduced into the record as an exhibit by reference. All of the parties were informed of that before the hearing and no one has requested a copy of model themselves. So I think it is properly in the record.

In terms of the testimony being within the proper

scope of rebuttal, I think it is within the scope of rebuttal. It addresses the impacts at least as the Department of the Interior sees them on the water supply available for Yuba County Water Agency.

Now, the main objection seemed to concern the testimony of the witness regarding a hydrologic analysis that he did not, he, himself conduct or perform. And I think clearly any statements he makes regarding the conclusions of that analysis are hearsay.

But hearsay is admissible under the Board's regulations in this instance for the reasons that have been brought out. Though, in the absence of testimony from the experts who actually did the modeling, I think the hearsay would receive limited weight.

H.O. BROWN: Thank you, Mr. Frink. Here's the decision on this. This is a close call, Mr. Gee. You're

skirting on the edge of rebuttal apparently.

There's been good discussion on the objections here. And on that basis I'm going to allow it and the objections as stated will help the Board to give it the proper weight of evidence.

MR. GEE: Thank you, Mr. Brown.

Mr. Guinee, if you can continue.

MR. GUINEE: Would it be helpful, Mr. Brown, if I

went back through the first part of the overheads to show you what my role in this analysis was so it clarifies for your understanding what I gave to the modelers? Because I actually gave them certain assumptions that I wanted them to model for us so that the Fish and Wildlife Service could provide this information to the Board.

H.O. BROWN: Mr. Guinee, I think we'll let the other parties make that request if they would like to see that. Thank you though for the offer.

MR. GEE: Mr. Guinee, if you'll proceed.

MR. GUINEE: Okay. So I'll just summarize that point. What I did was I gave the modelers the flows for the base case. I gave them the Draft Decision flows and I gave them the AFRP Fish and Game flows and asked them to do the simple comparison --

H.O. BROWN: The concern is that we don't add to the direct.

MR. GUINEE: Okay.

H.O. BROWN: That we keep it in the rebuttal.

MR. GUINEE: Okay. The rebuttal part then, going to 15-A, was Fish and Wildlife Service heard a lot of testimony from Yuba County Water Agency about their level of demand and their future level of demand. And so what

we did is we took a look at their historical demand and felt like that was the more proper number to use in the analysis.

And then we heard a lot of testimony about what they believe the impacts of implementing the Board's Draft Decision flow, or Fish and Wildlife Service, Fish and Game recommended flows on their water supply would be. And so in order to rebut that, we asked the hydrologists to do this evaluation.

And so, again, what we found was that in -- 1977 was the only year that implementing the Board's Draft Decision flows would impact their historical diversions of 251,000 acre-feet. And you can see by this bar that in that year the impact was close to 150,000 acre-feet.

And we all recognize that '77 was a dry year. And so you know there would have to be some conservation in that kind of year. The other thing we asked them to do then was to take a look at how do -- how does the implementation of the Board's Draft Decision flows affect

the stimulated storage as compared to the historical storage. And the color doesn't show up as well as I would like it to.

Mr. Gee, what exhibit number was this one again?

MR. GEE: This would be 15-C.

MR. GUINEE: So Exhibit 15-C shows you in the dark blue line, the historical end-of-month storages at New Bullards Bar. And you can see they range from about 600,000 acre-feet down to about 200,000 acre-feet.

And, then, in the red line, the simulated end of month storage, the model implementing the Board's Draft Decision flows showing, again, ranging from about 600,000 to just a little below 200,000 in 1978. And this stimulation was from 1971 to 1993, basically reflecting the time period after New Bullards Bar was built.

Okay. And then moving on to Exhibit Number --

MR. GEE: 16-A.

MR. GUINEE: 16-A, I asked them to compare the base case, which was the '65 Agreement flows, to the AFRP Fish and Game 1991 flow recommendations using historical deliveries of 251,000 acre-feet.

And what we see here is one, two, three, four, five, six, seven years that 100 percent of the water supply could not be delivered to Yuba County. And I also have a graph with just the bars to make it a little bit

easier for the Board to see.

So we have, again, '77, they're not able to deliver 100 percent to Yuba County Water Agency. And then

you have '24, '31, and 1988 where the reductions to Yuba County would be in that approximately 150,000 acre-foot range. And then you have three other years 1934, '76, and '92 where the reduction to Yuba County would be 50,000 acre-feet or less.

So, again, the main point here is that in 7 out of 70 years during the period of record you could not deliver 100 percent to Yuba County if you implemented the Fish and Game AFRP flows. But in '62 -- or '63 out of the 70 years you could still deliver 100 percent and deliver the AFRP Fish and Game flows.

MR. GEE: Thank you, Mr. Guinee. In Yuba County Water Agency's historical diversion numbers in Yuba County Water Agency's Exhibit 15-A and Yuba County Water Agency's Exhibit 27, do these diversion numbers include water dedicated to waterfowl habitat?

MR. GUINEE: That's my understanding from Yuba County Water Agency's testimony.

MR. GEE: So can you draw any conclusions based on water supply impacts as to the impacts on the waterfowl?

MR. GUINEE: First, I'd like to say when I went back and reviewed Dr. Frederick Reid's testimony, I want to

agree with his comment that he states that water is critical in river corridors for anadromous fish and he's

well-aware of that.

And I think -- we realize the Board has, you know, an opportunity and responsibility to kind of balance those needs. And just from our perspective I wanted to let the Board know that if the water supply to Yuba County is affected in 7 out of 70 years, it may be that those impacts to waterfowl then -- well, actually, you can draw the conclusion the impacts to waterfowl occur in less than 10 percent of years and those impacts are small.

I think the other point that I would like to make is implementing the Anadromous Fish Restoration Program flow regimes, or the Fish and Game '91 recommendations while it would have some impact to Yuba County's water supplies in 7 out of 70 years, it would greatly improve habitat conditions for fish in the Yuba River and would contribute to implementation of the Bay-Delta Water Quality Control Plan, particularly, helping to meet the narrative salmon doubling goal.

MR. GEE: Thank you, Mr. Guinee.

The witnesses are now available for cross-examine.

H.O. BROWN: Okay. We'll take our morning break at this time.

(Recess taken at 10:25 a.m. to 10:38 a.m.)

H.O. BROWN: Come back to order. With regards to the last decision on the objections that Mr. Lilly and others raised, we have a further clarification of that.

Mr. Frink, I'd like you to read that into record.

MR. FRINK: Yes, Mr. Brown. You noted the conclusions regarding the modeling would be given limited weight, something along those lines. I did want to read the information out of the hearing notice regarding models.

On Page 7 of the hearing notice it stated, (Reading):

> "Proposed exhibits are subject to the following requirements: A, Information based on technical studies, or models shall be accompanied by sufficient information to clearly identify and explain the logic, assumptions, development, and operation of the studies or models."

And in this instance, I think it certainly is arguable if there was sufficient information regarding the logic, assumptions, development, and operation of these studies or the models to make the conclusions of that modeling of much use under the standards stated in the hearing notice.

H.O. BROWN: Thank you, Mr. Frink.

Mr. Minasian, you were out of the room when I preempted that we're going to give the proper weight of evidence to that testimony that was given.

MR. MINASIAN: Thank you.

MR. LILLY: Excuse me, Mr. Brown. I don't think I heard Mr. Frink clearly. Was he saying that there is sufficient evidence in the record to give this, or is not? It wasn't clear from his statement. I would request he clarify.

H.O. BROWN: Mr. Frink.

MR. FRINK: Well, I'm not going to speculate on the conclusion that the Board would draw, but I think there is certainly a strong argument that there was not sufficient information on the logic, assumptions, development, and operation of the studies.

H.O. BROWN: All right. Cross-examination.

Mr. Cunningham.

MR. CUNNINGHAM: Thank you, sir.

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CROSS-EXAMINATION OF THE U.S. DEPARTMENT OF INTERIOR FISH AND WILDLIFE SERVICE

BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME

BY MR. CUNNINGHAM

MR. CUNNINGHAM: Good morning, gentlemen. Bill

Cunningham, Deputy Attorney General for the Department of Fish and Game. And I only have, I think, actually one question. Although we received a lot of information, I'm not sure where to start, so I'll just ask the one question. I think this goes to Mr. Fleming.

Mr. Fleming, in testifying you indicated that in looking at the impacts of elevating temperature as presented by the Yuba County Water Agency, theoretically, to encourage outmigration, you indicated that there were lots of possible effects, negative effects from such a scenario.

But one of the negative effects and I'm not sure you explained is whether or not there is such a thing as parr reversal. And is that a negative effect that could occur through increase in temperatures to encourage outmigration?

MR. FLEMING: I don't know.

MR. CUNNINGHAM: You don't know anything about the concept of parr reversal?

MR. FLEMING: Not specifically, no.

MR. CUNNINGHAM: Okay. That's the only question that I have, unless Mr. Guinee has anything to add on that subject.

MR. GUINEE: I did not look into that.

MR. CUNNINGHAM: Thank you, gentlemen. I appreciate

your time.

H.O. BROWN: Thank you, Mr. Cunningham.

Mr. Sanders?

MR. SANDERS: I don't have any questions. Thank you.

H.O. BROWN: Mr. Lilly?

MR. LILLY: Thank you, Mr. Brown.

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CROSS-EXAMINATION OF THE U.S. DEPARTMENT OF INTERIOR
FISH AND WILDLIFE SERVICE
BY YUBA COUNTY WATER AGENCY
BY MR. LILLY

MR. LILLY: Mr. Fleming, Mr. Guinee, Mr. Gee, obviously, we've met before, good morning.

MR. FLEMING: Good morning.

MR. GUINEE: Good morning.

MR. LILLY: I'm going to try to go through -- excuse me, I need one more exhibit. I'm going to try to go through my questions in the same order that Mr. Gee went through them, hopefully, that will eliminate some confusion. So I'll start with you, Mr. Fleming.

I believe one of your -- or one of your first criticisms of the Yuba County Water Agency's water budget that it used to develop its instream flow recommendations

was it was based on a full-development level of demand

rather than a present level of demand. Is that correct?

MR. FLEMING: Yes.

MR. LILLY: And is your basic argument that present level demand should be used, because that's what the Yuba County Water Agency currently is subject to, or full-development demand flow will occur sometime in the future?

MR. FLEMING: That is my understanding, yeah.

MR. LILLY: Okay. What is your understanding of how long any new instream flow requirements that are adopted by the State Water Resources Control Board will remain in effect?

MR. FLEMING: For a long time. My understanding is that it will remain in effect for a long time.

MR. LILLY: Now, another statement that you make was that -- a criticism of the Yuba County Water Agency's proposal is that basically -- and please correct me if I paraphrase it wrong -- but I believe your statement was the instream flows would be reduced at a greater percentage amount than the deliveries to the agricultural water users. Is that correct?

MR. FLEMING: That is my understanding from reading the document, yeah.

MR. LILLY: Okay. And is it your testimony that that should not be the case and that there should be

either equal percentage reductions, or in fact greater percentage reductions to the irrigation deliveries?

MR. FLEMING: There should be equal, in my mind, yeah.

MR. LILLY: Okay. And is there any legal basis for that statement of yours, that they should be equal reductions?

MR. FLEMING: I don't know.

MR. LILLY: Now, I think you criticized the prior Department of Fish and Game's estimates of steelhead populations in the Lower Yuba River; is that correct?

MR. FLEMING: No.

MR. LILLY: Okay. Well, please, tell me what is your -- just summarize, if you can, what your position is regarding the prior Department of Fish and Game's estimate of approximately 2,000 adult steelhead, which I believe was from the 1980s through the present.

MR. FLEMING: From my rebuttal, I don't believe I addressed steelhead. I addressed spring-run.

MR. LILLY: Okay. Well, then I'll focus on just spring-run. I'm sorry if I misheard you. What was your

statement regarding the prior estimates of spring-run then?

MR. FLEMING: That the number that is used in the report is a number that was used in 19 -- in the 1992

hearing and that number was not validated by any data according to the transcript.

MR. LILLY: Okay. Now, when you read that transcript, which witness was testifying? I don't think you clarified that.

MR. FLEMING: It was U.S. Fish and Wildlife Service. I can't remember if it was -- well, let me see if his name is in there, but it was a Fish and Wildlife Service biologist.

MR. LILLY: Okay. Why don't you just check and see if you have his name; otherwise, we'll have to dig through the transcript.

MR. FLEMING: Mr. Richardson.

MR. LILLY: Okay. And so is it your statement that this Board should or should not consider Mr. Richardson's professional judgment on this issue of the estimate of the spring-run populations in the Yuba River?

MR. FLEMING: I'm not interested in saying the Board should do one thing or another. I'm just pointing out that there was no data to back up that number. Because in

reading the report, it did not give that information.

MR. LILLY: Okay. Well, do you believe Mr. Richardson's opinion, then, is worthy of consideration by professionals in the fisheries biology field or not?

MR. FLEMING: Yes, I do.

MR. LILLY: Okay. And do you have any other estimate of spring-run salmon population in the Yuba River other than that that has been described by Mr. Richardson?

MR. FLEMING: No, I don't.

MR. LILLY: And is that answer both for present and for the populations over the past 20 years?

MR. FLEMING: Yes.

MR. LILLY: Now, I think you had -- another point that you talked about was basically you're saying that the proposition that lower flows and warmer water will stimulate outmigration of juveniles, of juvenile salmon; where higher flows and colder temperatures may cause delays in that.

I think your testimony was, basically, you have to look at the overall success of a given measure like that on the entire life cycle of the salmon rather than just on the timing of outmigration from the river into the ocean; is that correct?

MR. FLEMING: That is generally correct, yes.

MR. LILLY: Okay. And do you have any data regarding the overall success of different measures in the Yuba River on the life cycle of chinook salmon in the Yuba River?

MR. FLEMING: No, I don't.

MR. LILLY: Now, you had an overhead -- let me see

if I've got the right one here. I'll ask you to put it up there. Maybe you've got the number. It's the one that had the annual escapements and you were pointing to 1995 and '96.

MR. FLEMING: Right, I have it.

MR. LILLY: Oh, that's not an exhibit of yours, because that's Page 310 from Exhibit S-YCWA Exhibit Number 19?

MR. FLEMING: Yes.

MR. LILLY: Okay. And I just want to make sure I understand that. I think your point was that if I look at the conditions that the juvenile chinook salmon experienced in the spring of 1992, then you have an arrow going down to the adult escapement in 1995. Is that correct?

MR. FLEMING: That is correct. But I, hopefully, clarified that this is not an analysis. This was just

numbers and a graph to make the point that you need to consider the whole picture and not just what stimulates migration.

MR. LILLY: Okay. Well, my question is: If we're looking at juveniles in the spring of 1992, are those the fish that have grown from the eggs that were spawned during the fall of 1991?

MR. FLEMING: Yes.

MR. LILLY: Okay. And if there's a three-year cycle, wouldn't those fish come back as adults during the fall of 1994?

MR. FLEMING: If you do the math, yeah. But there's -- there's variation in the three-year cycle that you use. And actually there's a stronger correlation between returns in two-and-a-half years than there are between returns in the three years.

MR. LILLY: Okay. Well, if we measure from the spring of 1992 for two-and-a-half years we get to the fall of 1994, don't we?

MR. FLEMING: Well -- and, again, I just used these numbers to illustrate a point. There was no analysis and I wasn't trying to make the correlation between -- or the -- I just used those numbers and three years.

MR. LILLY: Okay. Well, shouldn't you actually have used those numbers in two years on your analysis?

MR. FLEMING: Two and a half would have been more accurate.

MR. LILLY: Okay. But that would have meant we would have correlated the 1992 spring conditions with the adult conditions in 1994; isn't that correct?

MR. FLEMING: Let's see, yeah, I think that might be the case.

MR. LILLY: And, similarly, the 1993 fall conditions

would be correlated with the adult-return populations in 1995; is that correct?

MR. FLEMING: Yes. The point is still just that we need to look at not what stimulates fish to emigrate, but what stimulates fish to emigrate and what creates good conditions all the way through to adults returning into the system. And that is the focus of that whole graph, et cetera.

MR. LILLY: Okay. And then, obviously, through the life cycle that those salmon experience many other factors can effect their individual survivals and the overall population; is that correct?

MR. FLEMING: Yes.

MR. LILLY: For example, conditions in the Delta as

they're going out?

MR. FLEMING: Yes.

MR. LILLY: And then, of course, conditions in the ocean regarding both ocean fishing and food supply?

MR. FLEMING: Yes.

MR. LILLY: And water temperatures in the ocean?

MR. FLEMING: Yes.

MR. LILLY: And then, of course, also when they're coming back up the river, just to kind of quickly go through a three-year cycle, they will be subjected to varying conditions in the rivers as the adults come up

from the ocean to the Yuba River; is that correct?

MR. FLEMING: Yes.

MR. LILLY: Okay. Is it, in fact, possible to do any kind of correlation analysis between the conditions that juveniles experience during the spring in the Yuba River and the adult-return numbers two-and-a-half years later?

MR. FLEMING: On the Yuba?

MR. LILLY: Yes.

MR. FLEMING: Is it possible?

MR. LILLY: Well, let me state it this way: Have you ever analyzed the correlations?

MR. FLEMING: Have I, no.

MR. LILLY: Do you know if anyone else ever has done a published correlation analysis of those factors?

MR. FLEMING: Not that I've seen.

MR. LILLY: Okay. Now going on, I think you submitted Exhibit S-DOI-10, which was in summary terms a criticism of the use of the instream flow incremental methodology by Castleberry, et al. Is that correct?

MR. FLEMING: Yes.

MR. LILLY: All right. Is there any other quantitative method to relate juvenile rearing habitat in the Lower Yuba River to the flows that occur in the Lower Yuba River?

MR. FLEMING: There are some being developed. There's a modification of what we're calling the IFIM right now into a two-dimensional model, yeah.

MR. LILLY: Okay. But is there any information that this Board could use in its decision-making process in this hearing other than the IFIM analysis to consider the relationship between juvenile rearing habitat and flows in the Yuba River?

MR. FLEMING: I'm not asking -- in my submission of that document, I did not expect the IFIM to be thrown out, but to be considered with the constraints that are

explained in Castleberry, et al.

MR. GUINEE: I would add to that, Mr. Lilly, that it's the same caution that we gave to the Board back in 1992. I don't know if you recall, but Randy Brown was with Fish and Wildlife Service then, not DWR Randy Brown, but the other Randy Brown.

And our key office now pointed out that the IFIM is not a very good model for developing quantities of water needed for rearing. It is -- it does not consider all the factors, as Mr. Fleming pointed out, that the Board needs to consider.

MR. LILLY: Okay. But, Mr. Fleming, I just wanted to clarify -- I understand that you have your concerns and obviously Mr. Guinee shares your concerns about the IFIM

method, but there's no other quantitative method for the Board to use to evaluate the relationship between habitat and flows at this time; is that correct?

MR. FLEMING: That is correct.

MR. LILLY: Now, going back to the question of the timing of the migration of the juvenile salmon from the Lower Yuba River, down to the Feather River and the Sacramento River to the Delta to the ocean that starts in the spring, in developing your testimony on this issue did

you consider the water temperatures that are present in the Lower Sacramento during these spring months that the outmigrating salmon could be experiencing?

MR. FLEMING: Yes.

MR. LILLY: Okay. And do you have an opinion as to whether average daily temperatures of 65 degrees would adversely affect outmigrating juvenile chinook salmon?

MR. FLEMING: Yes.

MR. LILLY: What is your opinion?

MR. FLEMING: My opinion is that higher temperatures do impact chinook, but it depends on length of time that they experience them and a lot of variables.

MR. LILLY: Okay. And at 65 degrees do you believe there would be adverse impacts, or do temperatures have to be higher than that before you start seeing these adverse impacts?

MR. FLEMING: That's a good question. I'd have to say that I've been sampling in the Sacramento River when it's been over 65 degrees and we have been capturing juvenile salmonids that are outmigrating and they do fine. And we, you know, have seen them. So adverse impacts, I can't say that there are adverse impacts.

MR. LILLY: Okay. And have you done sampling when the Lower Sacramento River temperatures on a daily average

have been as high as 70 degrees?

MR. FLEMING: Excuse me, I didn't hear it.

MR. LILLY: Yeah, I'll ask it again. Have you done sampling for juvenile chinook salmon outmigrating when the average daily water temperatures in the Sacramento River have been as high as 70 degrees?

MR. FLEMING: Yes, I have.

MR. LILLY: And have you also observed outmigrating salmon under those conditions?

MR. FLEMING: Yes, I have.

MR. LILLY: And what condition did you observe those fishes to be in?

MR. FLEMING: I have captured them in good condition and in poor condition. And just to kind of summarize, I've never done any analysis on the impacts of temperature on the fishes, so I really don't know. But in sampling them, I have seen them in good condition and poor

condition.

MR. LILLY: Okay. So do you have an opinion as to whether or not if they experience 70 degrees that will have an adverse affect on their long-term survival?

MR. FLEMING: In my opinion, 70 would not be a good thing --

MR. LILLY: Okay.

MR. FLEMING: -- to be subjecting fish to.

MR. LILLY: Okay. So somewhere between 65 and 70 the adversity starts setting in for these juvenile salmons?

MR. FLEMING: Yes.

MR. LILLY: I had some questions about Exhibit S-DOI-17. I wonder if you can put that up on the overhead, please.

MR. FLEMING: Is that the Sacramento River one?

MR. LILLY: Yes. As I understand it, this figure shows a -- or plots a relationship between Sacramento River flows at Freeport and the survival -- a survival index for fall-run juveniles. Is that correct?

MR. FLEMING: Yes.

MR. LILLY: Okay. First of all, what time of year are these flows that are being addressed here?

MR. FLEMING: This is probably -- right off the top of my head, I can't remember, but it's probably February

or March.

MR. LILLY: Okay. So this is winter rather than spring time period?

MR. FLEMING: Well --

MR. LILLY: I guess spring starts on March 21st, but

it's basically February, March rather than April, May?

MR. FLEMING: Yeah. And to be honest with you I can't remember what the date would be up --

MR. LILLY: Okay. And what exactly is the survival index that's shown here?

MR. FLEMING: It is the survival of fish through the Lower Sacramento meaning below Shasta Dam down, out to Chipps Island which is the Antioch, Pittsburg area where the San Joaquin and the Sacramento come together.

MR. LILLY: So, basically, the fish are released in the Upper Sacramento River and then there's an attempt to capture them down at Chipps Island?

MR. FLEMING: Yes.

MR. LILLY: Okay. Has any similar analysis like this been done with chinook salmon juveniles being released in the Yuba River and attempts to recapture them down in the Delta?

MR. FLEMING: Not to my knowledge.

MR. LILLY: Okay. And I think you testified that this illustrates the importance of considering the entire

life cycle of the salmon. But does this survival index that's shown here have any indication of the entire life cycle?

MR. FLEMING: This particular graph does not, no.

MR. LILLY: This is basically a 30-day window of their lives; is that correct?

MR. FLEMING: Yes. And this graph was not necessarily the whole life cycle. This was just the effects of high spring flows. The other one has the Delta outflow is -- here, this one includes the entire life cycle to adults.

MR. LILLY: And just so we're clear, you now have the overhead Figure 8 of Exhibit S-DOI-9?

MR. FLEMING: Yes.

MR. LILLY: Okay. All right. Well, let's go forward to that one while you have it up there.

MR. FLEMING: Okay.

MR. LILLY: I see there's an R square of .47, but there's no line plotted there. Is your general point that as Delta outflow increases, that then the escapement two-and-a-half years later also increases?

MR. FLEMING: Yes.

MR. LILLY: Okay. And as I understand it, the lower axis, the horizontal axis is in cubic meters per second?

MR. FLEMING: Uh-huh.

MR. LILLY: Do you know how to convert cubic meters per second to cubic feet per second?

MR. FLEMING: Right off the top of my head, I mean, it's math.

MR. LILLY: Do you know what the number is?

MR. FLEMING: I'm not going to give you a number.

MR. LILLY: Okay. Well, is it fair to say that you have to multiply these -- if you don't know just say so, I'm not trying to trick you. But is it a fair approximation that you have to multiply these numbers by about 30 to get cubic feet per second?

MR. FLEMING: It could be. I haven't even looked at numbers or anything like that, this is just an example.

MR. LILLY: My quick arithmetic is that there is just a little over 3 feet in a meter and if take 3 cubed you get 27, so I figured 30 would be pretty close.

So -- well, here's my question: If you take out those three data points in the upper right-hand corner, which would be at flows over 2,000 cubic meters per second, do you see any obvious trends in the other data points which would represent the relationship between escapement and Delta outflows less than 2,000 cubic meters per second?

MR. FLEMING: If you take out those three data points, then it would change the picture. But this is a

peer-reviewed article and it is used very often in science to help people understand the relationship between outmigration and flow. And I wouldn't suggest you take those three points out.

MR. LILLY: Okay. Well, is it fair to say that statistically those three points may be driving the relationship?

MR. FLEMING: They certainly have influence.

MR. LILLY: Okay. And do you have any basis for stating whether or not this relationship for the entire Central Valley versus Delta outflow can logically be carried over to a single river system like the Yuba River system?

MR. FLEMING: I'm sorry, I didn't follow that.

MR. LILLY: Yeah. Is there any data that would allow you to form the conclusion that a relationship like this would also exist on the Yuba River?

MR. FLEMING: There's data on other rivers that would bear this out, but not on the Yuba River that I know of.

MR. LILLY: Okay.

MR. GUINEE: I think I would add to that --

MR. LILLY: Excuse me, Mr. Guinee, I'll get to you. We're not on a panel right now, I'm just asking Mr. Fleming questions.

I think you clarified before that there is no similar correlation analysis like this that would correlate Yuba River outflows with Yuba River escapements two-and-a-half years later; is that correct?

MR. FLEMING: Yes.

MR. GUINEE: I would agree with that. I think the point of the graphic though, too, is that the fish in the Yuba are hydrologically connected to the Sacramento River at Freeport and the salmon and steelhead do use that migration corridor.

MR. LILLY: Okay. We'll go on now, Mr. Fleming. I think you testified that you disagreed with the statement in Exhibit S-YCWA 19, that the Yuba River project has contributed to the recovery of steelhead; is that correct?

MR. FLEMING: Yes.

MR. LILLY: Okay. Do you agree that since the Yuba River project was constructed and has been operating that the summer water temperatures in the Lower Yuba River are significantly lower than they were under preproject conditions?

MR. FLEMING: Yes.

MR. LILLY: And do you agree that those lowered temperatures in the Yuba River in the summer have been beneficial to juvenile steelhead rearing in the Yuba River during the summer?

MR. FLEMING: Yes.

MR. LILLY: And I think you also testified that the Yuba County Water Agency's operations of its project may influence the flows downstream in the Feather River and the Sacramento River and the Delta. Is that correct?

MR. FLEMING: The Yuba River flows influence those flows downstream, yes.

MR. LILLY: Okay. Have you done any hydrological analysis of the effects of the operation of the Yuba County Water Agency's project on the spring flows in the Feather River, the Sacramento River, or the Delta?

MR. FLEMING: No, I have not.

MR. LILLY: Okay. Thank you, Mr. Fleming.

I have some questions for you now, Mr. Guinee. First of all, in your direct rebuttal testimony you made some comparisons regarding the American River watershed and the Yuba River watershed; is that correct?

MR. GUINEE: Yes, I did.

MR. LILLY: Okay. Are you aware of the fact that approximately 600,000 acre-feet per year of water is exported on average from the Yuba River watershed?

MR. GUINEE: I'm not aware of the exact number. I'm aware that water does get exported from the watershed.

MR. LILLY: Okay. And are you aware that it's significant amounts of water?

MR. GUINEE: I'm not aware of the quantity of water exported from the Yuba River watershed.

MR. LILLY: Okay. So you do not know what percentage of the total unimpaired flow is exported out of the basin?

MR. GUINEE: No, I don't.

MR. LILLY: All right. Are any significant amounts of water exported out of the American River basin?

MR. GUINEE: Yes, there is water exported out of the American River basin as well.

MR. LILLY: And where is that?

MR. GUINEE: I'm not familiar with all of the diversion points.

MR. LILLY: Do you have any idea of how much is diverted out of the American River watershed upstream of the Folsom Dam?

MR. GUINEE: No, because for this analysis I used the Fair Oaks -- the exported numbers were taken out. And for the Yuba I used the Smartville gauge, which I assumed the exported quantities were taken out.

MR. LILLY: What is your understanding of the term, "unimpaired flow"?

MR. GUINEE: The quantity of water that is in the river undiverted.

MR. LILLY: Okay. So unimpaired flow is the amount

of water that would be there if there were no diversions; is that correct?

MR. GUINEE: That's my understanding.

MR. LILLY: Okay. So, in fact, your Exhibits S-DOI-13-A and 13-B do not account for any out-of-basin exports, do they?

MR. GUINEE: No, in the American nor in the Yuba, that is correct.

MR. LILLY: Okay. Are you aware that a significant amount of water on the order of 100,000 acre-feet per year actually is transferred from the upper Yuba River watershed into the upper American River watershed?

MR. GUINEE: I was aware that water was transferred from one to the other. I wasn't aware of the quantity.

MR. LILLY: All right. Let's go forward to the reservoirs. I think you compared New Bullards Bar Reservoir to Folsom Reservoir and said they have approximately the same capacities. Is that correct?

MR. GUINEE: That's correct.

MR. LILLY: Now, Folsom Dam is located on the main stem of the American River below the point where the south fork, the middle fork, and the north fork of the American River all join; is that correct?

MR. GUINEE: That's correct.

MR. LILLY: So is it fair to say that almost the

entire unimpaired flow of the American River watershed flows into the Folsom Reservoir?

MR. GUINEE: I would agree with that.

MR. LILLY: Now, where is New Bullards Bar Reservoir located?

MR. GUINEE: It's located on the north fork of the Yuba.

MR. LILLY: Okay. And is it fair to say, then, that no water from the south fork of the Yuba River flows into New Bullards Bar Reservoir?

MR. GUINEE: That's my understanding, unless there are some diversions that may go in there.

MR. LILLY: Okay. And as far as the middle fork, it would only be the amount of any water that's diverted by facilities into New Bullards Bar Reservoir; is that correct?

MR. GUINEE: That's my understanding.

MR. LILLY: Have you looked at what the unimpaired flow is into New Bullards Bar Reservoir?

MR. GUINEE: No, for this comparison I did not.

MR. LILLY: All right, let's go back to the American

River. The major facilities on the Lower American River constructed by the Bureau of Reclamation are Folsom Dam and Nimbus Dam; is that correct?

MR. GUINEE: Yes.

MR. LILLY: And Nimbus Dam blocked the migration of anadromous salmonids upstream of that point; is that correct?

MR. GUINEE: Well, you test my knowledge of history. I believe there was a dam prior to Folsom, but I didn't refresh my memory on the history of the dams built on the American River for this comparison.

MR. LILLY: Well, let's not look at history. Under current conditions today what dam blocks the migration of anadromous salmonids upstream on the American River?

MR. GUINEE: Under current conditions today that would be Nimbus Dam.

MR. LILLY: And that dam was constructed and is owned by the United States Bureau of Reclamation?

MR. GUINEE: It's operated by U.S. Bureau of Reclamation. Again, going back to the history, there may have been a relationship to the construction by the Corps of Engineers, but I didn't refresh my memory on the history.

MR. LILLY: Okay. And do you agree with the

testimony from several Department of Fish and Game witnesses that the most significant impact on spring-run chinook salmon and steelhead populations in the California Central Valley was the construction of dams that blocked their migrations to their historical habitats?

MR. GUINEE: I would agree, that has a very significant impact on those species.

MR. LILLY: Now, on the Yuba River under present conditions, what dam blocks the migration of anadromous salmonids upstream?

MR. GUINEE: That would be Englebright Dam.

MR. LILLY: And who constructed Englebright Dam?

MR. GUINEE: I didn't refresh my history, but as I recall it was the Corps of Engineers.

MR. LILLY: Now, in making your comparison did you compare any of the weighted usable area curves from the American River to the similar curves on the Yuba River?

MR. GUINEE: Very cursory, I did.

MR. LILLY: Okay. But you did not discuss that comparison in your testimony today?

MR. GUINEE: I was just trying to make a simple point to the Board that there are so many other things to consider when implementing flow regimes needed to keep

fish in good condition below a series of dams. And so the simple point was that a similar-sized watershed, the flow recommendations on the American were much higher than on the Yuba.

MR. LILLY: Okay -- excuse me, Mr. Guinee. The simple answer to my question is "no"?

MR. GUINEE: We could go back and do that --

MR. LILLY: Excuse me, Mr. Brown. I think at this point I'm entitled to a "yes" or "no" answer. I said:

Did you use introduce the comparison of the weighted usable area curves from the American River and the Yuba River into your testimony this morning? That is clearly something that could be answered "yes" or "no.".

H.O. BROWN: Mr. Guinee, this is Mr. Lilly's time.

MR. GUINEE: Okay.

H.O. BROWN: And he conducts the cross-examination as he so chooses. If you can't answer a question "yes" or "no," you can so state it. Or if you can answer it with a "yes" or "no," but it will require an explanation, you can state that up front, also, and give him the choice of what he wishes to do.

MR. GUINEE: All right. Thank you. For this comparison I did not compare weighted usable area for the American River to the weighted usable area for the Yuba

River.

MR. LILLY: And, finally, regarding the comparison of the American River watershed and the Yuba River watershed, where does the United States Bureau of Reclamation use the water that it releases from Folsom Reservoir and Nimbus Dam?

MR. GUINEE: I think some of that water would be used to support the exports in the Delta.

MR. LILLY: Okay. Is it fair to say that none of it is diverted from the American River itself, but it all flows down into the Sacramento River?

MR. GUINEE: No, I don't think that's accurate.

MR. LILLY: Okay. What portion is diverted in the American River?

MR. GUINEE: I didn't compare the portion that was diverted, but I'm aware of several diversions on the Lower American River that do take water directly from the river.

MR. LILLY: They take a very small fraction of the total; isn't that correct?

MR. GUINEE: I can't quote you the quantity that they take. I don't know.

MR. LILLY: Okay. Well, the only two diversions are those of the Carmichael Water District and the City of

Sacramento, aren't there?

MR. GUINEE: Those are the two major ones. There may be some other smaller ones.

MR. LILLY: Okay. Now, going forward to your description of the hydrological analyses that was performed by other Fish and Wildlife employees and consultants, you first talked about the base flows under the '65 Agreement.

Do you know whether their base case was actually a run of the hydrological model, or whether it was simply

the base flows that would exist under the assumption that the minimum flows authorized by the 1965 Agreement would be present all the time?

MR. GUINEE: What I gave them was the '65 Agreement flows and asked them to compare what the Yuba County Water Agency diversions would be with those '65 Agreement flows to what Yuba County Water Agency diversions would be with the Board's Draft Decision flows being implemented in the Lower Yuba River.

MR. LILLY: So do you know any of the details of how they ran their actual hydrological model beyond what you just described?

MR. GUINEE: I know the details to the extent that we sat down, myself and the modelers, and reviewed the

analysis. And I gave them the inputs to the model that I wanted included. And then after they ran the analysis, we sat down and they reviewed it with me.

MR. LILLY: All right. Well, I'll ask you some questions about the details and see whether you know them or not.

MR. GUINEE: Okay.

MR. LILLY: I think you said that you asked them to run the model with an assumption that the demand for irrigation water use was 251,899 acre-feet. Is that correct?

MR. GUINEE: That is correct. And that came from Yuba County Water Agency's Exhibit 15-A, "Historical Diversions from 1987 to 1999."

MR. LILLY: If the Yuba County Water Agency's demand at present were higher than this number of 251,899, would that affect the hydrological analysis that you described this morning?

MR. GUINEE: It may. I didn't ask them to do that analysis though.

MR. LILLY: Well, isn't it a fair assumption that if there's more water being diverted that that would affect the hydrological analysis?

MR. GUINEE: Yeah, it would affect the hydrological analysis, but I don't think it's fair to assume that Yuba County Water Agency's deliveries would necessarily go down a whole lot more than what they did in this analysis. That would have to be done on a separate analysis.

MR. LILLY: And neither you nor anyone else associated with Fish and Wildlife Service did that analysis?

MR. GUINEE: Actually, we were rebutting the testimony that Yuba County Water Agency provided in their direct testimony that some projected future level of demand is over 300,000 acre-feet.

And along the lines of what Mr. Fleming said in

his testimony, we think it makes more sense to show the Board under existing conditions, current conditions of existing historical diversions and fish flows that we were asking the Board to implement immediately what would be the effect.

MR. LILLY: So your testimony is that 251,899 acre-feet of demand is representative of current conditions?

MR. GUINEE: Yes, it's representative of the 1987 to 1999 period of time, that's correct. And that number isn't exactly the same number --

MR. LILLY: Okay. Yeah --

MR. GUINEE: -- it's actual 250,879 acre-feet.

MR. LILLY: I appreciate the correction. I think there was some fine print, I may have not gotten the exact number. Could you put up on the overhead S-DOI-Exhibit 15-B?

MR. GUINEE: 15-B, you bet.

MR. LILLY: Mr. Guinee, please correct me if I'm wrong, but my understanding is this exhibit shows the shortages that the Fish and Wildlife hydrologists calculated assuming target deliveries of 250.9 thousand acre-feet per year and the State Water Resources Control Board's Draft Decision flows. Is that correct?

MR. GUINEE: That's correct.

MR. LILLY: And according to this analysis there would only be shortages in irrigation deliveries in one year; is that correct?

MR. GUINEE: That's correct. 100 percent was delivered in the other 69 years.

MR. LILLY: All right. And the shortage in that one year, which was based on 1977 hydrology, would be approximately 150,000 out of 250,000 acre-feet; is that correct?

MR. GUINEE: That's correct.

MR. LILLY: So in percentage terms that's approximately a 60-percent reduction in irrigation deliveries in that year; is that correct?

MR. GUINEE: For that one year that's -- just doing the math in my head, 60 percent is probably pretty close.

MR. LILLY: Okay. Now, could you go forward to S-DOI-Exhibit 16-B.

MR. GUINEE: Just double-checking.

MR. LILLY: Okay. Now, as I understand, this graph is showing Fish and Wildlife Service's hydrological analysis under the assumption that the AFRP target flows would be implemented and the Yuba County Water Agency target irrigation diversions would be 250.9 thousand acre-feet per year; is that correct?

MR. GUINEE: That's correct.

MR. LILLY: And this shows shortages to the irrigation deliveries in seven years; is that correct?

MR. GUINEE: Right, 7 of the 70 years the analysis was done.

MR. LILLY: And in 4 of those years, the shortages -- obviously, the ones with the higher bars -- the shortages are either close to 150,000 acre-feet or significantly over that; is that correct?

MR. GUINEE: In four of the seven years, that's correct.

MR. LILLY: So, basically, in 4 of 70 years the shortages in irrigation deliveries would be approximately 60 percent or more; is that correct?

MR. GUINEE: Yes. And to clarify that, if you take out the 70-year period of record, what you average out is a reduction of about 10,000 acre-feet per year. So when you consider that in the context of a 70-year period it, in my view not -- it's something that I think we can deal with through some sort of relaxation criteria during dry years.

MR. LILLY: Oh, so you agree that some type of relaxation criteria for the instream flows in dry years is appropriate then?

MR. GUINEE: I think as I stated, yes, I do. In my testimony, I indicated that generally what the Service

does is identify what the fish flow needs are, and we recognize that in some years, dry years especially like 1977 or such as these other years, between '24, '31, '88, et cetera, that water supply is going to be short.

And so -- Mr. Fleming mentioned it, too. We recognize the Board has to in those dry years take water

supply into consideration. We're just urging that it not be the fish that take the total brunt of those water supply reductions, that it be distributed. And so we have on other streams implemented relaxation criteria for critical dry years such as these.

MR. LILLY: Okay. Because, obviously, this figure shows a reduction of almost 80 percent in a hydrological year like 1977; is that correct?

MR. GUINEE: Yes, 200 out of 250 is about 80 percent.

MR. LILLY: Now, in the modeling work that was done by the Fish and Wildlife Service's hydrologist, was there any provision made in the model to reserve a carryover storage in New Bullards Bar Reservoir for drought protection in the event the subsequent year was a drought year?

MR. GUINEE: Let me show you the analysis for that. And this is Exhibit Number 15-C, which shows you that -- what we asked the modelers to do was try to maintain

storage as close as we could to historical end-of-month storage.

And, in fact, you can see that in most years they did better. They were able to maintain close to 600,000 acre-feet in New Bullards Bar in those years except for

1977, 1998, and 1999 where they were not quite able to achieve the historical level of storage.

MR. LILLY: Okay. Mr. Guinee, my question is: Did the modeling protocol that was followed by the Fish and Wildlife Service's hydrologists provide for any carryover storage for drought protection?

MR. GUINEE: What this graph shows is carryover storage. I did not ask them to specifically carryover some minimum amount for storage; although, it may be that the 200,000 acre-feet of the historical end-of-month storage is that number.

MR. LILLY: Okay. Are you aware that in hydrological modeling it's very important to recognize the fact that in the real world you don't know what type of water year the next year is going to be?

I mean, obviously, when you're reviewing the modeling of 72 historical years of record, you can know what all 72 years are going to be in advance before you set up your modeling. But in the real world, you don't have that luxury. You don't know what the following year

is going to be.

My question is: Do you know whether or not the modeling protocol followed by the Fish and Wildlife

Service's hydrologist addressed this point?

MR. GUINEE: On that particular point, I'm not sure he did.

MR. LILLY: Okay. Let's go forward to Exhibit S-DOI-Exhibit 16-C. If you would put that up on the overhead. Now, Mr. Guinee, as I understand it this is a modeling of a simulation where the AFRP target flows and, again assuming, Yuba County Water Agency irrigation deliveries are 250.9 thousand acre-feet per year; is that correct?

MR. GUINEE: That's correct.

MR. LILLY: And this simulation shows the storage in New Bullards Bar Reservoir dropping to zero in the early part of 1978; is that correct?

MR. GUINEE: Yes, it does.

MR. LILLY: Are you aware that the Yuba County Water Agency is required to maintain a minimum pool under its license with the Federal Energy Regulatory Commission?

MR. GUINEE: That's my understanding.

MR. LILLY: And do you know what the amount of that minimum pool is that must be required to satisfy the Federal Energy Regulatory Commission license?

MR. GUINEE: I don't remember specifically, but I'm assuming that it's in that area of 200,000, because

historical storages attempted to stay above 200,000.

MR. LILLY: Okay. So then if it, in fact, is 200,000 or more, then this modeling run shows a scenario under which the Federal Energy Regulatory Commission license of the Yuba County Water Agency would be violated; is that correct?

MR. GUINEE: Yes, with an explanation, that this is where the Fish and Wildlife Service agrees that in some years water supply is limited. And so there would need to be in a dry year some relaxation criteria so that reservoirs were not emptied.

MR. LILLY: Okay. Because according to this simulation and the graph you previously showed, this shows emptying the reservoir down to zero while also having a 80-percent cutback in irrigation deliveries; isn't that correct?

MR. GUINEE: In that one year out of 70. And I think you know that's the point that we're trying to make to the Board, in that one year we would have some relaxation criteria so that all the other 69 years are not constrained by a low fish flow to get you through that one year.

MR. LILLY: Okay. But you do agree that responsible

hydrologic planning involves preparing for repeats of hydrological conditions like those that occurred in 1977?

MR. GUINEE: Correct. And most of the time fish flows are modified, or there are relaxation criteria for the 10 percent of the driest years. And that's what our analysis showed, too, in about 7 out of 70 years on the Yuba you would need some kind of relaxation criteria.

MR. LILLY: Mr. Brown, if I may have a moment. We, obviously, had to digest a lot of material this morning, I just want to have a brief moment to confer with my team here to see if I missed anything. If I could request we take about a three-minute break, and I can do that and then we can move on.

H.O. BROWN: Fine. We can go off the record for three minutes.

(Off the record from 11:29 a.m. to 11:31 a.m.)

H.O. BROWN: Back on the record.

MR. LILLY: Thank you for allowing that short break, Mr. Brown.

I have two more questions regarding the modeling, Mr. Guinee. Do you know whether or not the Fish and Wildlife modeling work accounted for the out-of-basin exports that occur from the Upper Yuba River watershed?

MR. GUINEE: I do not know that, Mr. Lilly, whether they did or not.

MR. LILLY: Okay. And do you know whether or not the Fish and Wildlife Service hydrological modeling work that you have described today accounted for the limitations and constraints that are specified in the 1966 contract between the Pacific Gas and Electric Company and the Yuba County Water Agency?

MR. GUINEE: I'm not aware of the details on how that was treated or not treated in the analysis.

MR. LILLY: Great. Thank you, both, Mr. Guinee and Mr. Fleming, Mr. Gee. I have no further questions.

H.O. BROWN: Thank you, Mr. Lilly.

Mr. Minasian, how much time do you require.

MR. MINASIAN: I would guess 20 minutes.

H.O. BROWN: Okay.

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CROSS-EXAMINATION OF THE U.S. DEPARTMENT OF INTERIOR FISH AND WILDLIFE SERVICE
BY SOUTH YUBA WATER AGENCY AND CORDUA IRRIGATION DISTRICT
BY MR. MINASIAN

MR. MINASIAN: Mr. Guinee, could we start with the assumptions that were used by the hydrologists that worked with U.S. Fish and Wildlife. First, could we have the name and spelling of the person in CH2MHill that did this work and the location?

MR. GUINEE: Ben Everett. Do you want me to spell

it?

MR. MINASIAN: E-v-e-r-e-t-t?

MR. GUINEE: I believe so, yeah.

MR. MINASIAN: And which office?

MR. GUINEE: He's with CH2MHill here in Sacramento.

MR. MINASIAN: And what kind of a program and what part of the work did he utilize?

MR. GUINEE: Basically, what Ben did was we have a contract with CH2MHill to help Fish and Wildlife Service develop the Water Acquisition Program. And the Water Acquisition Program is pursuant to Central Valley Project Improvement Act whereby money has been designated to buy improved flows for fish to help restore anadromous fish populations in the Central Valley.

So as part of that process Ben developed a model called a spreadsheet model that --

MR. MINASIAN: That's an Excel system?

MR. GUINEE: It is Excel, that is correct.

MR. MINASIAN: Okay.

MR. GUINEE: And he used the hydrology from the different rivers that we were looking at and interested in in potentially acquiring water. And I think I mentioned some of them earlier such as the Stanislaus, the Merced. The Yuba was one of those rivers that we had asked him to develop this model so that we could, in that Water

Acquisition Program, look at the hydrologic conditions, determine to what extent the hydrology was meeting the fishery flows and give the Fish and Wildlife Service a sense in what kind of years do we need to go in and buy additional water.

We didn't want to go buying spring flows, April, May, and June and 1998 or '83-type circumstance when flood control releases were being made. And so in the development of that model then, he has the ability to do analyses and comparisons from year to year on what the hydrology is in the system, how much flow is being released below Englebright.

MR. MINASIAN: And so did he utilize the same records that you utilized for the question -- to resolving the question of which water to buy in developing these spreadsheets and these overheads?

MR. GUINEE: Basically, he used that model which he had developed for our Water Acquisition Program. And then I gave him the scenarios that I wanted him to compare using that model. And those scenarios were the '65 flows Agreement flows compared to the Board's Draft Decision flows. And then the '65 Agreement flows compared to the AFRP Fish and Game flow recommendations.

MR. MINASIAN: So the variables that Mr. Everett was

working with were basically what you wanted him to consider as the amounts being utilized by the Yuba County Water Agency rather than some research that he did in regard to the amounts that would be utilized or the demands of Yuba County Water Agency?

MR. GUINEE: Well, that's correct. In fact, the demand, the historical demand was the one I specifically gave him from Yuba County Water Agency's Exhibit 15-A that 1987 to '99 history demand rather than a future level of demand.

MR. MINASIAN: Now, in purchasing water under the AFRP, do you use an average historical demand, or do you use a current demand of the party that holds the water rights that you're approaching?

MR. GUINEE: It would depend. If we're talking about an one-year purchase or a short-term purchase we would likely use a historical -- yes, the historical or the current level of demand.

If we're talking about a long-term acquisition, 10, 20 years then we would likely look at the future level of demand, like a 20/20, or 20/30.

MR. MINASIAN: Now, the second hydrologist's working on this project name was?

MR. GUINEE: The second hydrologist is Derek,

D-e-r-e-k, Hilts, H-i-l-t-s. And he is staff to the fish -- he is a member of the Fish and Wildlife Service.

MR. MINASIAN: And is he here in Sacramento?

MR. GUINEE: Correct, in our office at 28 Cottage Way.

MR. MINASIAN: And what part did he have in this project?

MR. GUINEE: Essentially, Derek reviews the Excel spreadsheets for technical accuracy. And then the way this particular one went was, we had a meeting where Ben came over and presented the analysis to us, Derek, himself, and a couple of other Fish and Wildlife Service employees. We reviewed the results and then Derek printed out the overheads. And our office assistant staff made copies for today's hearing.

MR. MINASIAN: Did Mr. Hilts make any independent examination of the question of how much water would be delivered by the Yuba County Water Agency under the scenarios?

MR. GUINEE: Derek used the same assumption that I asked Ben to use: Historical diversion of 250.9 thousand acre-feet per year.

MR. MINASIAN: Okay.

MR. GUINEE: So, then, he did, yes, review the output that Ben had developed here. He agreed that it is accurate.

MR. MINASIAN: Did either of them, independently

other than what you provided them, examine the effects of the flow regime proposed upon the Bullards Bar Reservoir carryover storage?

MR. GUINEE: They did this analysis comparing the historical end-of-month storage to the simulated end-of-month storage. They also did a 70-year period of record which both would have been simulated then, because there was no Bullards Bar back in 1922 when that period of record begins. But they did a simulated end of September storage using both the base case as well as the Board's Draft Decision.

MR. MINASIAN: And this Excel spreadsheet, how did it input the PG&E requirements and the FERC requirements?

MR. GUINEE: I'm not totally familiar with the details on how it did that. I'm assuming that it used the most recent FERC and PG&E requirements.

MR. MINASIAN: Okay. Well, let's look at your figure of 248.9 -- 248,900 acre-feet as the Yuba County Water Agency's deliveries under the base case.

MR. GUINEE: Okay.

MR. MINASIAN: You see that?

MR. GUINEE: You want to put it up on the screen?

MR. MINASIAN: Well, I think if you want, I want you to compare that figure -- yes, go ahead and put it up -- with Yuba County Water Agency's Exhibit 15, Page 11. And,

unfortunately, I don't have an overhead. So I'm going to have to look over your shoulder, if that's all right.

Do you see that purports to be a statement of the amounts of historical diversions in certain years from 1987 to 1998?

MR. GUINEE: Yes, this is Exhibit 15. And that's Page 11. Table 10 purports to be historical diversions from '87 to '98.

MR. MINASIAN: Did you know that this data existed in terms that you didn't have to use a theoretical figure, you could use the actual current figure for the last ten years?

MR. GUINEE: Actually, if you look at Exhibit 15-A, which I did use, it was introduced subsequent to Exhibit 15, because I believe it was pointed out to Yuba County there were some errors in Table 10 in Exhibit 15. And I think 15-A corrects those errors.

MR. MINASIAN: Let's just get a ballpark figure here

with your figure of 248,000 acre-feet and compare it to actual diversions for waterfowl use and agriculture use. And you see I put arrows, like, 1987 the actual diversions are 320,000 acre-feet?

MR. GUINEE: Yeah. Actually, 1987 says 332,878. And then Yuba County Exhibit 15-A corrected that to be 252,805.

MR. MINASIAN: And do you see that in 1991 the -- excuse me. Do you see in 1999 we're dealing with 300,000 acre-feet?

MR. GUINEE: Right. This Table 15 -- or Table 10 in Exhibit 15 only goes through 1998. 15-A does include 1999 and indicates 301,000 acre-feet as the historical diversion.

MR. MINASIAN: And in 1987, 292,000 or about 40,000 acre-feet more than the figure you used?

MR. GUINEE: 1987, actually, shows 332,878 as the historical diversion, in Exhibit 15. Whereas Exhibit 15-A corrected that to be 252,805.

MR. MINASIAN: Isn't it 292,000?

MR. GUINEE: No. See that --

MR. MINASIAN: I'm sorry, 1997. I'm sorry.

MR. GUINEE: Okay.

MR. MINASIAN: 292,000?

MR. GUINEE: 1997, that's correct. That figure was pretty much the same in both of the exhibits.

MR. MINASIAN: Okay. So you knew that the demand of the Yuba County Water Agency had changed over time as a result of changes in the amount of rice that could be planted under the Government Program; changes in the distribution system that allowed certain areas to go off overdrafted wells. And, yet, you used a figure that's

approximately 30 to 40,000 acre-feet a year less than even the current demands, didn't you?

MR. GUINEE: No. What I did was I averaged, I took an average of the 1987 to 1999 historical diversion, added all those diversions up and divided by the number of years and got the average of 250,880 acre-feet.

MR. MINASIAN: Okay. So --

MR. GUINEE: And in some years the historical diversion is higher than that, and in some years the historical diversion is lower than that.

MR. MINASIAN: And you used three years '91, '92, and '94 in which the Department of Water Resources asked landowners within the Yuba County Water Agency to pump groundwater and not divert Yuba River water, did you not?

MR. GUINEE: I don't know that that's the case. I

used the data provided by Yuba County Water Agency.

MR. MINASIAN: And so if the figures in regard to the demand, or the need for water were wrong, would that -- was that part of the hydrologic study performed at all by Mr. Hilts or Mr. Everett?

MR. GUINEE: I didn't understand the question. Are you suggesting --

MR. MINASIAN: Let me rephrase --

MR. GUINEE: Are you suggesting that Yuba County data is wrong?

MR. MINASIAN: No. I guess I'm asking: Who made the assumptions, or made the determination that using an of average, which included three years in which DWR had purchased varying amounts between 20 and 70,000 acre-feet of groundwater, and utilizing a period in which the rice program curtailed planting of rice by 30 or 35 percent was a reasonable hydrological approach to the question of what would happen to Bullards Bar and what would happen to groundwater pumping?

MR. GUINEE: Basically, the decision to use 250,880 acre-feet as the average historical diversion was my decision based on the testimony I'd heard here from Yuba County Water Agency that according to Exhibit 15-A that reflected historical diversions from 1987 to 1999.

Now, I did not do an independent analysis to clarify whether, in fact, those numbers were accurate or not. I just took those at face value.

MR. MINASIAN: Okay. If we brought Mr. Hilts and Mr. Everett in here on the 17th of May do you think they could do a hydrologic study which examined the question of what the true current deliveries are assuming that we don't have groundwater purchases by the DWR and assuming that we plant all of our agricultural land?

MR. GUINEE: The Excel model that CH2MHill developed for the Service to use can input assumptions that you want

to make. And then the model can be run to determine and give you some answers.

As to the specific question you're asking, whether they can do that on May 17th or not, it may take more time than just, you know, a few hours on May 17th to do that.

H.O. BROWN: Mr. Frink, you had a comment.

MR. FRINK: Yes, Mr. Brown, I do have just a clarification. It appeared from the questions Mr. Minasian was asking that he was assuming that the historical diversion demand figures reflected in Exhibit S-YCWA-15-A do not reflect the amount of groundwater that

was used for in-basin use. And my understanding, based on the footnote, is that the historical demand does include the groundwater that's pumped for in-basin use. I just wanted that clarification to be in the record.

H.O. BROWN: Thank you, Mr. Frink.

MR. MINASIAN: I am, unfortunately, dealing with the original exhibit. And I appreciate your rehabilitating the testimony in that regard, Mr. Frink.

So, Mr. Guinee, with Mr. Frink's help here you're -- do you know today whether or not the figures for '91, '92, and '94 include -- take out of account the groundwater purchases of DWR?

MR. GUINEE: I don't know specifically about the

groundwater purchases of DWR. There is a column in Table 10 that shows groundwater pumped for in-basin use in 1991 and 1994. I did not include those when I totaled up the historical diversions and averaged them for the 250,000 acre-foot average.

MR. MINASIAN: And we do have a figure in 1997 of demand which is still 40,000 above the 248,000, don't we?

MR. GUINEE: Actually, the other column of total historical diversion demand, that includes the groundwater pumped, averages 259,000. So it's not 40,000 difference.

MR. MINASIAN: Well, I'm not asking you about the

average. I'm asking you: 1997, how much water was used for duck habitat and irrigated agriculture diverted at Daguerre Point?

MR. GUINEE: I would have to go back to Yuba County Water Agency's other exhibits which differentiated between the quantity of water used for duck habitat and total diversions. And as I recall, as I reviewed that document -- in fact, Mr. Gee has it here -- what was the year you asked about?

MR. MINASIAN: 1997.

MR. GUINEE: In 1997 it indicates that 42,000, or almost 43,000 acre-feet of the 292,000 acre-feet was designated as waterfowl habitat.

MR. MINASIAN: Okay. So the total use in 1997 is

297 which is 40,000 or so above your assumption for the purpose of drawing these graphs; is that not correct?

MR. GUINEE: No. I did use the 292,000 for 1997. The duck water is included in these historical diversions.

MR. MINASIAN: Right. In terms of making your average, you included it?

MR. GUINEE: Right.

MR. MINASIAN: But you did not include it in terms of reflecting that the demand for water in Yuba County has

changed over time during the period, because of artificial factors including the amount of acreage that could be planted under Government set-aside programs?

H.O. BROWN: Mr. Minasian.

MR. MINASIAN: Yeah.

H.O. BROWN: If you don't mind, we're going to adjourn for the lunch hour.

MR. MINASIAN: Good.

H.O. BROWN: And we will let you continue when we meet back here. We'll meet back here at 1:00 o'clock.

MR. MINASIAN: Thank you.

(Luncheon recess.)

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MONDAY, MAY 1, 2000, 1:00 P.M.

SACRAMENTO, CALIFORNIA

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H.O. BROWN: Come back to order.

Mr. Minasian, you're up.

MR. MINASIAN: Mr. Guinee, when you gave the inputs to these persons in regard to running the Excel model, did you tell them to use average deliveries for the full

period?

MR. GUINEE: Mr. Minasian, what I told them is to use that average from Exhibit 15-A. I actually did the calculation for them. I calculated the average of the historical diversions from 1987 to 1999. And in refreshing my memory I looked at Exhibit 27 from Yuba County Water Agency as well. And I believe Exhibit 27 and 15-A are consistent in terms of the total historical deliveries and it does include the water delivery for waterfowl habitat.

MR. MINASIAN: Okay. My question to you was: Did you provide instructions to them to use an average water use in running the Excel program?

MR. GUINEE: Correct. I told them to use the average historical diversion of 250.9 thousand acre-feet.

MR. MINASIAN: So as I understand Excel, it can be used for a checking account, as an example, can't it?

It's a balance. You start with a balance, don't you?

MR. GUINEE: I don't understand the intricacies of the Excel model. So I don't know that I'd compare it to a checking account.

MR. MINASIAN: Let me get to the ultimate: If in a given year it was a wet water year and the consumers

within Yuba County used 290,000 acre-feet instead of 250, where would that water be stored under your model run?

MR. GUINEE: I'm not sure that I understood your question. Could you, please, repeat it? Is this a hypothetical?

MR. MINASIAN: Well, I want to know how your model operated, the model you developed and you asked these hydrologists to run. It assumed Bullards Bar storage at 900,000 acre-feet, roughly, didn't it?

MR. GUINEE: 966,000 acre-feet, roughly.

MR. MINASIAN: And 15, in its various versions, includes blue lines that go up to the top, doesn't it.

MR. GUINEE: Exhibit 15?

MR. MINASIAN: Yes.

MR. GUINEE: Right. The blue lines when they go up to the top, as you say, that refers or shows when the reservoir is full.

MR. MINASIAN: Okay.

MR. GUINEE: Correct, that's what that represents.

MR. MINASIAN: Okay. And you have to tell the programmers to put something in in regard to the monthly amount of water use and the monthly amount of storage, didn't you?

MR. GUINEE: What I asked them to put in was the

average deliveries and then the modeler had some assumptions about what the monthly use was.

MR. MINASIAN: And do you know what that was?

MR. GUINEE: No. In terms of how much per month, I don't know the precise numbers per month that he assumed.

MR. MINASIAN: They probably used just averages, took 1/12th of the demand and 1/12th of the storage and put it in, right?

MR. GUINEE: No. I'm not sure that's the case, because agricultural demands are generally higher for March, April, through October than they are November through February. So I think it was more of a prorated amount per month.

MR. MINASIAN: Okay. And so if, in fact, Yuba County Water Agency's customers used 290,000 acre-feet in a given year, and you have assumed in the model run that they used only 250, that water would have had to be stored somewhere, wouldn't it?

MR. GUINEE: No. The model is just a theoretical model. And so in that situation the model is simply

modeling the average and not accounting for the variability and demands either higher than the 250,000 average or lower than the 250,000 acre-foot average.

MR. MINASIAN: Based upon your experience working with modelers, Mr. Guinee, would you give us an opinion as to whether or not it is more probable or less probable that Bullards Bar would run out of water using an average demand figure than using average inputs for irrigation season use and storage?

MR. GUINEE: Okay. Please, repeat the question. I didn't quite follow.

MR. MINASIAN: Yeah. If you used an average monthly storage amount and if you used an average irrigation demand amount, and you used an average total demand of agricultural use rather than realtime numbers, you used an Excel program and you started with the balance, where would you get the extra storage for the 50,000 acre-feet that was used in 1997 above 250,000 acre-feet?

MR. GUINEE: I guess I didn't do that evaluation, Mr. Minasian. So I'm not sure how it would come out.

MR. MINASIAN: And you don't know if Mr. Hilts or Mr. Everett did it either, do you?

MR. GUINEE: Actually, I did not ask them to vary the demand annually. That is something that the model has the ability to do.

MR. MINASIAN: Are you telling us that if we brought Mr. Hilts and Mr. Everett in here they could produce a

model that varied the demand on an annual basis, on the basis of the actual fluctuations in the period of 1989 through 1999, as an example?

MR. GUINEE: No. I don't think you need to bring them in here to do that. In fact, I don't think they could do it sitting here in front of the Board. I think that's the kind of a computer simulation evaluation that, as I said earlier, the model that CH2MHill built for the Service's Water Acquisition Program, you can change the inputs and the assumptions.

And so it would be a matter of then entering into the model what demand level you wanted to assume for each year. Now, I was working with only 13 years of actual historical demands. And so that's why I used the average, because we were running a 70-year trace.

MR. MINASIAN: Let's direct our attention to fish issues. Mr. Fleming, you asked that there be admitted an article by Daniel Castleberry elating to various issues in fish science.

Do I correctly gather that your conclusion from that article is that IFIM criteria in regard to the amounts of water that are most beneficial for various life stages should not be weighted heavily in determining flow

standards on the Yuba River?

MR. FLEMING: It's an awful long question, I'm not sure I followed the whole --

MR. MINASIAN: Well, tell us what you think the article by Castleberry, which is two-pages long -- and it's titled an "essay" rather than a study; is it not?

MR. FLEMING: I don't have it right here with me.

MR. MINASIAN: Well, let's put up the first sheet of it.

MR. FLEMING: Okay.

MR. MINASIAN: See the word "essay"?

MR. FLEMING: Yeah.

MR. MINASIAN: That's something other than a scientific paper, isn't it?

MR. FLEMING: Yeah. An essay can be a scientific paper though.

MR. MINASIAN: Okay.

MR. FLEMING: And just to point out the scientific merit of this paper, if you want to look at the names, Dan Castleberry, Joseph Cech, Don Erman, Hankin, Healey, Kondolf, everybody up there is a professor at UC Davis, Berkeley, University of Washington, those are -- Jennifer Nielsen -- highly acclaimed people in their fields.

MR. MINASIAN: And this is two-pages long, isn't it?

MR. FLEMING: Yes.

MR. MINASIAN: So Pages 20 and 21, August '96?

MR. FLEMING: Uh-huh.

MR. MINASIAN: Okay. Now, in your mind --

MR. GUINEE: Mr. Minasian, the point of that is that the word of caution is these quantitative models don't really quantify for fish, or what kind of flows the fish need. There are so many other variables besides depth and velocity that have to be considered when making flow recommendations for salmon and steelhead.

MR. MINASIAN: Okay. So in 1992 when the Board held its hearings, this essay did not exist, did it?

MR. FLEMING: The essay did not exist, because it wasn't printed until 1996. I think the sentiments behind this essay existed in 1992.

MR. MINASIAN: Now, as I understand IFIM it basically attempts to quantify utilizing graphs, various beneficial and nonbeneficial aspects of certain flow levels, and various life stages; is that correct?

MR. FLEMING: Yes.

MR. MINASIAN: And the 1992 hearing didn't include any IFIM study of the stretch of the Feather River below the confluence of the Yuba down to the Delta, did it?

MR. FLEMING: Feather River down to the canal --

MR. MINASIAN: Okay.

MR. FLEMING: -- no, not to my knowledge.

MR. MINASIAN: Okay. And so what does this essay stand for as far as you understand it in regard to the question of whether or not IFIM is applicable to determining what regime we should try to approximate in the Yuba River?

MR. FLEMING: It's my understanding that the IFIM was used to come up with the flows that are being recommended by both Yuba County and the Department of Fish and Game, and to some degree, the Anadromous Fish Restoration Program.

MR. MINASIAN: Well, in fact, the highest flow in any IFIM criteria for chinook salmon, either fall or spring, was 600 cfs in the spring, was it not?

MR. FLEMING: Very low, I can't tell you exactly. And that is the reason why I brought this in is just to give more information for the foundational choice to select the flows.

MR. MINASIAN: Okay. So in 1992 the IFIM studies, in regard to the various life stages of all of the fish that were in the river, indicated in the spring that if you were trying to maximize the habitat for all of these species a flow somewhere in the neighborhood of 600 and 700 cfs would be about right. And the flows above that would be detrimental, did it not?

MR. FLEMING: I don't recall the specifics of the

IFIM right now.

MR. MINASIAN: So what does this 1996 essay tell you was wrong about the IFIM on the Yuba River that was utilized in regard to the 1992 hearing?

MR. FLEMING: It tells me that -- and you and everybody else -- that any time that the IFIM is used that you need to consider the cautions that I read before. That the sampling and measurement problems associated with representing a river reach with selected transects and with hydraulic and substraight data collected at transects, that sampling and measurement problems associated with developing the suitability curves and problems with assigning biological meaning to weighted usable area, which is a statistic estimated by the PHABSIM.

MR. GUINEE: I would add to that, Mr. Minasian, that instream flow studies generally end up with some sense of a minimum flow needed for the fish. And so assuming that any flows higher than that are detrimental to the fish is false. Flows higher than that are generally even better for the fish. So generally instream flow studies are identifying an absolute minimum that a fish may be able to get by on.

MR. MINASIAN: So it's your opinion that when an

IFIM graph goes down that is showing that the habitat is

reduced in its quality for a particular species at a particular life stage that we ought to disregard that and assume the line is drawn upwards?

MR. GUINEE: No. I think as was pointed out in 1992 in Randy Brown's testimony that I refed to earlier, if you extend that graph far enough oftentimes what you see is based on the channel configuration, that once the flows get up out of the inside channel then you have a lot more habitat that becomes available. And so you need to look at the whole picture.

MR. MINASIAN: Okay.

MR. GUINEE: So at 3,000 cfs what you may see is a more rearing flow than what you saw at a 1,000 cfs --

MR. MINASIAN: Now, the channel, has the channel of the Yuba River widened in a fashion in which the IFIM graphs used in '92 are outdated at this point?

MR. GUINEE: No, that's not what I'm suggesting. What I'm suggesting is often in instream flow studies, the flows are measured in an opportunistic manner. In other words, whatever flows are present during the study are the flows that are measured. And the transects that are set up across the stream may not extend far enough up the bank to capture the change in habitat as the flows increase.

To give you an example --

MR. MINASIAN: Was there any indication in the IFIM

study done by Beak Associates who were hired by the Department of Fish and Game that they were in any way limited in their IFIM by flow restrictions, or lack of cooperation?

MR. GUINEE: Yes, I think there is -- not a lack of cooperation, but the flow study that was done during the six-year drought, in 1987 to '92 periods, was one of the driest periods in California. So the flows that Beak had the opportunity to go out and measure depths and velocities across transects were lower flows than what occurs there such as in 1999 or the year 2000 flows.

MR. MINASIAN: Well, that brings me to this question, Mr. Guinee, apparently you would like to testify in regard to this essay. Have you read this essay?

MR. GUINEE: Yes, I have.

MR. MINASIAN: Okay. And my copy is not very good. Would you look at the top of the column to the right, three lines down. Do you see that the essayist is saying, (Reading):

"This element embodies the adoptive management principles that management programs should be

experiments and that information should both motivate and result from management action."

MR. GUINEE: I see that sentence, yes.

MR. MINASIAN: Okay. So isn't this essay basically

saying that we should not have rote temperatures and rote flows when we consider standards?

MR. GUINEE: I'm sure that everyone that reads it has their own understanding of it. My understanding --

MR. MINASIAN: Is that a reasonable reading of this article?

MR. GUINEE: I think that is. And I think from my perspective working on the Anadromous Fish Restoration Program what we've concluded from that is that flows in the stream and like flows like the Anadromous Fish Restoration Program, or Fish and Game has recommended that the Board implement, should continue to be evaluated.

It's important to get a better understanding of what the fisheries are responding to and to get additional data from the stream itself to either corroborate or substantiate that the fish, in fact, are responding in a positive manner to the flows and the production of the population is improving.

MR. MINASIAN: And, Mr. Fleming, would you look down in the area that is underlined beginning with the word,

"managers." Does it say,

(Reading):

"Managers will learn more if the monitoring program also includes a suite of indices of the growth, condition, and the development of the

target species. These indices need to be interpreted with awareness of the complications arising from variations in life history patterns within and among populations"?

MR. FLEMING: Yes, I see that.

MR. MINASIAN: Okay. And does that indicate to you that from 1992 to the present time there should have been an approach to adaptive management on the Yuba River?

MR. FLEMING: Yeah, I think it's safe to say that.

MR. MINASIAN: All right. And look at the line right above it.

(Reading):

"This is particularly likely with anadromous fishes such as salmon where populations of adults depend on harvest, ocean conditions, and other factors not related to instream flows, and populations of juveniles are hard to estimate accurately."

Do you see that language?

MR. FLEMING: Uh-huh.

MR. MINASIAN: Do you agree with that?

MR. FLEMING: Yeah. You know you're going down and then up and then -- so you're kind of mixing up my context and my thinking.

MR. MINASIAN: Okay. Well, you tell us: What

should we have been doing since 1996 when this essay came out and how does it conform with what's being proposed by U.S. Fish and Wildlife and California Department of Fish and Game in terms of an uniform temperature and an almost uniform flow throughout the spring, summer, and fall?

MR. GUINEE: I can take a try at that, Mr. Minasian. I think what we have recommended that since 1992 and at that hearing we recommended that the Board implement the AFRP, or Fish and Game level flows in the Yuba River.

And this approach is one that through the Anadromous Fish Restoration Program we said, then, it would be important to continue to monitor and evaluate those -- that new minimum flow regime to see if, in fact, the fish were outwardly responding to it, do the monitoring. And then determine whether those flows were, in fact, adequate or whether higher flows were needed to provide the temperature protection that Fish and Game and

National Marine Fisheries Service has and is recommending here at this current hearing.

MR. MINASIAN: Well, upon what data do you recommend that colder temperatures be maintained through April and May which retard the growth of juveniles and retard their time of emigration if you adopt the ideas of this essay?

H.O. BROWN: Mr. Frink?

MR. FRINK: Yes, Mr. Brown, I believe that you

instructed before the close of the hearing that rebuttal was to be limited to the scope of the evidence already presented. And I think the cross-examination on rebuttal is to be limited to what is stated on rebuttal. I don't recall a discussion of temperature by these witnesses in their rebuttal testimony.

MR. MINASIAN: Well, I believe that you'll find, Mr. Brown, that the whole article prepared by Marty Kjelson in 1999 and Pat Brandes relates to temperature and flow and the survivability of salmon in the Sacramento and Delta conditions.

H.O. BROWN: I agree, Mr. Minasian. Proceed.

MR. MINASIAN: Okay. All right. Go ahead.

MR. GUINEE: I was going to add, for the Yuba River we recommended April, May, and June flows to help with the

downstream outmigration or emigration of juvenile chinook salmon.

MR. MINASIAN: Help with them in the outmigration, where?

MR. GUINEE: From the reach below Englebright Dam at least to the mouth of the Feather River.

MR. MINASIAN: How does it help them to retard their growth rate and keep the temperature low when we know the temperature is a queue for outmigration?

MR. GUINEE: They're actually cold-water fish. They

like cold water, Mr. Minasian. And so you can make an argument that a little bit warmer water in April -- and I think Mr. Fleming did a good job in his direct testimony of showing that there are so many other variables such as flow, the ability to move downstream that come into the picture.

MR. FLEMING: I would add that characterizing cooler temperatures as retarding growth would be inaccurate. There's nothing that says that cooler temperatures retard and warmer temperatures increase the growth, but cooler temperatures do not retard. That's an inaccurate way to describe --

MR. MINASIAN: Do you agree that cooler temperatures are correlated to retarded growth, because cooler

temperatures depress food production?

MR. FLEMING: Retard it, no, I don't agree. I agree that cooler temperatures initiate slower growth in salmon, but that is not -- when you use the word, "retard," you're bringing with it all the negative ramifications and connotations that "retard" has. It's just a natural process that they go through. There's nothing negative about cool waters and slow growth.

MR. MINASIAN: Okay. So smaller can be just as good as larger?

MR. FLEMING: Yeah. And it gets back to the point

that I was trying to make that you can increase temperatures to grow fish faster, but that does not correlate into more escapement, to more successful adults coming back at the end of their life span. Okay.

There's data that show that fish who spend longer time in the rivers may grow slower, and with higher flows outmigrate more successfully and produce more adults coming back to increase the population.

MR. MINASIAN: Okay. So let's examine what you're advocating by your rebuttal testimony. Are you advocating that we hold the juveniles in the Yuba River longer by maintaining colder temperatures than would exist in the

state of nature before any dams?

MR. FLEMING: I'm not advocating that or saying that you could hold the fish in the river. The fish will react to stimulus. And we're not holding them. You're not holding them. So we're not advocating something unnatural.

MR. GUINEE: Right. To add to that, Mr. Minasian, when you look at the flows being recommended for April, May, and June, in our view it's important to have higher flows during the juvenile outmigration period so the juvenile fish can leave when they're ready to leave.

Like Mr. Fleming talked about earlier, there is that variability in terms of rate of fish growth, timing

of when those fish are ready to go migrate downstream.

And so by providing higher flows during the migration period, the fish can leave when they're ready to leave, not by some sort of attempt by a management practice to queue that. We're not talking about queuing outmigration. We're talking about providing good conditions during the outmigration period.

MR. MINASIAN: Good conditions which correlate with slower growth and later outmigration; is that correct?

MR. FLEMING: Yes.

MR. MINASIAN: You didn't like the word "retard,"

right?

MR. GUINEE: Yes. So then the fish are bigger when they leave the river in April, May, when they get to the estuary they can survive.

MR. MINASIAN: Now, again my copy machine is not good. This is Page 113 of Marty Kjelson's and Pat Brandes' study that is DOI-9. In the left-hand column you see the language,

(Reading):

"Since many of our coded-wire tagged smolt releases were made from mid May to early June when temperatures were often high, it is possible that the flow survival relationship in Figure 4 does not apply to April and early

May when temperatures are lower.

If higher temperatures are a major cause of the lower survival at low flows, then smolt survival for April and early May would be expected to be somewhat higher.

We plan to initiate cooperative efforts with the State, SWP, and Federal, CVP, Water Project operators so we can release tagged smolt in April and June under identical flow and

diversion. This will be possible in drier years when the river flows in April and June are under the control of project operations through reservoir releases.

The temperature differences between April and June will, thus, enable us to quantify the changes in survival attributed to temperature alone."

Is that language, in fact, included in the study?

MR. FLEMING: Yes.

MR. MINASIAN: Okay. And do you know that, in fact, Mr. Steve Cramer, the State Water Project contractors, and the Bureau cooperated to do those studies?

MR. FLEMING: Do I know that Mr. Cramer -- I don't know that Mr. Cramer and all those people are --

MR. MINASIAN: You know those studies have been

done, do you not?

MR. FLEMING: They're under way.

MR. MINASIAN: And the conclusions from those studies are that if the juveniles do not go out in earlier periods, before the air temperature rises, that their mortality and survival chances decrease, that mortality increases, survival decreases?

H.O. BROWN: Mr. Gee.

MR. GEE: I believe that question is beyond the scope of the rebuttal.

MR. MINASIAN: So, effectively, we bring in a study in 1989, but we don't bring in the latest information?

H.O. BROWN: Mr. Minasian, wait a minute.

Again, Mr. Gee.

MR. GEE: I believe Mr. Minasian's question goes beyond the scope of my rebuttal.

H.O. BROWN: Mr. Minasian.

MR. MINASIAN: It does, if we aren't going to talk about anything except the 1989 study, which said that they needed more studies, which have been done, I don't think the objection is well-taken. These witnesses have given their opinion in regard to temperature and flow in the Sacramento River and San Joaquin River.

H.O. BROWN: Okay. Do you have any follow-up to that question?

MR. MINASIAN: No. If they don't want to answer, I don't want them talking.

H.O. BROWN: If you have an opinion, answer.

MR. FLEMING: I think those studies are underway and there shouldn't be any conclusions from those studies at this point.

MR. MINASIAN: You do know --

MR. FLEMING: They're in-progress.

MR. MINASIAN: -- it gets warmer in April and May than it is in March; isn't it?

MR. FLEMING: And I would also add that under the current flow scenarios that they're experiencing in the San Joaquin, which is what this portion of the document is talking about, temperatures are an issue, because flows are so reduced. But, you know, those studies are underway and there shouldn't be any conclusions drawn from them at this time.

MR. MINASIAN: I guess I do have a follow-up question. What does your heart tell you is the condition of the Sacramento River water temperature on an average from May 15th on compared to from April 15th on?

MR. GUINEE: I don't think that's a question of what our heart tells us. It's the data shows that for juvenile salmon that there is a point where temperatures start becoming warm. I don't think it's necessarily May 15th.

In fact, in wetter years there may be good outmigration conditions all the way through June. So it varies with hydrology. It varies with air temperatures. There's so many factors that affect it. You would have to look at the data.

MR. MINASIAN: So why are we recommending to the Board a uniformed flow standard for April, May, June, July, September? And what does it mean when you say, well, we think there ought to be some dry-year relief?

MR. GUINEE: What we're recommending as a minimum-flow regime, we believe in the concept of continuing to monitor and evaluate that minimum-flow regime and the concept of some dry-year relief is one of the ways we've done it on other streams, is to take a look at when, say, the inflow is below a certain level combined with storage below a certain level, something like that, then there would be some relaxation criteria built in so that everybody understood then how the fishery flow would be reduced proportionately to reductions by other water users.

MR. MINASIAN: You're referring to relaxation so the water users can get more water diverted, aren't you?

MR. GUINEE: I'm actually referring to what Mr. Fleming referred to earlier, you know, about the fish not being the only ones taking cuts in flow. That all the

water users would have to conserve in those kind of years. Waterfowl might not get four acre-feet per acre in those years. They might only get three acre-feet per acre. So

things like that.

MR. MINASIAN: Do you have something in your mind with regard to dry-year relief for the juvenile fish that is sitting there in 56-degree water and its growth is slow, are we going to warm it up so that that fish can get out quicker?

MR. GUINEE: I think juvenile salmon like 56 degrees, so I don't know.

MR. MINASIAN: Thank you.

H.O. BROWN: Thank you, Mr. Minasian.

Mr. Bezerra.

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CROSS-EXAMINATION OF THE U.S. DEPARTMENT OF INTERIOR FISH AND WILDLIFE SERVICE

BROWN'S VALLEY IRRIGATION DISTRICT

BY MR. BEZERRA

MR. BEZERRA: Good afternoon, Mr. Fleming, Mr. Guinee.

MR. FLEMING: Good afternoon.

MR. BEZERRA: My name is Ryan Bezerra. I'm the attorney for Brown's Valley Irrigation District in this proceeding. I have a few questions for you. Are you

aware of the fact that the Yuba River Project serves a flood control purpose?

MR. FLEMING: Yes.

MR. GUINEE: Yes.

MR. BEZERRA: And that the Yuba River Project's operations are subject to certain flood control criteria established by the U.S. Army Corps of Engineers?

MR. FLEMING: Yes.

MR. GUINEE: Yes.

MR. BEZERRA: And did the hydrology modeling that the Fish and Wildlife Service presented and conducted take those flood control criteria into account?

MR. GUINEE: I believe they did.

MR. BEZERRA: And on what basis do you believe that?

MR. GUINEE: In general, when we do hydrologic modeling, whether it's on the Yuba River or on one of the CVP streams Fish and Wildlife Service works on, we have to take into account flood control criteria so that when a reservoir gets to a certain level at a certain time of the year you have to release that water.

MR. BEZERRA: Did you specify to the hydrologists who conducted the modeling being presented that they include those criteria?

MR. GUINEE: Not specifically. It's generally an assumption --

MR. BEZERRA: Did you specifically -- I'm sorry. I didn't mean to speak over you. Did you specifically instruct those hydrologists to include those criteria?

MR. GUINEE: Not specifically, I just assumed that they would include that.

MR. BEZERRA: So do you have any actual knowledge that they actually included those criteria?

MR. GUINEE: I assumed they did since they generally do in all the other modeling and analyses and evaluations of hydrology.

MR. BEZERRA: Do you have any specific knowledge that they included those criteria?

MR. GUINEE: No, I didn't ask them that specific question.

MR. BEZERRA: Okay. Thank you. I appreciate that. You said -- Fish and Wildlife's recommendation is that the State Board immediately adopt the flow and temperature requirements stated in the Draft Decision; is that correct?

MR. GUINEE: Yes, at a minimum. I would add to that, we think it's important for the Board to consider implementing the Anadromous Fish Restoration Program, those flows immediately.

MR. BEZERRA: So you also recommended that the Board consider implementing the flow and temperature

requirements recommended by the California Department of Fish and Game and the National Marine Fisheries Service; is that correct?

MR. GUINEE: Correct. Based on the testimony that National Marine Fisheries Service and the Department of Fish and Game presented here, I think it's important for the Board to consider implementing those temperature and flow criteria as well.

MR. BEZERRA: In conducting its hydrological modeling did the Fish and Wildlife Service estimate what temperatures would occur at -- what temperatures could occur under the various flow scenarios of the model?

MR. GUINEE: I didn't ask the hydrologist to model the temperatures that would result in those flows. No, I didn't ask that.

MR. BEZERRA: Do you know if the flows recommended by the Fish and Wildlife Service would cause the Yuba County Water Agency to comply with the temperature requirements of the State Board's Draft Decision?

MR. GUINEE: I did not ask them to do that evaluation, so I don't know.

MR. BEZERRA: Did you ask the people who model -- did the hydrological modeling for Fish and Wildlife to determine if the flows that Fish and Wildlife is recommending would comply with the temperature

requirements recommended by the California Department of Fish and Game and National Marine Fisheries Service?

MR. GUINEE: I did not ask them to do any temperature analysis, or evaluation of those flows.

MR. BEZERRA: Did you ask the -- excuse me.

Did the people who did the hydrological modeling for the Fish and Wildlife Service assess the water supply impacts of Yuba County Water Agency attempting to comply with the temperature requirements of the State Board's Draft Decision?

MR. GUINEE: No, I did not ask them to do that analysis. This is just a simple analysis of what the water supply impacts would be in meeting the Board's Draft Decision flows and the AFRP, the Fish and Game's 1991 recommended flows.

MR. BEZERRA: Simply the flows, not the temperatures?

MR. GUINEE: Correct. I did not ask them to do any temperature modeling.

MR. BEZERRA: And so am I safe in assuming that Fish and Wildlife Service has not conducted any hydrological modeling that would reflect the water supply impacts of Yuba County Water Agency attempting to meet the temperature criteria recommended by California Department of Fish and Game and the National Marine Fisheries

Service?

MR. GUINEE: That's correct, we have not done any of that analysis.

MR. BEZERRA: Is it your general impression from this hearing that attempting to meet the temperature requirements will require that the Yuba County Water Agency maintain instream flows higher than the ones recommended in both the Draft Decision and in your testimony in order to meet the recommended temperature criteria?

MR. GUINEE: Because I haven't done that analysis, I don't know to what extent the AFRP recommended flows meet the temperature criteria that National Marine Fisheries Service and the Department of Fish and Game recommended. So I would not want to hazard a guess as to how much more water would be needed to do that.

MR. BEZERRA: Let me pose a hypothetical: If it would require that Yuba County Water Agency release more water in order to meet the temperature requirements than to meet the flow requirements recommended in the Draft Decision, would you anticipate that the water supply impacts would be greater than those presented by Fish and Wildlife's hydrological model?

MR. GUINEE: Okay. Based on your hypothetical

scenario, the hypothetical answer would be that there

might be more water needed. I don't know, I haven't done that analysis.

MR. BEZERRA: And one more question, again, a hypothetical: If we assume that it would require more water to meet the water temperature standards proposed by California Department of Fish and Game and National Marine Fisheries Service than to meet the minimum flows you've recommended, would that have a greater water supply impact than demonstrated in the hydrological modeling that Fish and Wildlife has conducted?

MR. GUINEE: Given that hypothetical scenario that more flows were needed to meet cooler temperature requirements than the hypothetical answer would be that there may be more supply impacts.

MR. BEZERRA: Okay. Thank you very much, Mr. Guinee. I appreciate it.

H.O. BROWN: Thank you, Mr. Bezerra.

Mr. Morris.

MR. MORRIS: I have no questions.

H.O. BROWN: All right. Thank you, Mr. Morris.

Anyone here from the Department of Water Resources? All right. Staff?

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CROSS-EXAMINATION OF THE U.S. DEPARTMENT OF INTERIOR
FISH AND WILDLIFE SERVICE
BY STAFF

MR. MORA: Mr. Guinee, I'm Ernie Mora. When you requested the model studies be conducted and provided your modelers with the average delivery amount, which I believe was 250,000 cfs, did you at least request your modelers to take into account the difference in average quantities of deliveries during different type of water years, or did you just tell them, just use this total, 250 amount, for every year regardless of what water year type it was?

MR. GUINEE: I'm going to say the latter, Mr. Mona. We just had that average from Exhibit 15-A to work with. And I didn't try to break it down into how that historical diversion might have changed in wet, below normal, above normal, and dry years.

MR. MORA: Thank you. That's all I have.

H.O. BROWN: Mr. Gee, do you have redirect of your rebuttal?

MR. GEE: I just have a few questions.

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REDIRECT TESTIMONY OF THE U.S. DEPARTMENT OF INTERIOR
FISH AND WILDLIFE SERVICE
BY MR. GEE

MR. GEE: Mr. Fleming, in early response to a question from Mr. Lilly you said that you sampled juvenile chinook salmon in the Sacramento River at temperatures from 65 degrees to 70 degrees; is that correct?

MR. FLEMING: Yes.

MR. GEE: And can you determine whether fish are in good conditions simply on the presence or absence of fish in the water?

MR. FLEMING: No. And I guess it needs to -- you know, that whole statement needs some clarification. The sampling I'm referring to was trawling in the Sacramento area, Sacramento River, Mile 55, so very close to the Delta, far down the river system.

And the temperatures I'm referring to are not -- they're spot-check temperatures. When you're out on the boat, you dip the thermometer into the water and take a

spot temperature. Okay. And that reflects the temperature right then, not the temperature over the day or what they've experienced over extended periods of time.

And I mentioned that the fish were alive and there were some in good and some in bad condition. And

Mr. Gee's question right there, asked, you know, can you tell if fish are in good condition when you're just looking at them, when you just sample them?

And just by physically looking at the fish for a very short period of time you can't determine the amount of stress that they're going through. So really my statement about the fish being in good condition is, basically. So you can tell that they're alive. And if you take care of them and let them go and they swim away, I said they're in good condition, but really there's no way to deal with the level of stress they're experiencing, because of the heat of the water and the sampling and all that kind of stuff. So I just want to make that clarification.

MR. GEE: Thank you, sir. I have no further questions.

H.O. BROWN: Okay. Recross? Anyone?

Mr. Lilly.

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RECROSS-EXAMINATION OF THE U.S. DEPARTMENT OF INTERIOR AND FISH AND WILDLIFE SERVICE BY YUBA COUNTY WATER AGENCY

BY MR. LILLY

MR. LILLY: Mr. Fleming, just following up on Mr. Gee's question, I just want to make sure I'm clear.

Do you have an opinion regarding whether -- and this is not just based on your trawling experience, but based on all of your experience and professional education -- do you have an opinion whether or not an average daily temperature of 65 degrees in the Lower Sacramento is acceptable for juvenile salmon that are outmigrating through the Lower Sacramento River?

H.O. BROWN: Mr. Cunningham.

MR. CUNNINGHAM: Mr. Brown, I'll object. That goes beyond the scope of redirect.

H.O. BROWN: Mr. Lilly.

MR. CUNNINGHAM: The status of the redirect question was very narrowly focused on the specific statement made about catching fish through trawling in the Delta and spot measurements of temperature.

H.O. BROWN: Mr. Lilly.

MR. LILLY: Yes, the testimony raised a question and

cast -- appeared to cast some doubt on the precision of Mr. Fleming's prior testimony. I think it's appropriate to seek clarification of that.

H.O. BROWN: Mr. Cunningham, anything more?

MR. CUNNINGHAM: Sir, I think Mr. Lilly's question goes far beyond that. He's now asking his opinion about the general physiological responses of juvenile salmonids in the Delta and what would be necessary to keep them in

good condition, temperature wise, or otherwise.

That was not what he testified to on redirect. His statement was very narrowly focused about his actual sampling processes and events and observations. No conclusions. No opinions.

H.O. BROWN: Thank you.

Mr. Gee.

MR. GEE: I wish to add that Mr. Fleming's comments only were clarifying his response to Mr. Lilly, that is all.

H.O. BROWN: I understand. I concur with the objection. Sustained.

MR. LILLY: Fine. Following the Board's ruling, I have no further questions.

H.O. BROWN: Okay. Any further recross?

Do you have any additional exhibits, Mr. Gee?

MR. GEE: I do, Mr. Brown.

H.O. BROWN: Okay.

MR. GEE: I introduce Exhibits Department of Interior Number 9, 10, 13-A, 13-B, 14, 15-A, 15-B, 15-C, 16-A, 16-B, 16-C, and 17. I wish to withdraw S-DOI-11 and 12.

H.O. BROWN: Ernie, did you get all that?

MR. MORA: Yes, sir.

H.O. BROWN: Does that concur with your --

MR. MORA: Except for Exhibit Number S-DOI-18, which was a copy of the 1992/'93 flow graph that he put up originally.

MR. GEE: Mr. Mona is correct. And I submit that one as well.

H.O. BROWN: Okay. All right. Are there any objections to the admission of those exhibits?

Mr. Lilly.

MR. LILLY: I object to Exhibits S-DOI-9, 10, and 17 on the grounds that those are hearsay. Those are clearly statements made by other authors who are not present in the hearing. And if they are admitted, I request that they be admitted subject to the Board's limitations of the use of hearsay evidence.

I object to Exhibits 15-A, 15-B, 15-C, 16-A, 16-B, and 16-C on the basis of lack of foundation. And I won't repeat, unless the Board requests, my prior objection regarding the fact that Mr. Guinee was simply summarizing his understanding of modeling work that was done by other people who are not present at this hearing.

And I object to Exhibit 18 simply for the reason we don't have copies of it, so we can't look at that to see whether or not we have any further objections. I propose that Mr. Gee furnish copies of that to us and then we can handle that at the appropriate time.

MR. MORA: Mr. Brown, I have extra copies of Number 18 for the parties.

H.O. BROWN: You have one extra copy?

MR. MORA: I have several extra copies.

H.O. BROWN: All right. Why don't you look this over, Mr. Lilly, and the rest of you that are interested in it. And, Mr. Gee, you have comments on the other -- I'm sorry, Mr. Minasian.

MR. MINASIAN: I'd like to join in the objections on behalf of Brophy, Cordua, and South Yuba Water Agency.

H.O. BROWN: The same exhibits?

MR. MINASIAN: Yes, and on the same basis.

H.O. BROWN: Mr. Morris?

MR. MORRIS: I'd also like to join in the objections.

H.O. BROWN: All right. Mr. Gee -- wait a minute.

Mr. Bezerra.

MR. BEZERRA: I'd like to join them as well.

H.O. BROWN: I apologize, Mr. Gee. You may now rise.

MR. GEE: Thank you, Mr. Brown. I believe that throughout these hearing the Board has taken as a standing objection that evidence as to hearsay would have that limitation. As to Exhibits 15-A, 15-B, 15-C, 16-A through C --

H.O. BROWN: That's 16-A through C?

MR. GEE: That's right. There was the early admonition that the Board would take this into evidence and gave it the weight that it is due, given Mr. Guinee's testimony. And it should be admitted for that reason.

H.O. BROWN: Thank you, Mr. Gee.

Mr. Frink, you wish to add any comments?

MR. FRINK: As the Hearing Officer has recognized throughout on hearsay exhibits that are admitted, they're admitted subject to the provisions of the Board's

regulations regarding the use of hearsay.

Exhibits 15-A, B, and C and 16-A, B, and C go beyond simply being hearsay. They are based on modeling results and the modelers were not present. The assumptions and logic utilized in the models were not present, or were not identified.

I think it's within the discretion of the Chair as to whether they will be admitted or not, but certainly if they are admitted under the provisions stated in the hearing notice I think they would be given very limited weight and use.

H.O. BROWN: Thank you, Mr. Frink.

Exhibits 15-A, B, and C will be admitted on the hearsay Rules of Evidence, to be given the weight

accordingly.

Exhibits 16-A, B, and C on the modeling, for lack of foundation, that was well discussed. Mr. Frink, your explanation of that, as Mr. Minasian walked through the door, I think that gave that proper recognition as to the lack of foundation.

And on that basis and your recent statement, Mr. Frink, I think I will admit those into evidence. On Exhibit 18, is there further comments or objections on it?

MR. LILLY: Mr. Brown, could I just seek clarification? Is it correct that you're ruling for 16-A, B, and C also applies to 15-A, B, and C, because those were also out -- hydrological output drafts? I just wanted to make sure we had that record clear on that.

H.O. BROWN: Thank you, Mr. Lilly. I think that's correct, is it not.

Mr. Frink, they were part of the modeling exhibits, also?

MR. FRINK: Yes. 15-A, B, and C, 16-A, B, and C were all outputs from the model.

H.O. BROWN: All right. Does that answer your question, Mr. Lilly?

MR. LILLY: Yes, it does. Now, may I move on to 18?

H.O. BROWN: Yes.

MR. LILLY: I don't have a fundamental objection to

18, but I would request that Mr. Gee ask one of his witnesses to clarify where this data came from and where it is being measured.

We have an unlabeled graph right now. We don't know what river it's on. And if it's the Yuba River, we don't know the point of measurement. So assuming they can give some kind of authenticity to this right now, we have a graph without any basic foundational evidence to support

it.

H.O. BROWN: Why don't you come forward, Mr. Lilly. And ask those questions one at a time and we'll get that on the record.

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FURTHER RECROSS-EXAMINATION OF THE U.S. DEPARTMENT OF INTERIOR AND FISH AND WILDLIFE SERVICE BY YUBA COUNTY WATER AGENCY

BY MR. LILLY

MR. LILLY: Okay. That's fine. Mr. Fleming, was 18 your exhibit?

MR. FLEMING: Yes, it is.

MR. LILLY: Okay. First of all, what is this figure depicting?

MR. FLEMING: It's a picture of the hydrograph for the Yuba River.

MR. LILLY: At what measurement location?

MR. FLEMING: That I'm not particularly sure of. I'm thinking it's Smartville, but I don't remember.

MR. LILLY: It may be Smartville, it might be Marysville?

MR. FLEMING: Yeah.

MR. LILLY: Okay. And where did this data come

from?

MR. FLEMING: U.S. Army Corps report, that's yet to be published, on feasibility -- it's feasibility study for Daguerre Dam.

MR. LILLY: Mr. Brown, I don't object to its coming into evidence. It's obviously entitled to whatever weight the Board thinks is appropriate. I think there is some question as to how much weight this exhibit should be given.

H.O. BROWN: Thank you for getting that on the record, Mr. Lilly.

Any further comments on Exhibit 18? All right, it will also be admitted into the record.

Mr. Gee, thank you. Panel, thank you very much for your time and participation.

MR. FLEMING: Thank you.

MR. GUINEE: Thank you.

H.O. BROWN: Mr. Cunningham, you're up. We'll go off the record for a moment while you get set up.

(Off the record 1:54 p.m. to 1:55 p.m.)

H.O. BROWN: Back on the record.

MR. CUNNINGHAM: Thank you, Mr. Brown. It's probably the shortest break we've had since we started this hearing. In fact, Mr. Brown, following what U.S.

Fish and Wildlife Service did, it might be easier, again, to take another brief moment off the record. We're going to have several written exhibits. They're already identified, at least, with our numbering. What I might want to do is offer those now for everyone to pick up so to minimize the disturbance as we actually discuss these exhibits and go forward.

H.O. BROWN: Thank you.

(Off the record from 1:57 p.m. to 1:59 p.m.)

H.O. BROWN: Back on the record.

MR. CUNNINGHAM: Thank you, Mr. Brown.

In looking now, we got pretty well cleaned out. If more copies are needed, we'll make them available. We brought 6 for the Board and 20 for the parties. We thought they were going to be sufficient numbers, but apparently not.

MR. FRINK: I have an extra set.

H.O. BROWN: All right.

MR. CUNNINGHAM: We have another complete set. Thank you, Mr. Brown. Mr. Brown, if we also might, one of

my two witnesses is appearing for the first time and needs to take the oath before she can testify. If it's the appropriate thing to do, we should probably do it now.

H.O. BROWN: All right. Do you promise to tell the truth during these proceedings, if so answer, I do?

DR. RICH: I do.

H.O. BROWN: Please, be seated.

MR. CUNNINGHAM: Thank you, Mr. Brown.

Mr. Brown, I have two witnesses today on behalf of the Department of Fish and Game for rebuttal. Mr. John Nelson, who has previously appeared, and Dr. Alice Rich, who has just been sworn in. We also, as you have seen earlier, brought written exhibits, which we have identified for purposes here strictly for identification as Exhibits S-DFG-38, S-DFG-39, S-DFG-40, S-DFG-41, and S-DFG-42.

And we'll present those with those numberings and we'll refer to that as our next exhibits in order, as Mr. Mona tells me. And with that I would like to go ahead and ask my first questions.

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REBUTTAL TESTIMONY OF THE CALIFORNIA DEPARTMENT OF FISH AND GAME

BY MR. CUNNINGHAM

MR. CUNNINGHAM: Mr. Nelson, you have previously taken the oath in this proceeding?

MR. NELSON: Yes, I have.

MR. CUNNINGHAM: Mr. Nelson, you've heard previous testimony I believe from Yuba County Water Agency's biologists that the fall-run chinook salmon populations on the Yuba River have increased since the construction of the New Bullards Bar Dam. Do you have any comments on this statement?

MR. NELSON: Yes, I do. It's been indicated that the post-New Bullards Bar fall-run populations have increased over the pre-New Bullards Bar populations as you indicated. However, this does not reflect the pre- and post-population trends. If one compares the population trends pre- and post- to New Bullards Bar, there is a significant difference between the trend lines.

MR. CUNNINGHAM: Do you have an exhibit that illustrates this difference in trend lines, Mr. Nelson?

MR. NELSON: Yes, I do. And that is Exhibit S-DFG-Exhibit 41.

MR. CUNNINGHAM: Thank you, Mr. Nelson.

MR. NELSON: And actually what I've done here is I have taken the pre-New Bullards Bar fall-run populations from 1953 to 1971 and plotted a regression line. And I've done also the same for the post-New Bullards Bar, 1972 through 1999.

And if you look at those two lines, the solid line is the post-New Bullards -- excuse me, the pre-New Bullards Bar population. And you notice it has quite a steep slope. And if you compare that with the dotted lines, which is the post-New Bullards Bar population, it is a flatter slope.

And really what that is saying is that the pre-New Bullards Bar population was expanding at a much greater rate than has the post-New Bullards Bar population. And since New Bullards Bar it appears that the population expansion has actually been suppressed.

MR. CUNNINGHAM: Thank you, Mr. Nelson. I think also we heard earlier testimony about the size of the fish salvaged at the Hallwood-Cordua fish screen. And I believe it suggested that the size of the fish salvaged from the Hallwood-Cordua fish screen have been used to evaluate the effectiveness of the South Yuba-Brophy rock gabion.

Can you provide any information as to the appropriateness of using the size of the fish captured at the Hallwood screen to evaluate the South Yuba-Brophy rock gabion?

MR. NELSON: Yes. The testimony by Mr. Cramer regarding the effectiveness of the South Yuba-Brophy rock gabion, he stated that small fry-size

fish were not present at the time that the Yuba diversions were occurring. And this is partially based on the salvage data, or the fish collected at the Hallwood screen. And it's based upon the size criteria of those fish that were collected.

And this is simply not the case as far as the size of fish present. As evidenced by our previous testimony where we indicated that fry in the 27-millimeter size range were present in the river in late July. Also, we would not expect the Hallwood screen to be efficient at capturing small fry-size fish.

As previously indicated, the screen exceeds the criteria established for the protection of fry-size fish. That is over 25 percent of the screen area is hot, exceeds the criteria for post-velocities. And also the opening size of the screen is 5/32nds, almost twice the size of the DFG and NMFS recommended criteria of 3/32nds. Also, as we can see from comparisons of the preliminary captured data from our rotary screw trap this year and at the Hallwood screen this year -- and this is --

MR. CUNNINGHAM: This is S-DFG-42?

MR. NELSON: I believe so.

MR. CUNNINGHAM: S-DFG-42.

MR. NELSON: And this is data that has been collected in the last month. We installed the fish screen

the 13th of April when, roughly, the diversions began. And as you know from previous testimony, the rotary screw trap was also operating, or is continuously operating in the Yuba River.

And really what this is saying is that if you look at the bottom graph, and there's basically three different categories of fish, the bottom graph is fish captured that are greater than 80 millimeters in length.

And if you'll notice that the -- and this is captured both in the rotary screw trap and in comparison with those fish that are salvaged at the Hallwood screen. They're both basically capturing that size category of juvenile fish.

You move up to the center figure, that is the size range of 40-millimeter to 80-millimeter fish. The top line with the open boxes is the rotary screw trap. And the dark boxes on the bottom are the fish screen. As you can tell, there are really more captured with respect to the rotary screw trap, although they are both capturing that size category of fish.

And if you were to look at the fry-size fish, the top category, virtually the fish screen is capturing zero fish of that size category. And the rotary screw trap is still demonstrating that there are substantial numbers of fry-size fish present.

So really what this comes down to is using the fish that are present and the size of fish that are being captured in the Hallwood screen is not appropriate for making an evaluation of the effectiveness of the Fyke trap, or the effectiveness of the rock gabion with respect to the size of fish at the time of year the diversions are occurring.

And so really the point I'd like to make here is there are small fish present at times of year that Mr. Cramer sampled. And using his -- I believe it was 80 millimeters was roughly the size range, average size fish that he caught -- is biased by using the Hallwood screen data. And effectively should have sampled the river, made an attempt in the river to capture fish that are obtained to present a representative sample of what is in the river at a certain time of year.

MR. CUNNINGHAM: Thank you, Mr. Nelson.

Dr. Rich, I think before we start much further into your testimony, I would like to notice that Exhibit S-DFG-40 is a copy of your resume.

Dr. Rich, is this a true and correct copy of your resume?

DR. RICH: Yes, it is.

MR. CUNNINGHAM: Okay. And, Dr. Rich, did you also

prepare some written testimony as part of your rebuttal

for today's appearance?

DR. RICH: Yes, I did.

MR. CUNNINGHAM: And is S-DFG-Number 39 a true and correct copy of that testimony?

DR. RICH: Yes, it is.

MR. CUNNINGHAM: Thank you, Dr. Rich. Now if we can go to some specific questions.

Dr. Rich, Yuba County Water Agency's fisheries biologists in testifying earlier in this hearing used something called a condition factor as an, quote, indicator of general nutritional condition, or well-being of a fish, closed quote. I believe that's from Page 3-16 of Exhibit S-YCWA-19.

Dr. Rich, is the condition factor a good indicator of general nutritional condition or well-being of a fish?

DR. RICH: No, it really is not. And I'd like to give a couple reasons. Mr. Nelson, could you put the first slide up?

MR. CUNNINGHAM: This slide is an overhead from Exhibit S-DFG-38. This is Page 1 of S-DFG-38?

DR. RICH: To refresh our memories a bit on what a condition factor is, it's basically a relationship between

weight of a fish to the length of a fish. And if the girth, or the size of the fish increases, the condition

factor increases. If the size of the fish decreases in terms of the actual weight or volume, then the condition factor decreases.

It has been repeatedly criticized by us physiologists for years and years, because it's something that is -- may be fairly useful in a laboratory situation where we may have a lot of control but there may be some problems there as well. In the field, however, where we really do not have control on environmental factors which can effect a condition factor it is really of no use.

First of all, the amount of food that's in a fish's stomach will directly affect the condition factor. If the fish has just had a meal, the condition factor is fairly high. If the fish has not been eating for quite some time, it will be low. And, consequently, somewhere in between if it's basically digesting its food.

Secondly, during the parr-smolt transformation, condition factor decreases and the fish become more lean, or slim, so the condition factor is going down. The season of the year can affect the condition factor, of course, which we have no control over.

And, finally, the race of a species can certainly affect it, because the spring-run, for example, on the Yuba River and the fall-run have different life cycles. And depending on their nutritional state, again, this

could affect them, since we do not know in terms of juveniles if we were actually sampling, or whether the people that were sampling were sampling spring-run or fall-run. We have no way to determine what's really going on.

So, consequently, there's nothing in terms of field studies for the Yuba River, or any other river for that matter, there really is no ability to determine any sort of cause-effect relationships, whether it be condition factor with temperature, condition factor with flows, condition factor with any other factor in the river.

MR. CUNNINGHAM: Dr. Rich, earlier testimony by Yuba County Water Agency's fisheries biologists, a statement was also made in Exhibit S-YCWA-18 that the Cech and Myrick report, which I believe was included in our exhibits, as I think it's S-DFG-36, demonstrated that, quote:

Nimbus steelhead used in this study preferred temperatures between 17 degrees Centigrade, paren, 62.6

degrees Fahrenheit, closed paren, and 20 degrees Centigrade, paren, 68 degrees Fahrenheit, closed paren, irrespective of ration level or rearing temperature, closed quote.

They also stated on Page 3-25 of Exhibit

S-YCWA-19 that Cech and Myrick, quote:

Found that steelhead and chinook salmon acquired from the Nimbus hatchery on the American River exhibited higher preferred temperature ranges than reported by the other researchers who are listed in Table 3, closed quote.

Dr. Rich, are the above statements correct interpretations of the results of the Cech and Myrick report, to your knowledge?

DR. RICH: No, they are not. And before I delve into the Cech and Myrick report, I need to discuss a little bit about fish bioenergetics so I think people will understand how I reached the conclusions that I did. So we're going to have a very quick study of Fish Bioenergetics 101.

First of all, we need to clear up something really basic, which is that the method that physiologists use to determine optimum growth -- basically, optimum thermal requirements is not using growth rate.

Secondly, the way physiologists do determine what the optimum thermal ranges will be is using what's called maximum food conversion efficiency, or behavioral studies in a laboratory where you're looking at preferred temperature. I think it's worthwhile to provide you sort of a layperson's definition of what food conversion efficiency is.

This is the amount of food that a fish eats which is transformed into body weight. And, actually, we also as human beings, as mammals have a similar sort of thing, it applies to all mammals.

In the laboratory situation when one is feeding the fish as much as they want at the 100-percent ration, as the temperature goes up the amount of food that the fish needs also goes up. And provided that one can satisfy that need in terms of the increased temperatures then the fish will continue to grow up to a certain point.

But in a field situation, one never has it so good. One -- the fish never feed -- bioenergetically it is not efficient for the fish to be feeding at 100-percent ration. They wouldn't be able to do anything with their lives, basically, if they had to do that. So the bottom line is as the temperatures increase it is much less efficient to growth and it's much more difficult for the

fish to grow.

The preferred temperature is something that usually are set up in laboratory situations, again, where we have a controlled situation. And this is the situation where the fish is provided with a series of flumes, for example, and the different water temperature regimes and they can have their choice where they end up, where they want to go.

And fish physiologists generally have always assumed that where the fish, given the opportunity to go anywhere, that this preferred temperature is probably one of the more accurate ways of determining what that optimum thermal temperature would be for the fish.

MR. CUNNINGHAM: Just for the record, the overhead and the exhibits we're looking at now is S-DFG-38, Page 2.

DR. RICH: Mr. Nelson, if I could have slide three.

MR. CUNNINGHAM: And this will be Page 3 of S-DFG-38.

DR. RICH: This figure is a figure summarizing growth-rate preference, food conversion efficiency experiments that have been done on juvenile chinook salmon. And there's a number of key points that I want to go over with you on this.

The first of which is the preferred temperature. The second is that the maximum food conversion -- the temperatures at which maximum food conversion occurs is the optimum temperature. The third is that the temperatures at which maximum growth rate occurs is not an optimum temperature.

And, finally, in the range that one finds for the maximal growth rates, if you look at the research the people have done, myself included, you will find that there's actually a lot of stress that can occur during

those periods.

And I think what I'd like to do is start from the bottom here. This down here is a preferred range. And this is a study that was done actually some years ago.

MR. CUNNINGHAM: You're referring to the bottom line with arrows that says "Preference," to the left?

DR. RICH: That's correct. And the range on this study was 53.1 to 55.4 degrees Fahrenheit.

MR. CUNNINGHAM: And this was developed by the study, to your knowledge?

DR. RICH: Yes, it was. And this is considered, as I said, by fish physiologists to be one of the ways that we determine the optimal -- basically the optimal temperature for the fish.

The second way is to look at the food conversion efficiency. And in the study on the American River where we worked about 13 years ago or so we found that when the fish were fed 100-percent ration, basically, we just fed them and fed them as much as they could eat, that we have a range of between 55 and about 61.7 degrees Fahrenheit, which was where they maximally converted their food.

If you look at the very top of the graph, on the left-hand side here we have a line that says, "Maximum Food Conversion Efficiency," and in parentheses it says, "60-percent ration." This was a study that was you done

by Dr. Brett and colleagues up in Canada back in 1982.

And they've estimated that the fish in the Nechako River were actually feeding at about 60-percent ration. And at that ration level the optimal thermal number was 58 degrees.

Now, if we look on the right side of this whole graph here, we have both maximum growth rates and thermal stress. And at the very top of the graph here, again, this is Dr. Brett's study, we had a range of 64.6 to I think 69.7, I can't quite read it here.

Again, they were feeding the fish maximally. And when we were doing our studies on the American River we

also had a very wide range in terms of the growth of these fish in terms of optimal temperature. But what you notice is that when you look at all the studies on water temperature on juvenile salmonids, which I have done many times, you will find this whole region from about 60 degrees up can be thermally stressful, depending on the conditions that the fish are exposed to.

So, basically, what I'm trying to say here is when you've got fish in a laboratory that are fed as much food as they want, this will never be the same as what's happening in the real world. The fish do not feed maximally in the real world. They are exposed to predation. They're constantly trying to swim to obtain

food. All the bioenergetic requirements that a fish needs will go there first.

And if its metabolic rate has been satisfied, then it may have energy left over to go swim after some food. If there's still some energy left from the food it obtained, then maybe it can escape a predator, maybe not.

After all of these things have been satisfied, then if its lucky it will grow. But growing and reproduction are at the very end of the cycle in terms of what these animals can do. And as water temperature increases, it becomes increasingly more difficult for the

fish to satisfy their basic requirements let alone grow.

Mr. Nelson, may I have the next slide, this is Page 4 of Exhibit DFG-38. And I'm not going to belabor the point, but these are studies that have been done on chinook salmon fry. And I think the key thing I wanted to get across here is the fact that -- I believe it's generally been assumed -- Mr. Bratovitch during his testimony, I believe other people have stated it as well, that in the Yuba River the emigration of salmonids is primarily the post-emergent fry, which, in other words, is very small fish. And this is all the more reason to make sure that the temperatures are not increased, because fry are much more sensitive to higher water temperatures than juveniles.

Now, I'd like to turn our attention to the Cech and Myrick report. There's a number of things that we can say about the Cech and Myrick report, or I can. But one of them is not that they concluded that 66.2 degrees Farenheit is the optimal for juvenile chinook salmon or for steelhead trout.

And, in fact, and these are basically quotes out of their report. Number one, quote, "We did not detect significant temperature affect on full-ration salmon gross

conversion efficiencies." And I just discussed what the conversion efficiencies were. There's no difference with different temperatures that -- the data did not show that 66.2 was an optimal temperature.

Secondly, quote, "Reduced ration-gross conversion efficiencies were also similar and negative at all temperatures tested," unquote. Third, quote, "There were no significant differences between mean or final preferred temperature of any treatment, hence, this did not show what an optimal temperature would be for these fishes."

Similarly, for steelhead there were no significant differences between the mean and final preferred temperatures. And, in fact, in their report they actually stated that it is premature to conclude that an optimal temperature for the Central Valley steelhead is 19 degrees Centigrade, or 66.2 degrees Fahrenheit.

So, basically, Cech and Myrick did not demonstrate their optimum temperatures for chinook and steelhead running higher than previously determined. And they, certainly, didn't determine that 66.2 Farenheit was an optimal temperature. So what did they do?

Well, I have some bullet points here of some of the results. First of all, the fish, if they're starved lose weight similar to human beings. Secondly, if they're

fed as much as they want, they will grow better than if they're not fed much.

Secondly, similarly with swimming, they will swim better if they're fed as much as they need compared to the reduced rations. Fourth, there is no affect on oxygen consumption rates.

Fifth, if you increase the temperature at which these fishes are acclimated you will increase the temperature at which 50 percent of them -- and this is called critical thermal temperature -- it's something that has been worked out for both chinook and steelhead juveniles and it's nothing new.

Next, they did not exhibit higher preferred temperatures ranges than reported by other researchers. And, finally, they certainly did not conclude that 66.2 degrees Fahrenheit was optimal for chinook salmon or steelhead.

Consequently, they really didn't provide any new data for us physiologists, which is, frankly, sort of disappointing. May I have the next slide? This is an -- it's Page 3-25, Table 3 from Yuba County Water Agency's exhibit S-YCWA 19. And when I first saw this I thought, well, they basically did their homework, the biologists

did. And they went through and found out what various people had done in terms of determining what the optimum temperatures were. And, ultimately, came up with reasonable results, basically reporting all the various work that I and others have done.

And if you note on this, it's probably easier to see on your handout than it is to see on the board up here, that the highest temperature for anything was about 60.1 for juveniles. And as I said they appeared headed in the right direction, until they got the Cech and Myrick report, which even if the Cech and Myrick report had proved something, I think any scientist would caution one to use one study as opposed to probably 30 and just assume that the most recent one was accurate. The point is that the most recent one, which is the Cech and Myrick report, did not prove anything new.

MR. CUNNINGHAM: Dr. Rich, in testimony provided by Yuba County Water Agency, mean monthly temperatures were used to estimate the percent of ton of water temperatures

exceeded given values, for example, 60 degrees Fahrenheit.

Dr. Rich, do mean monthly water temperatures provide an accurate depiction of the physiological and behavioral responses of the chinook salmon or steelhead to water temperatures in the Yuba River?

DR. RICH: No, they do not. First of all, fish don't respond to mean monthly temperatures any more than you and I respond to mean monthly air temperatures. They respond to what happens instantaneously, particularly, for any animal that's a coldblooded, or a poikilotherm animal, they are dependent upon what's happening around them constantly.

So if it's hotter, they're hotter and they must find additional food, for example, to maintain their metabolism. Secondly, when one models the mean monthly water temperature, the slide up here, which is Page 9 from DFG Exhibit 38, these data were some data given to me by Fish and Game. And they are -- this one, basically, summarizes the mean monthly water temperatures at the Marysville gauge station from January of '96 to January of 2000.

All this is, basically, is an example that shows that when one looks at the mean monthly water temperatures, you completely remove the variability -- maybe not completely, but substantially enough that you

don't really have an accurate representation of what the fish is responding to.

If I could have the last slide, please. This

last slide depicts the daily minimum, the daily maximum, and the daily average temperatures for the same site, basically, the same depth.

Basically, it shows the data in terms of a more realistic fashion in terms of a fish's response. I mean, ideally, we'd like to be able to look at these things from a minute-to-minute count, but that's something that really isn't very realistic. But we, certainly, did look at the variations in a given day and find out what the fish are exposed to.

And this is a much more accurate representation of what's happening in terms of a fish's response. Where when one looks at the mean monthly, all of these red areas that you see here on the graph have been removed and these are the maximum temperatures that fish were exposed to over time.

And from the beginning of the spring through the summer, of course, the temperatures can get quite high. And these fish have to learn to adapt if they can, or if they can't, they will either die, or at some subsequent time in their life they may die.

When one takes information and just uses, for

example, mean monthly water temperature instead of looking at the temperatures that has happened to the fish at every

minute of its life, and if one tries to make comparisons, for example, it's very common to take mean monthly flows and try to relate them to mean monthly temperatures.

And so you end up looking at the means of the means. And you say, okay, is there a relationship between these temperatures and these flows? And sometimes people will come up with answers saying, yes. Or you might try to take mean data temperatures and flows and try to relate it to a condition factor, or to other various things, fish populations, or something like that.

The bottom line is when you're starting with something that is wrong, in terms of what the fish -- it's not an accurate representation of what the fish is being exposed to, you have what I have commonly called a bioaccumulation of error. You, basically, just end up exacerbating the problem. And you never really have an accurate idea of what's happening to the fish itself.

H.O. BROWN: Mr. Cunningham.

MR. CUNNINGHAM: Sir?

H.O. BROWN: Let's take our afternoon break.

MR. CUNNINGHAM: Thank you, sir.

(Recess taken from 2:35 p.m. to 2:43 p.m.)

H.O. BROWN: Come back to order.

MR. CUNNINGHAM: Mr. Brown, I had one last question for Dr. Rich.

Dr. Rich, it is my understanding that in your opinion to use a mean monthly water temperature for the management of juvenile salmonids would not be the appropriate way to manage juvenile salmonids?

DR. RICH: Yes, that's absolutely correct.

MR. CUNNINGHAM: My witnesses are available for cross-examination of the panel.

H.O. BROWN: Thank you, Mr. Cunningham.

Mr. Gee.

MR. GEE: Mr. Brown, I have no questions. Thank you.

H.O. BROWN: Thank you, Mr. Gee.

Mr. Sanders.

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CROSS-EXAMINATION OF THE CALIFORNIA DEPARTMENT OF FISH AND GAME

BY SOUTH YUBA RIVER CITIZEN'S LEAGUE

BY MR. SANDERS

MR. SANDERS: Just a couple questions for Mr. Nelson. I'm looking at S-DFG-42. I'm especially interested in the top graph for the smallest fish. Your testimony -- correct me if I'm wrong, your testimony was that essentially no -- none of those less than

40-millimeter fish are being caught at the fish screen; is that correct?

MR. NELSON: Very, very few. For all intents and purposes, it's been zero. I believe there's been one to six fish captured since we started trapping on the 13th of April of this year.

MR. SANDERS: Okay. This data is just from the past month?

MR. NELSON: That's correct. This is the first year that we have run the screw trap. We had a screw trap at the river simultaneously with the Hallwood fish screen operations.

MR. SANDERS: Okay. And your conclusion based on the comparison of the fish trap versus the fish screen is that those fish are present, but that the fish screen is -- they're not appearing at the fish screen; is that correct?

MR. NELSON: That's correct. The smaller fish -- and, actually, if you look at it, there is a definite difference in the number of fish captured in the 40- to 80-millimeter range. And, actually, where this breaks off is around 65, although it was not plotted on here, but the break off is about 65 millimeters or less. The fish are present in the river, but they are not showing up at the Hallwood-Cordua screen, for whatever reasons, for the

effectiveness of the screen for some reason.

MR. SANDERS: Now, do those fish less than 65 millimeters, are they -- are they entrained in the diversion, is that what happens to them?

MR. NELSON: My conclusion would be that they are lost at the -- from the point of intake to our collection facilities primarily due to the inadequacy of the screen. And that's for various reasons, I indicated, because about 25 percent of the screen surface is hot, meaning that the approach velocities through it are much greater than the current criteria. Also, the openings are almost twice as large as required by NMFS and DFG. And also there would be the other issues brought up before, predation in approximately the one-third mile downstream from the intake to the actual fish screen.

MR. SANDERS: Okay. When you say, "lost," you mean they don't return in three years to spawn again?

MR. NELSON: No.

MR. SANDERS: Okay.

MR. NELSON: They're going someplace -- either they're preyed upon and consumed by other predators, or they're going on through the canal on to the ags.

MR. SANDERS: Okay. You drew some conclusion about the fact that these fish, these tiny fish are present. You were correlating that to the South Yuba-Brophy's

screen?

MR. NELSON: Correct.

MR. SANDERS: So I'm just trying to make it clear: What do you think happens to those small fish when they encounter the south screen, do they pass through the screen, or are they killed, what happens to them?

MR. NELSON: All of the above. I mean, my opinion based upon other previous testimony is that they are lost to predation either in front of, or behind the rock gabion, but -- and that they are passing through the rock gabion. They could also be entrained in the rock gabion.

MR. SANDERS: Okay. And why did Mr. Cramer conclude otherwise?

MR. NELSON: Well, partially is he based his efficiency of his Fyke trap of the sampling on the size of fish -- his conclusions are based upon the size of the fish that were encountered at a given time of year, at springtime, at the Hallwood-Cordua fish screen.

And as we demonstrated here, using that size criteria, which I believe his average fish size was 80 millimeters in May, as I recall, is inappropriate, because the Hallwood screen is just not sampling for that size of fish. And we are losing all those fish that are generally less than 65 millimeters.

MR. SANDERS: Okay. Thank you very much.

H.O. BROWN: Thank you, Mr. Sanders.

Mr. Lilly.

MR. LILLY: Mr. Brown, in light of the hour and the amount of new information that's been provided by the Department of Fish and Game, in particular S-DFG-39 which is 12 pages, single-spaced, and which has not even been summarized, unless 38 is the summary of 39, I'd request that we just break early today so we have time to review these materials to prepare a more efficient and appropriate cross-examination tomorrow morning.

H.O. BROWN: Mr. Minasian?

MR. MINASIAN: Obviously, I will join in that.

H.O. BROWN: Mr. Cunningham.

MR. CUNNINGHAM: Mr. Brown, thank you. While I appreciate Mr. Minasian's and Lilly's quandaries, the testimony contained in S-DFG-39 actually only goes to seven pages, that it also consists of a bibliography, which I think is appropriate, and a definitional dictionary which just makes an effort to identify some terms, and it's not an awful lot of information to assimilate.

The witnesses are here. And this witness has come at some considerable expense and time to make an

appearance today. We are prepared to offer this witness for cross-examination and have done so.

We did our best to provide additional testimony in written form to expedite this proceeding, other than to delay it. If you wish I will put this witness back on as a direct witness and I'll have her read this testimony, all seven pages of it and Mr. Lilly can then cross-examine that witness at that point in time, as has he has already cross-examined Fish and Wildlife Services' witnesses this morning, who also provided lengthy direct statements.

Our direct testimony took less than 45 minutes and probably closer to a half hour in an effort to be expeditious. And I would like to go ahead and proceed with these witnesses, if possible.

H.O. BROWN: Mr. Frink, do you have a comment?

MR. FRINK: Yes, Mr. Brown. The hearing notice did not prescribe any pre-submittal requirements on rebuttal exhibits. Everybody is kind of in the same boat. I don't believe anybody did distribute their rebuttal exhibits before their testimony began.

I think it could slow the hearing up, considerably, if the Board adjourned each time that rebuttal exhibits were presented in order to give

everybody else an opportunity to consider them at length.

H.O. BROWN: Thank you, Mr. Frink.

Mr. Lilly.

MR. LILLY: Yes. I mean this is not something that

we would ask for every single party. But this witness, in particular, we did not object regarding the scope of rebuttal, because arguably -- although I think there was some considerable gap in the testimony -- arguably responded to some of the testimony we had offered regarding temperatures.

But we have a whole new witness who has not even testified in the direct testimony at all. We have a detailed submission of testimony with approximately 20 technical papers cited to support it. And most importantly, some completely new concepts that were not offered on direct.

So I don't really think that the comments are appropriate. And we're asking for the hearing to adjourn approximately one hour before it normally would. I think we have a good argument that we ought to be entitled to have until May 16th to respond to this, but we are at least asking to have until tomorrow morning. And I really think that's an appropriate request.

H.O. BROWN: Mr. Minasian.

MR. MINASIAN: Mr. Brown, if I might offer a compromise. Why don't I go ahead and try to examine Mr. Nelson in regard to his testimony relating to the South Yuba-Brophy screen. And that would leave you losing as little time as possible and giving Mr. Lilly and I and

whoever else wants it, substantial time to digest what really ought to have been direct evidence on the part of DFG, a surprise. Temperatures, why wasn't it presented in the first place?

H.O. BROWN: Here's the ruling on this, I did tell Mr. Frink that I intended to adjourn today at somewhere between 10 and 5 to 4:00. And if there is someone that is willing to follow, now, Mr. Lilly, and to, in a sense, take your place until a later date, I will permit that.

If there is no one, then, you're up, Mr. Lilly. But it does appear like the first one after you is Mr. Minasian. And if you're ready, then, I will give you some time in that manner, but we do want to take advantage of these witnesses while they're here.

MR. MINASIAN: I appreciate that. Can someone find me a copy of Mr. Cramer's 1993 study? I did not happen to bring it today, not anticipating it.

H.O. BROWN: All right. Mr. Frink?

MR. FRINK: We may have it.

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CROSS-EXAMINATION OF THE CALIFORNIA DEPARTMENT OF FISH AND GAME

BY SOUTH YUBA WATER AGENCY

BY MR. MINASIAN

MR. MINASIAN: Mr. Nelson, I gather that the rotary

screw trap in the Hallwood-Cordua screen seem to be operating in accordance with normal practice for those facilities in the period of April 13th through April 29?

MR. NELSON: Yes.

MR. MINASIAN: And the rotary screw trap is actually anchored in the river; is it not?

MR. NELSON: No.

MR. MINASIAN: Well, where is it anchored?

MR. NELSON: I mean it's anchored to the bank. It's not in the river. I'm not sure what you mean.

MR. MINASIAN: But it's sampling flows of the river; is it not?

MR. NELSON: It is sampling flows in the river, yes.

MR. MINASIAN: And the Yuba River flows vary from time to time as do the diversions at the Hallwood-Cordua diversion; do they not?

MR. NELSON: That's correct.

MR. MINASIAN: All right. What are the comparative amounts of flow that are being sampled by the Hallwood-Cordua fish screen and the rotary fish trap through the periods of April 13 through April 29?

MR. NELSON: I can't tell you the exact flow difference. What I can tell you is that the flow that is going through the rotary screw trap is probably on the order of a magnitude of less than has occurred at the

Hallwood-Cordua diversion. At a 1,000 cfs flow in the river, we were sampling approximately 33 cfs.

MR. MINASIAN: Okay. And what was the diversion rate at Hallwood-Cordua, as an example, from 4/13 to 4/17?

MR. NELSON: Much greater.

MR. MINASIAN: Well, it was raining during that period of time; wasn't it?

MR. NELSON: There was a couple of days of rain, but I've seen the diversion operating with approximately five-foot of depth in the canal during that period of time.

MR. MINASIAN: Okay. In order to compare these two capture rates in terms of the size of fish, wouldn't it be appropriate to put a correlation between the amounts of flow going through the screw trap, rotary screw trap and

the amounts of flow going through the Cordua-Hallwood screen?

MR. NELSON: No.

MR. MINASIAN: Why not?

MR. NELSON: I'm not comparing numbers. I'm comparing relative sizes captured. And I would expect that they would be captured in relatively the same percentage of sizes regardless of the flow. And what we're clearly seeing is that at 40 millimeters and less the screen is capturing zero fish.

I believe, like I said, there's one to six fish captured in that entire time frame. And I know during that entire time period the flow was much greater in the Hallwood-Cordua diversion than was ever being sampled by the rotary screw trap. And, actually, that -- while not indicated on the figure I showed, is, actually, approximately 65 millimeters or less. The Hallwood screen is not capturing that size class of the smaller of fish.

MR. MINASIAN: Now, you're indicating to us that effectively the capture rates and the populations they're capturing are similar; is that correct?

MR. NELSON: What I'm trying to indicate with those is that the size of fish captured is significantly different.

MR. MINASIAN: Okay. And the position of the rotary screw trap is how far below Daguerre Point?

MR. NELSON: About five miles. It's down Hallwood Boulevard.

MR. MINASIAN: Okay. And effectively the juvenile fish sizes that you will find frequently above Daguerre and below Daguerre, is it your view that those sizes would be the same proportionately?

MR. NELSON: I believe at this time of year they would be fairly proportionate, yes.

MR. MINASIAN: And have you done some sampling to

determine the size of the fish being captured five miles below Daguerre is approximately the same proportion of the population you would find above Daguerre?

MR. NELSON: I have not done that for this time period, but I have no reason to believe that they would be substantially different at this time of year.

MR. MINASIAN: Now, in addition I note that you show the numbers of fish in different tabulations along the left side. That is you're taking the number of fish of various sizes and you're using different scales in each of the three charts. Is there a reason for that?

MR. NELSON: It's relative to the number of fish

captured either at the screen or at the rotary screw trap. And it's being driven by the actual number captured.

MR. MINASIAN: Now, the size of the fish does determine what part of the river it prefers to frequent, does it not, in terms of bank or the main channel?

MR. NELSON: They use -- yes, different size fish use different habitats.

MR. MINASIAN: Okay. And so when we look at the rotary screw trap five miles below, in order to have a direct comparison in regard to the population being pulled into the intake channel of the Hallwood-Cordua canal, we would have to make sure that the rotary screw trap was sampling the same side of the river or bank of the river

or main stem of the river, would we not?

MR. NELSON: I think I know where you're going. And the answer is that the Hallwood-Cordua diversion is probably sampling a much greater habitat type than is the rotary screw trap. It is taking off -- "it" meaning the Hallwood screen is on the bank and you are capturing those fish that would be associated with the stream margins as it comes down.

It is also taking quite a deep area also, mid-channel -- not mid-channel, but into the water column. And so it's sampling that habitat also. Whereas, the

rotary screw trap is basically just sampling the surface.

MR. MINASIAN: And there are differences in terms of where under 40-millimeter or under 65-millimeter fish would prefer to be in the water column, aren't there?

MR. NELSON: Yes. And I would suspect a very much larger number would show up in the Hallwood-Cordua diversion simply because of its location.

MR. MINASIAN: Well, if that was so, why couldn't we go out and put a net in the Hallwood-Cordua canal ahead of the screen and see how many under 40 and under 65 we picked up at the time that the screen trap was registering no fish?

MR. NELSON: I mean if you want to spend the money, you could do that. I see no purpose in it, because I do

believe that it is taking a representative sample being exposed to the diversion just as the representative sample of fish in the river being expose to the rotary screw trap.

MR. MINASIAN: So in your view, as an example, on the 17th of April it appears the rotary screw trap picked up 20 fish of a size under 40. And the Hallwood-Cordua picked up none. Now, would you have be able to tell us how many, cfs were being diverted on April 17 at the

Hallwood-Cordua?

MR. NELSON: I actually believe I was out there that day.

MR. MINASIAN: That's what I'm asking you.

MR. NELSON: I didn't look at the diversion rate. But what I recall, I believe it was that date, was that there was at least three foot of water, two to three feet of water going through and present at the screen.

MR. MINASIAN: Right. But that's three feet in height, isn't it?

MR. NELSON: That's correct.

MR. MINASIAN: Okay. And you don't know how many cfs it is, do you?

MR. NELSON: No. It's probably in excess of 100 to 200 cfs, I said at the minimum.

MR. MINASIAN: That's your estimate?

MR. NELSON: Yes.

MR. MINASIAN: Now let's talk about the significance of these figures in regard to Mr. Cramer's study in 1993. Mr. Frink has been good enough to give me a copy of his copy of this.

Do you remember that they basically monitored juveniles from the first day that the gates were opened through the training levee until the middle of August?

MR. NELSON: I recall something of that testimony. I'd like to see the document, but go ahead.

MR. MINASIAN: Okay.

MR. NELSON: We'll share.

MR. MINASIAN: We'll share.

MR. NELSON: That's okay. Go ahead. Go ahead.

MR. MINASIAN: Do you see they say, (Reading):

"We sample every day that water was diverted into the canal until July 22nd, at which time we stopped sampling, because we were not catching any juvenile chinook"?

MR. NELSON: Yes.

MR. MINASIAN: Okay. And do you remember that one of the reasons why Mr. Cramer was trying to figure out what size fish were being caught at the Hallwood-Cordua canal is to try to determine how the 27 fish that were in

the pond in front of the training levee got there?

MR. NELSON: As far as the number of fish that he captured, yes.

MR. MINASIAN: Yeah. And do you remember that once they opened the training level, the 27 came through and that was the end of it, there were no more fish?

MR. NELSON: No. That's not the case.

MR. MINASIAN: Okay.

MR. NELSON: What his data demonstrates is that based upon the trap efficiency of the size of fish he tested no more fish came through. And he based that trap efficiency upon the size of fish that were captured at the time of year at the Hallwood-Cordua diversion. And that diversion is only effective at capturing fish that are generally larger than 65 millimeters.

MR. MINASIAN: Okay. Well, look -- you've got the study in front of you now. If, in fact, the Hallwood -- the South Yuba-Brophy gabion is leaking fish, why aren't fish being caught throughout the period up to July 22nd of varying sizes?

MR. NELSON: There could be a variety of reasons. In our 1992 testimony we did indicate that there were substantial numbers of young-of-the-year, or fry-size salmonids present behind the diversion. But also you're looking at an area that is -- there are predators in the

diversion, or in the pool behind the rock gabion.

MR. MINASIAN: Okay. Let's stop there.

MR. NELSON: Also --

MR. MINASIAN: Go ahead. Go ahead.

MR. NELSON: -- I would say, and this is based on my

professional judgment, is that the size of fish that Mr. Cramer indicated that he caught were smolt-size fish and larger. And so there may be a tendency for those fish to exit the diversion as opposed to fish that may be juvenile fry-size that may be rearing in there.

MR. MINASIAN: Let's break it down, then. First, there could have been predators either ahead of the trap --

MR. NELSON: Right.

MR. MINASIAN: -- is that your first assumption?

MR. NELSON: I have seen predators in there, squawfish.

MR. MINASIAN: Okay.

MR. NELSON: Larger trout.

MR. MINASIAN: Okay. Now, Mr. Odenweller swam this. Mr. Smith of U.S. Fish and Wildlife Service swam this. Mr. Cramer studied it. Did anybody indicate to you that throughout the irrigation season predators were thriving on juvenile salmon that went through the gabion before they got through the training level?

MR. CUNNINGHAM: Mr. Brown, if I might?

H.O. BROWN: Mr. Cunningham.

MR. CUNNINGHAM: Mr. Brown, this question goes

beyond the scope of the rebuttal testimony provided by this witness. His testimony on this whole subject went to the efficacy of the Hallwood-Cordua fish screen as compared to another screen, which is clearly identified in a size class of fish not evident by those found by the Hallwood-Cordua screen.

Mr. Minasian now is asking questions about the predation behind the gabion at the South Yuba-Brophy diversion. And this whole line of questions goes far beyond anything provided in the rebuttal. Mr. Nelson never testified at all in rebuttal about what other elements, or problems were identified with the South Yuba-Brophy screen.

H.O. BROWN: Thank you, Mr. Cunningham.

Mr. Minasian.

MR. MINASIAN: I think he just answered that the reason why the information regarding the Hallwood-Cordua screen efficiency and the size contained in Exhibit 42 doesn't correlate to captures in the period of May 7 through July 22nd of 1993 is because there could be predators between the gabion and where the trap was located. I would think I would be entitled to pursue

that.

H.O. BROWN: Mr. Cunningham?

MR. CUNNINGHAM: Mr. Brown, if I might. Last I understood the nature of this process, the questions asked in cross went to the direct testimony provided in rebuttal, not as a way to explore otherwise improper cross.

To the extent that Mr. Minasian is continuing to pursue other elements that may be a problem in the South Yuba-Brophy diversion, yes, I chose not to object to the first question, perhaps, I was mistaken. But he has now obtained an answer that he wishes to pursue, the original question and the original answer themselves exceeded the scope of rebuttal testimony provided by this witness.

H.O. BROWN: Thank you.

Mr. Frink, do you have an opinion on this?

MR. FRINK: I do believe that the scope of the cross-examination is exceeding the scope of the rebuttal at this point.

H.O. BROWN: I agree, Mr. Frink.

Mr. Minasian.

MR. MINASIAN: All right. Let me go into it in a different way. When I look at Exhibit 42 and I see the sizes of the fish being caught in the rotary screw trap in the month of April in 2000, am I correct that we're

looking at 60 fish on April 21 of a size of 80 millimeters or larger?

MR. NELSON: What day was that for?

MR. MINASIAN: April 21 just, as an example -- excuse me, April 20th, your lower chart.

MR. NELSON: April 20. And how many were captured in the rotary screw trap of 80 millimeters or larger?

MR. MINASIAN: Yeah.

MR. NELSON: Approximately, between 20 and 25 fish, approximately 22 fish then.

MR. MINASIAN: Okay. Then let's go up above on the same date, between 40 millimeters and 80 millimeters, 125 caught in the rotary screw trap?

MR. NELSON: That's approximately correct, yes.

MR. MINASIAN: Okay. And then we go up above and there's about -- it looks like 16 40-millimeter or smaller?

MR. NELSON: Yes.

MR. MINASIAN: Okay. So about 100 fish of these ranges are being caught by 33 cfs rotary screw trap sampling on a given day; is that correct?

MR. NELSON: Approximately, yes.

MR. MINASIAN: Okay. Do you have an explanation for why similar numbers aren't being detected at the trap run by Mr. Cramer in 1993 during any of the periods from the

beginning of the diversions through the summer?

MR. NELSON: Say that one more time.

MR. MINASIAN: Okay. Well, we know the rotary screw trap is sampling 33 cfs, don't we?

MR. NELSON: Well, it's relative to the flow in the river but, yes, a 1,000 cfs that's approximately correct.

MR. MINASIAN: And we know that the Brophy-South Yuba diversion at times diverts more than that, don't we?

MR. NELSON: Yes.

MR. MINASIAN: Okay. Well, why did the sampling in 1993 not pick up these sort of magnitudes of small fish if the gabion leaks fish?

MR. NELSON: It comes back to the original question you asked me: Why aren't the fish showing up there in Mr. Cramer's Fyke net? And the answer would still be the same:

Is that there can be losses within the -- well, first of all I would say, that what's going to go through the gabion, as we've testified to previously both at this hearing and the original hearing, is the small fry-size fish.

So somewhere above the 40-millimeter range. I believe above the 40-millimeter range, in that neighborhood, you're not going to expect to see those fish present in or behind the gabion unless it's overtopped.

MR. MINASIAN: Okay. So the -- you would expect to see, first, very small-length fish in the period of April, May, June going through the gabion, because that's the size of the intersizes between the rocks; is that correct?

MR. NELSON: That's correct.

MR. MINASIAN: Okay. Let's look at Page 16 of Mr. Cramer's report, because on that he has itemized the 26 fish by mean length. And they go 106; one fish on May 13, 106 millimeters long. That's not small, is it?

MR. CUNNINGHAM: Mr. Brown, if I might, I'd object again. This is going far beyond the scope of rebuttal. If Mr. Minasian wished to ask this witness to evaluate and examine Mr. Cramer's testimony, the time for that was during his original presentation of testimony some weeks ago.

MR. MINASIAN: Wait a minute.

MR. CUNNINGHAM: His rebuttal today has been solely limited to a comparison of the efficacy of two screens, one which clearly does identify in the system at present the existence of small juvenile salmonids. What also has happened is that in the same period of time the Hallwood-Cordua screen does not identify those same salmonids or appear to capture those same salmonids.

The assumption and opinion then formed was that there is a problem in using the Hallwood-Cordua screen as

some kind of benchmark statistical sampling methodology on this system. And that's his entire scope of testimony.

He did not come here to dissect Mr. Cramer's testimony and presentation in the 1992 hearing. And I think this is far outside the scope of the rebuttal.

H.O. BROWN: Mr. Minasian.

MR. MINASIAN: I won't consume your time. Basically, this data relating to the sampling in April of 2000 was not available when he testified before. Any purported significance of it was not available.

It has been brought here today to basically cast doubt upon testimony and test results submitted by us. This is our one chance to basically ask whether or not Mr. Nelson's conclusions are justified. And I know him to be a good-faith person. He will try to answer and tell us where his conclusions may be a little bit weak, let's say.

H.O. BROWN: How many more questions do you have?

MR. MINASIAN: Well, I don't want you to think I'm filibustering here. I would guess I have about 15 minutes of Mr. Nelson.

MR. CUNNINGHAM: Mr. Brown --

H.O. BROWN: On the screen issue?

MR. MINASIAN: On the screen issue.

MR. CUNNINGHAM: Mr. Brown, if I might. This is not

only starting to become outside the scope, this is getting

to be repetitive. And I have to honest, I think Mr. Minasian used a word I would have chosen in "filibustering."

This is an attempt to avoid examining the other witness that I presented here, at great cost. And I find this to be, honestly, troublesome. And I'd use other words, but I'm trying to be polite.

We brought this witness here, to avoid asking this witness questions because they wish to go home, spend 24 hours in examining the testimony that she presented so that they can better make their cross-examination, this to me is a difficult question for you to confront.

I have today already been faced with cross-examining witnesses presented by Fish and Wildlife Service, without the luxury of an overnight review of their testimony. Tomorrow I'm going to hear probably the rebuttal presented to us by the Yuba County Water Agency. And, again, I will not be given the luxury of taking an overnight leisurely look at their testimony to come up with relevant cross.

We are here, it is the time to do this. Mr. Brown, I'd ask that if Mr. Minasian has questions for these witnesses we proceed. And we do not do this by

spending another 15 minutes asking Mr. Nelson about the rotary screw trap and the Hallwood-Cordua fish screen.

H.O. BROWN: Thank you, Mr. Cunningham.

Gentlemen, Mr. Cunningham presents a rather strong argument. If you have proper questions for rebuttal, please, proceed and ask those. If you don't, I would appreciate it if you would terminate your cross-examination on this subject.

If there's other people here that will follow you, Mr. Minasian, that have rebuttal testimony, I will accommodate them to the extent that they're willing to be accommodated. And that, perhaps, may cut the slack Mr. Lilly looking for. But if not, then, Mr. Lilly is up.

So, please, stick --

MR. MINASIAN: I'm sure I'll have at least 20 minutes for Ms. Rich myself.

H.O. BROWN: That's fine.

MR. MINASIAN: It may be quite amateurish, but --

H.O. BROWN: Address them to the rebuttal then, Mr. Minasian, and we'll proceed in that manner.

MR. MINASIAN: Could the Chair give me some guidance as to what the limits of cross-examination of Mr. Nelson regarding the significance of these sampling data in

regard to the Brophy -- South Yuba-Brophy screen is?

Because we are -- you know, we continually get shot at in regard to the screen, but this is the first time they've actually come out with some new data in regard to

the screen. Now, how far can I go on this?

H.O. BROWN: Well, you have made some, I think, very appropriate points in your cross-examination already.

MR. MINASIAN: Okay.

H.O. BROWN: Mr. Minasian, I don't know how much further you need to go on this. I think your point is made.

MR. MINASIAN: Okay.

H.O. BROWN: To that extent, you may proceed and I'll recognize it when I see it.

MR. MINASIAN: Good. Don't hesitate to be abrupt with me, Mr. Brown.

H.O. BROWN: You're a gentleman, Mr. Minasian.

MR. MINASIAN: Well, you haven't so far, but it's -- Now, do you see any sizes, John, that would be less -- the smallest size fish that they caught in almost two-and-a-half months is about 106 millimeters; isn't it?

MR. NELSON: Yes. But what I was indicating by my testimony is that you do not have any indication of whether a Fyke trap was capable of capturing those 65

millimeter and less fish. He used an average size which, I believe, was 80 millimeters, in that size range to calibrate his trap to see what the efficiency was of the Fyke net.

MR. MINASIAN: Well, we know that the trap caught

two steelhead of 25 millimeters, don't we?

MR. NELSON: I believe it was in that size range that there were two steelhead present, yes.

MR. MINASIAN: So it was catching steelhead of that size. Would there be any reason to think it would not catch juvenile chinook of that size?

MR. NELSON: Yes. We only know that two juvenile steelhead in the 25-millimeter range were captured. We have no idea how many were exposed to -- or came in contact with the Fyke net, because we have no idea what the efficiency is.

MR. MINASIAN: Well, we do.

H.O. BROWN: We'll go off the record for just a minute.

Mr. Frink, I'd like to talk to you.

(Off the record from 3:21 p.m. to 3:22 p.m.)

H.O. BROWN: Back on the record. Proceed.

MR. MINASIAN: Okay. We do know what size of fish

goes through the gabion, because the Department of Fish and Game did a catch-and-release study in 1989 and detected no fish passing through the gabion even though they released some 7,000 juveniles in the intake channel, don't we?

MR. NELSON: No --

MR. CUNNINGHAM: Mr. Brown, again -- I'm sorry,

Mr. Minasian, I appreciate your efforts.

Mr. Brown, I'm going to object. Again, this is outside the scope of the rebuttal. This witness has not testified at all about Fish and Game's release, or attempts at fish in any attempt to quantify the verbosity of the gabion screen for small fish.

This witness has testified to a very specific, very focused element that should be considered by this Board, in part in rebuttal to testimony and intended to be rebuttal to testimony provided by other parties. Again, this goes beyond the scope of the rebuttal.

H.O. BROWN: Mr. Frink.

MR. FRINK: Yes, Mr. Brown. In this instance I think I would agree with Mr. Cunningham. I thought you had already ruled regarding the scope of proper cross-examination on rebuttal.

I think the exhibit that was introduced regarding

the fish screen and the number of fish that were caught in the fish screen versus the number of fish that were caught in the trap, the purpose of that exhibit was explained. It was a limited purpose. And the witness has not attempted to discuss the information in Mr. Cramer's report other than to explain that in his opinion on the basis of the evidence stated in this exhibit, that the screen and the trap have a difference in the size of the

fish that they captured.

I think that the questions have been beyond the scope of proper cross-examination on rebuttal and they continue to be so.

H.O. BROWN: All right, Mr. Frink.

Mr. Minasian, do you have a response?

MR. MINASIAN: No. I submit it to the Chair.

H.O. BROWN: All right. I counsel you and ask you this time to move on.

MR. MINASIAN: Okay. Are there any plans to provide for any sampling of the Brophy-South Yuba diversion during the same period that the rotary screw trap is operating?

MR. NELSON: Not at this time.

MR. MINASIAN: If you were to design a study to try to provide some true correlation to the rotary screw trap

that you're running in the Yuba River, what would you have South Yuba and Brophy do?

MR. CUNNINGHAM: Mr. Brown, if I might, again, this is outside the scope of rebuttal. This witness has testified only to the extent that an assumption made by Mr. Cramer --

MR. MINASIAN: I'll withdraw the question, so we don't get any more final argument from Mr. Cunningham. But it would be nice if somebody told us what additional data they want, if they want to use this in some way in

regard to the screen.

So, Ms. Rich, you've done substantial work in regard to temperature and chinook salmon; have you not?

DR. RICH: First of all my name is Dr. Rich --

MR. MINASIAN: Dr. Rich, I'm sorry.

DR. RICH: Yes, I have.

MR. MINASIAN: And, Dr. Rich, would you explain to us the interrelationship between the food source, the temperature condition, and the consumption by juvenile or fry?

DR. RICH: I believe I already did that, but I will certainly do it again.

MR. MINASIAN: Please do it on the Yuba River so we can be specific.

DR. RICH: The Yuba River is similar to any other river in terms of the general functions that the fish has to abide by. We know several things about it. One, we know for certain that the fish are not being feed maximally out there. And, therefore, whatever water temperatures one would determine to be optimal in a laboratory situation where the fish are fed maximally, this would not apply to the Yuba River.

In other words, the fish would need a lower temperature. And I believe that when we do not have bioenergetic-type of studies on a particular river system

that it's best to err on the side of caution for the fish. And there's nothing that's been presented so far to suggest otherwise as far as I'm concerned.

The fishing go out and they feed, the fry feed, the juvenile feed as they're proceeding through their life. And as the water temperatures increase, getting enough food so that the fish can actually survive and sustain their metabolic rates becomes increasingly difficult.

And, in addition, as I said previously, they are constantly having to avoid predators. There may be other factors in the Yuba River that I'm not aware of. There

may be other stressers, the bottom line is being a fish is a stressful existence.

MR. MINASIAN: Right. So let's take the Yuba River and IFIM study that was done by Beak and resulted in the 1991 Fishery Management Plan. Is one of the elements of IFIM to determine what the optimum environment is for food production?

DR. RICH: I did not review the IFIM for this project. That was not my task. My task was simply to review the water temperature information.

MR. MINASIAN: So when the Department of Fish and Game did its 1991 study and came before the Board in 1992 and handed in a document that said during the rearing

phase this flow and this condition is optimal for juvenile or fry, would they have to know what temperature and food conditions were present?

DR. RICH: I have not reviewed that document, so I really can't answer the question.

MR. MINASIAN: Okay. Would you be able to give us an idea of how one would go about studying the peculiarities of food production in the area above Daguerre Point and below the Garcia gravel pit in terms of food production and temperature?

MR. CUNNINGHAM: Mr. Brown, I'd like to object.

This goes outside the scope of rebuttal. This witness did not testify about food production between certain fixed point on the Yuba River. And I think to ask her now to form a new opinion about information that was not part of her rebuttal, again, goes outside the scope of any possible cross-examination here.

H.O. BROWN: Mr. Minasian.

MR. MINASIAN: And the relevance would be, and the relationship to the testimony would be that we are being told that Dr. Rich has an opinion in regard to the optimum temperature conditions for various life stages of juvenile chinook and steelhead upon the Yuba River.

I, certainly, ought to be able to go in to whether or not that opinion is based upon the actual food

production conditions on the river.

H.O. BROWN: Did you talk about food production at all, Dr. Rich?

MR. CUNNINGHAM: Mr. Brown, part of my objection here is to the extent that Dr. Rich talked about food assimilation as part of the growth process, she spoke in both general terms and she also spoke in direct rebuttal to specifically identified statements provided in Exhibit 19 by the Yuba County Water Agency.

This witness is not presented as a person who is to formulate research criteria for future study on the Yuba River, nor is she presented as somebody who is going to go out and dissect each element of the Yuba River itself.

Her testimony was very specifically focused. The questions that we asked were very specifically focused as to pieces of testimony that she was seeking to rebut. This, again, these generalized questions are fine if we are to talk about her as an original witness in our direct presentation where the scope of cross is routinely rather broad.

If you wish to extend the scope beyond cross in this proceedings, your Honor, that's fine with us. But I would then expect the same courtesy extended to me when I wish to cross-examine witnesses to come. I don't think

that's going to get us very far. And it's going to extend the time of this hearing substantially.

MR. MINASIAN: I think I can rephrase the question and get around what I perceive to be Mr. Cunningham's objection.

May I withdraw the question and rephrase it?

H.O. BROWN: You may withdraw the question and rephrase.

MR. MINASIAN: You testified in regard to temperature and the propensity or the ability of juvenile salmon to uptake food, to use food efficiently.

Is it correct that there are certain temperature conditions at which the metabolic processes of the small salmon are depressed by the temperature of the water?

DR. RICH: Are you talking about lower temperatures? I'm not understanding.

MR. MINASIAN: Yes. That's --

DR. RICH: Okay. It would have to be a really freezing water, literally, for any of the fish that reside in this river. For example, the fry, which is what I'm assuming you're referring to, do best at temperatures in the low to mid-50 degrees Fahrenheit.

If one were --

MR. MINASIAN: Do best, you mean metabolically they grow faster?

DR. RICH: Yes.

MR. MINASIAN: Okay. Now, let's take that and the organisms which they eat in a natural river compared to a laboratory are different, aren't they?

DR. RICH: This is true.

MR. MINASIAN: That is the river has to produce the

food rather than the pellets being dropped in the laboratory tank; isn't that true?

DR. RICH: Yes, that's true.

MR. MINASIAN: Okay. So at what temperature is the optimum production of food in the river?

DR. RICH: There's no way to determine that now, we do not have the data.

MR. MINASIAN: Well.

DR. RICH: This is the information that when we don't have data from a physiological standpoint in terms of making sure that the fish are not stressed, I certainly would not recommend increasing water temperatures to, theoretically, increase growth rate. One can assume that they are probably growing fine at the temperatures that they are provided, in the low 50's.

MR. MINASIAN: Well, but we do know that benthic organisms and other food, which is common in the Yuba River, because we're plentiful at warmer temperatures, don't we?

DR. RICH: I don't necessarily know that about the Yuba River.

MR. MINASIAN: Well, you've studied other rivers, haven't you?

DR. RICH: Other rivers was not part of my rebuttal.

MR. MINASIAN: Okay. Well, is it correct that there's a balance that needs to be maintained between the temperature of the water in order to produce adequate food which juveniles or fry can consume, and maintaining the metabolic condition of the fish so that they can actually consume the food that's available?

DR. RICH: This is true.

MR. MINASIAN: Okay. Now, what have you done to come to an opinion in regard to what would happen to the food production, the organism production in the Yuba River if, in fact, we maintain temperatures at 56 degrees?

DR. RICH: What have I personally done?

MR. MINASIAN: Yes.

DR. RICH: I have not personally done anything.

MR. MINASIAN: How would one normally go about doing studying that issue?

DR. RICH: I could spend the next hour talking about how one could study it. I don't believe that was part of my rebuttal either.

MR. MINASIAN: Well, just, you know, until somebody

objects, kind of help me understand this.

MR. CUNNINGHAM: Mr. Brown, it's invited error.

H.O. BROWN: You're up, Mr. Cunningham. I think it

appears, unless the Chair gets really rough with Mr. Minasian, which I'm reluctant to do, we haven't had to do that throughout this hearing.

This is a difficult hearing. There's a lot involved here on both sides. And I'm trying to cut enough slack for all sides to where you can ask the questions and get the answers and get the information on the record to help best determine how this Board should act.

Mr. Minasian, when you're through we will adjourn for the day.

MR. MINASIAN: I appreciate it, but this is I think really critical to understanding the weight of Dr. Rich's testimony. If I may go on?

H.O. BROWN: That's true. But, again, I'm going to ask you one more time --

MR. MINASIAN: Is this pretty obvious to the Board that temperature effects food production?

H.O. BROWN: I can understand where you're heading.

MR. MINASIAN: Okay.

H.O. BROWN: Your point has been made. And I think we're ready to move on.

MR. MINASIAN: Dr. Rich, the laboratory tests that

are referred to in your chart which expresses thermal stress, those are laboratory tests, they're not attempts

to correlate to the actual conditions in the Yuba River?

DR. RICH: Some of the studies are laboratory, other ones are not.

MR. MINASIAN: Let's, as an example, figure out the origin of Fish and Game 38, which is the juvenile stage of life. What rivers does that come from, or what type of studies does that come from?

DR. RICH: Basically, a large variety of different kinds of studies, if you include the thermal stress zone that I've got on there. I have already mentioned that the maximum growth rate and the maximum food conversion efficiency curves came from both Brett, et al., 1982, and my studies on the American River. In addition --

MR. MINASIAN: Now, your studies on the American River were hatchery studies, were they not?

DR. RICH: These were hatchery studies.

MR. MINASIAN: So they're equivalent to lab, but they're done in an open-air hatchery type of conditions?

DR. RICH: No. Actually, it was a laboratory study. It wasn't open air.

MR. MINASIAN: Good. Thank you.

DR. RICH: In addition, the rather broad range of thermal stress is just a summary of literally dozens of

different kinds of studies that various people have done on juvenile salmonids. They're temperature tolerance studies. They're growth studies. They're food conversion studies. They're preference studies, some were laboratory, some were field.

I believe there's an effect -- I know that there's a list of all these various studies in an exhibit. And I don't know the number of it, but it was an exhibit that Fish and Game provided, which was my testimony in 1997 on the Delta Wetlands hearings.

And in the back is a long, long, list of tables that have a summary of all the various water temperature studies on chinook salmon and steelhead -- actually, chinook salmon.

MR. MINASIAN: Now, in a Sierra stream like the Yuba River, the food source are natural organisms that develop in the water and they develop because of nutrients, temperatures, air temperature and water temperature; isn't that correct?

DR. RICH: Yes.

MR. MINASIAN: Okay. In the basis of this chart are the, basically, alfalfa pellets or other things that are feed to the fish to check their metabolic intake and their growth rate?

DR. RICH: Some of the studies that are summarized

on this figure were field studies, in which case people actually fed the fish bugs or invertebrates, other ones were moist pellets. There were a variety of food sources.

MR. MINASIAN: Do you have an opinion as to whether or not -- strike that. Let me strike that.

So when we look at this line in this gray area, if I give you a hypothetical that it's necessary to get into the gray area, the potential thermal stress area in order to produce a maximum or optimum food supply, do you have an opinion as to whether or not this line would basically move over -- all of the lines would move over, that is do they move in proportion to each other?

DR. RICH: No, they don't.

MR. MINASIAN: Okay. That is that you would end up with a different growth rate line even though you might have more food; is that correct?

DR. RICH: Well, I think we want to get away from the concept of growth rate, that's not what shows what is optimum for the fish. We want to look at food conversion efficiency and for preference. Unfortunately, it required few of those kinds of studies on growth rate.

But the few studies that we do have on food conversion efficiency for salmonids and, specifically chinook and steelhead, demonstrate that the food conversions, the maximum food conversion efficiency

temperature is always going to be lower than the maximum growth rate temperature.

MR. MINASIAN: What do we know about the conversion rate of various types of natural organisms such as we would find in the Feather, or Yuba by juvenile fish? Are there certain organisms that create a better growth rate, or a higher growth rate?

DR. RICH: Not necessarily. There's a wide range -- it depends on what the fish are eating. If they're eating invertebrates, if they're eating other fish, there's no "yes" or "no" answer to that. It's kind of a variable.

MR. MINASIAN: Is there a theory among some scientists in your field that one of the keys that initiates immigration is the absence of a certain type of food that is preferred by fry or juvenile?

DR. RICH: No.

MR. MINASIAN: Is there any relationship between the food source and immigration, going out to the ocean?

MR. CUNNINGHAM: Mr. Brown, if I might. Again, this goes outside the scope of rebuttal. And I'm trying to be reluctant to raising my objections but, again, I must re-assert it at this point.

MR. MINASIAN: The devil made you do it, huh?

MR. CUNNINGHAM: It did.

H.O. BROWN: You've been very generous,

Mr. Cunningham.

MR. MINASIAN: Yeah. I appreciate that.

So when we look at the line difference between the -- if I may withdraw and rephrase.

When we look at the line difference of thermal stress between the chinook juvenile and the fry, you've drawn that line four degrees cooler for fry than for juvenile; is that correct?

DR. RICH: That's correct.

MR. MINASIAN: Okay. And do you have any reason to believe that that, in fact, is the optimum -- strike that.

Do you have any reason to believe that that is the correct temperature in terms of food production, benthic organisms on the Yuba River, or is this a laboratory line?

DR. RICH: That is both a laboratory and a field line. None of the studies that are depicted on here were on the Yuba River.

MR. MINASIAN: Okay. Could you tell us which rivers led you to believe that the line should, in fact, be drawn at 56 rather than 60 for the fry life stage?

DR. RICH: I believe there were some studies that were done on the Sacramento. There's been studies that have been done in the Pacific Northwest.

MR. MINASIAN: These are other than laboratory

studies?

DR. RICH: Some of them were lab, some of them were field. As I've said before, the laboratory studies represent the optimum situation. So if you have a situation where you find that 60 degrees Fahrenheit is the optimum water temperature for salmonid juvenile, then we as physiologists know that when you get out to the real world that that 60 degrees optimum is actually probably not going to be relevant.

Basically, it's apple and tomatoes. The field studies and the laboratory studies are very, very different. The one thing we know is that when you go into the field and you look at a salmonid in the field, that the optimum temperature for those fish in the field given the same size would be lower than the optimum temperature in the laboratory where the fish are fed maximum rations. In the field the fish always feed less than maximally. 60 percent is probably high.

MR. MINASIAN: And the reason they feed less than maximally is they don't have to put up with predators in the lab circumstance, isn't it?

DR. RICH: Rephrase your question.

MR. MINASIAN: Yeah. That is they don't have to

find a place to hide and they don't have to avoid predators and consume energy in the lab, do they?

DR. RICH: Well, they consume a different kind of energy, which is metabolic energy, so you're correct in terms of water temperatures. In terms of predators, no, unless you put a predator, or you personally go in and grab the fish. You're right, in the laboratory, theoretically, they do not have predators.

MR. MINASIAN: Okay. So if we maintained water temperature for the periods of March, April, May, why not June, at 56 degrees in the Yuba River and it produced less natural food, how would you approach that in terms of balancing whether that's good to main the fish in good condition, or whether or not it's bad?

DR. RICH: It's a very hypothetical question. I really don't think it's relevant to my rebuttal. I said nothing about jerking water temperatures around during the spring months.

I, basically, testified that we know in terms of these fish species and these life stages, these temperatures you don't want to exceed, unless you know more. If you know more then you ultimately can determine in a field situation that 60 degrees Fahrenheit you could

validate, that would be great. If you can't validate it, physiologists, stress physiologists always err on the side of caution --

MR. MINASIAN: That is: Make it colder?

DR. RICH: I'm saying make it colder. I'm saying not make it warmer. I think we're talking about two different things here. I'm not suggesting that you go out and make the water colder. I'm suggesting that you not let the water go up.

MR. MINASIAN: Okay. What do you understand to be the natural temperature regime before any dams on the Yuba River?

DR. RICH: I don't have any data on that. I'm not familiar with that.

MR. MINASIAN: And you are aware that there is another stretch of river below the Yuba called the Feather and then there's another stretch called the Sacramento, which the emigration pattern has to go through?

DR. RICH: Yes, I'm aware of that.

MR. MINASIAN: Okay. Now, can you suggest to us how the temperature regime of the water in the Yuba River could be maximized in terms of producing growth, maximizing the number, and giving them the best chance of surviving in their emigration pattern?

DR. RICH: No, I can't suggest that. It's a hypothetical.

MR. MINASIAN: Okay. So really what your testimony is in regard to laboratory results at various temperatures with various feeding regimes, other than the studies

you've told us about which were in stream conditions.

DR. RICH: Is that a question?

MR. MINASIAN: Yeah. That's what I'm trying to understand. What's the extent of your testimony in regard to what this Board should order in regard to temperature?

DR. RICH: With regard to temperature, I'm not going to suggest what the Board should order. That's not my job. With regard to temperature and salmonids I'm basically stating that you don't want to exceed the optimal thermal range as we know it.

And if we don't know it for a field situation then you want to err on the side of caution and use the temperatures that we do know are not stressful.

MR. MINASIAN: Okay. If I gave you a copy of the Beak IFIM study and you studied it tonight and came back tomorrow and it, in fact, talked about food production at various temperatures and various reaches of the river, could that help you make a recommendation as to actual

temperature conditions that you would recommend on the basis of your experience?

MR. CUNNINGHAM: Mr. Brown, I'm going to object again. This is outside the scope of rebuttal. This witness was not presented as someone who would opine about what is the desirable temperature levels on this river.

H.O. BROWN: I would suggest that when a question is

asked of your witness and it was not part of the rebuttal testimony that you just respond with "no opinion," and move on. Maybe that would be quicker.

How much more time do you need, Mr. Minasian?

MR. MINASIAN: Oh, 10, 12 minutes.

H.O. BROWN: We're going to break. This is a good time. I said we were going to break at ten till.

MR. MINASIAN: Okay. Thanks.

MR. CUNNINGHAM: Mr. Brown, if I might?

H.O. BROWN: Yes.

MR. CUNNINGHAM: Mr. Brown, I appreciate the time, I know you need to break right now. May I ask, to the extent that Mr. Minasian is not going to continue his cross-examination tomorrow that both of them show up tomorrow with another two hours of cross-examination from Mr. Minasian of this witness --

H.O. BROWN: No, he has 12 minutes for tomorrow

morning.

MR. CUNNINGHAM: Thank you, sir.

H.O. BROWN: And then after that we'll be back on schedule with Mr. Lilly.

So 12 minutes in the morning, Mr. Minasian.

MR. MINASIAN: Thank you. Thank you for your patience.

H.O. BROWN: And if I forget, Mr. Cunningham, I'm

sure you will remind me.

MR. CUNNINGHAM: I will.

H.O. BROWN: Thank you for your patience all of you today. And we stand adjourned until 9:00 in the morning.

(The proceedings concluded at 3:49 p.m.)

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REPORTER'S_CERTIFICATE

STATE OF CALIFORNIA)
) ss.
COUNTY OF SACRAMENTO)

I, MARY R. GALLAGHER, certify that I was the Official Court Reporter for the proceedings named herein, and that as such reporter I reported in verbatim shorthand writing those proceedings; that I thereafter caused my shorthand writing to be reduced to typewriting, and the pages numbered 2286 through 2504 herein constitute a complete, true and correct record of the proceedings.

IN WITNESS WHEREOF, I have subscribed this certificate at Sacramento, California, on this 14th day of

May, 2000.

MARY R. GALLAGHER, CSR #10749